Master Maths 9 Worksheet 1
Whole Numbers 1

1

Name: _____

1. Write the following numbers in words.

(a) 7038

(b) 95 247

(c) 20 601 038

2. Write these numbers in numeral form.

(a) three hundred and four thousand, nine hundred and seven.

(b) fifteen million, twenty-one thousand and eight.

3. Without using a calculator ***add*** **100** to each of the following numbers.

(a) 8 (b) 9 652 (c) 59 979

4. Without using a calculator ***subtract*** **10** from each of the following numbers.

(a) 105 (b) 2004 (c) 34 109

5. Round the following numbers to the nearest 10.

(a) 82 (b) 5697 (c) 93 452

6. Complete this multiplication table.

×	2			10		
		56				
3			12			
	22					
	2					12
9					45	
		48		60		

7. ***Without using a calculator*** solve the following problems.

(a) $3 \times 4 + 2 \times 6$ (b) $3 \times (4 + 2) \times 6$

(c) $8 \times 3 \div 6 \times 12 \div 8$ (d) $3 + 5 \times 2 - 4 \times \frac{1}{2}$ of 6

(e) $8 + \frac{1}{2}$ of $(6 + 8) + 3 \times 4 \div 2 - (6 + 10) \div 2$

(f) $\frac{1}{2}$ of $(18 - 6 \times 2) + \frac{2}{3}$ of $(8 \times 3 + 18 \div 3)$

Master Maths 9 Worksheet 2
Whole Numbers 2

2

Name: _____

1. Write the following numbers as products of their prime factors in index form.

Example: $72 = 2^3 \times 3^2$

(a) 168 (b) 2160

2. Complete the following tables showing conversions to and from roman numerals.

Number	Roman Numeral
29	
33	
49	
87	
152	
229	
469	
880	
1383	
2697	

Number	Roman Numeral
	XXII
	XXXIX
	LVI
	XCIV
	CXVII
	CCCXVII
	DLXVII
	CMXLI
	MMDCLXXV
	MMCMXLIV

3. Without using a calculator evaluate the following.

(a) $\sqrt{36}$ (b) $\sqrt{(100 - 19)}$ (c) $\sqrt{23^2}$

(d) 7^2 (e) $3^2 + 4^2$ (f) $(12 - 7)^2$

4. Without using a calculator evaluate the following.

(a) 30×100 (b) 800×20 (c) 400×500

(d) $6000 \div 10$ (e) $8000 \div 200$ (f) $18\,000 \div 900$

5. Find the approximate answer to the following problem by rounding the numbers first.
A farmer stacked 89 bales of hay onto a truck.
Each bale weighed 32 kg.
What was the total weight of the hay on the truck?

6. Use a calculator to solve the following problems.

(a) $\dfrac{89\,112 \div 79}{5076 \div 9}$

(b) $\dfrac{230 \times (203 - \sqrt{7921})}{115 \times (301 - \sqrt{5329})}$

(c) $\dfrac{\dfrac{63733}{\sqrt{529}} - \dfrac{19110}{\sqrt{1225}}}{\dfrac{45333}{\sqrt{729}} - \dfrac{14808}{\sqrt{144}}}$

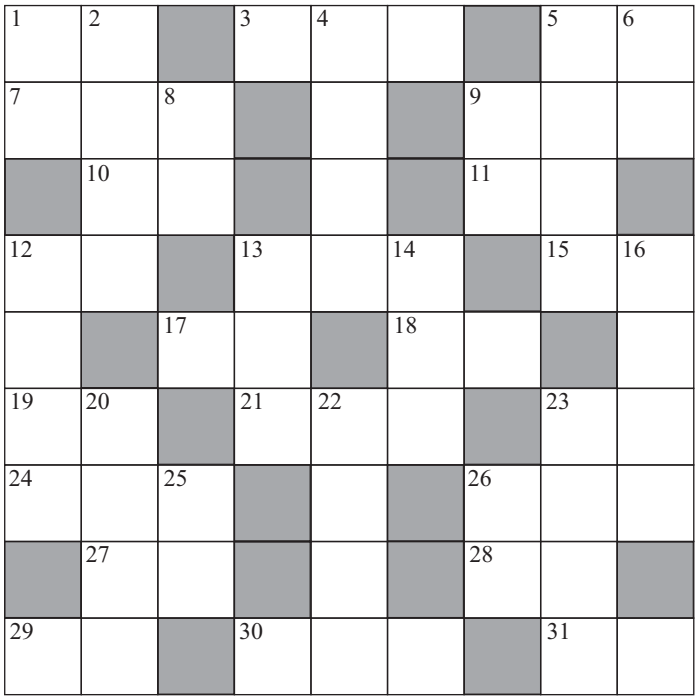
(d) $\dfrac{8^4 - 4052}{3^6 - 727} \div \dfrac{612 - 564}{\sqrt{(1099 - 523)}}$

(e) $\dfrac{5^5 - 2621}{2410 - 7^4} \times \dfrac{1307 - 1234}{\sqrt{(5329 \times 64)}}$

Master Maths 9 Worksheet 3
Whole Numbers 3

3

Name: _____



Clues Across

1. 117 - 28
3. DCXVII (Roman Numeral)
5. $\frac{87 + 10 \times 9}{3}$
7. The average of 154, 167, 168 and 187
9. CCVII (Roman Numeral)
10. $\sqrt{1 + 3 + 5 + 7 + ... + 19}$
11. A backwards fortnight
12. The number of hearts in a deck of cards
13. Product of 202 and 3
15. $3^2 \times 2^3$
17. Inches in a foot
18. $\sqrt{5^2 + 12^2}$
19. The number of days between the end of February and the start of June
21. The number of degrees in two circles
23. $\frac{1}{3}$ of 267
24. $\frac{1216}{2}$
26. The square root of 12 544
27. One quarter of 29 across
28. Three and a half decades
29. Half a gross
30. The number of sheets in a ream of paper
31. The tenth prime number

Clues Down

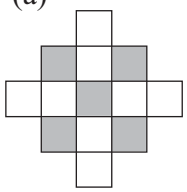
1. $(2x + 1)^2$ where $x = 4$
2. $(100 - 2)^2 + 9$
4. 2, 2, 4, 12, 48, 240, ☐
5. 17 more than 10 times 30 across
6. (LV) + (XLII) (Roman Numerals)
8. The number of degrees in a right angle
9. Two dozen
12. The year of the Atlanta Olympics
13. The sum of 218 and 409
14. One quarter of 2440
16. The largest palindrome number smaller than 3000
20. 4(293 + 178 + 32)
22. The number of minutes in two days
23. 3 × (16 down) - (3 across) - (9 across)
25. The number of keys on a standard piano keyboard
26. A baker's dozen

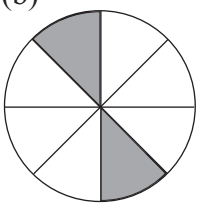
Master Maths 9 Worksheet 4
Fractions 1

4

Name: _____

1. What fraction of these figures is shaded?

(a)  ___

(b)  ___

2. Write the following fractions in their simplest form.

(a) $\frac{12}{18}$ ___ (b) $\frac{15}{55}$ ___ (c) $\frac{36}{48}$ ___ (d) $\frac{45}{72}$ ___

3. Complete the following equivalent fractions.

(a) $\frac{3}{5} = \frac{\square}{15} = \frac{\square}{40} = \frac{27}{\square}$

(b) $\frac{6}{7} = \frac{\square}{21} = \frac{54}{\square} = \frac{\square}{91}$

4. Change the following fractions to have the same denominator and hence arrange them in order from the smallest to the largest.

$\frac{2}{3}$ $\frac{5}{8}$ $\frac{7}{12}$

___ ___ ___

5. (a) Change $7\frac{3}{8}$ to an improper fraction.

___

(b) Change $\frac{88}{9}$ to a mixed number.

___

6. Write the first quantity as a fraction of the second in its simplest form.

(a) 20 cm : 1 m ___

(b) 20 seconds : 1 minute ___

(c) 80 cents : $4 ___

7. Evaluate the following without using a calculator.

(a) $\frac{3}{11} + \frac{5}{11}$ ___ (b) $\frac{5}{7} - \frac{4}{7}$ ___

(c) $\frac{2}{3} + \frac{2}{7}$ ___ (d) $\frac{3}{4} - \frac{2}{5}$ ___

(e) $2\frac{2}{3} + 3\frac{3}{4}$ ___ (f) $3\frac{4}{7} - 1\frac{5}{8}$ ___

(g) $\frac{6}{7} \times \frac{5}{12}$ ___ (h) $2\frac{7}{10} \times 4\frac{4}{9}$ ___

(i) $\frac{6}{7} \div \frac{2}{21}$ ___ (j) $2\frac{2}{3} \div 3\frac{5}{9}$ ___

Master Maths 9 Worksheet 5
Fractions 2

5

Name: _____

1. Find the following amounts.

(a) $\frac{1}{4}$ of 36 kg (b) $\frac{4}{5}$ of \$500

(c) $\frac{5}{8}$ of 64 m (d) $\frac{3}{4}$ of 420 kg

2. (a) How many quarters are in $3\frac{1}{2}$?

(b) How many tenths are in $4\frac{3}{5}$?

(c) How many sixths are in 12?

(d) How many 3's are in 14?

(e) How many $\frac{2}{3}$'s are in 8?

3. Use a calculator to solve the following problems. Give answers as proper fractions or mixed numbers.

(a) $2\frac{5}{6} \times (8\frac{1}{4} + 3\frac{3}{5})$ ____

(b) Find $\frac{3}{5}$ of \$4540

(c) $3\frac{1}{4} + 2\frac{3}{7} + 4\frac{7}{9} - 6\frac{3}{13}$ ____

(d) If a brick weighed $3\frac{1}{2}$ kg, what would 2450 bricks weigh?

4. An area of 2000 m^2 was to be paved with bricks.
One-quarter of the area was paved on Monday.
Two-fifths of the remaining area was paved on Tuesday.
Two-thirds of the remaining area was paved on Wednesday.
The remaining area was paved on Thursday.
(a) Find the area that was paved on each day.

Monday

Tuesday

Wednesday

Thursday

(b) What fraction of the area was paved on Thursday?
Give answer in its simplest form. ____

5. Blue and white paint was to be mixed so that three-quarters of the mixture was blue.
If 24 litres of blue was used, how many litres of white should be added?

6. A number of students entered a mathematics competition. Rounds of questions were asked and after each round a fraction of the students remained to compete in the next round.
After the first round of questions one-fifth of the students remained.
After the second round one-quarter of these students remained.
After the third round one-third of these students remained to compete in the final.
There were eight students in the final.
How many students entered the competition?

Master Maths 9 Worksheet 6
Decimals 1

6

Name: _____

1. (a) How many hundredths is eight tenths?

(b) How many tenths is twenty-nine hundredths?

(c) Place the decimal point in this number so there are seven thousandths. 58367801

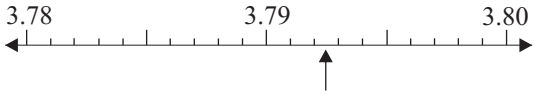
(d) What number is mid way between 18.76 and 18.85?

(e) Add four hundredths to 12.575.

(f) Write as a decimal number: sixty-seven thousandths

(g) Write in words: 0.52

(h) What number is shown on this scale?



(i) Write $15\frac{27}{1000}$ as a decimal number.

(j) Write 4.8901 in fraction form. ____

(k) Convert $\frac{5}{8}$ to a decimal.

(l) Convert $\frac{7}{9}$ to a decimal.

2. Round the following numbers to the nearest tenth.
(a) 2.531 (b) 6.329 (c) 12.9612

3. Round the following numbers to the nearest hundredth.
(a) 5.3019 (b) 0.7663 (c) 14.09731

4. Round the following numbers to two decimal places.
(a) 12.8714 (b) 8.0574 (c) 0.09371

5. Write the following numbers in scientific notation.
(a) 548 000 000 (b) 60 910 000 000

(c) 0.000 007 32 (d) 0.000 000 051 02

6. Solve the following problems without using a calculator.
(a) 8.9134×100 (b) $8931.5 \div 100$

(c) $0.003\,45 \times 1000$ (d) $54.789 \div 1000$

(e) $2300 \div 10\,000$ (f) $34.51 \times 100\,000$

Master Maths 9 Worksheet 7
Decimals 2

7

Name: _____

1. Use a calculator to solve the following problems.
Give answers correct to ***two*** decimal places.
(a) 5.89 × 7.325 (b) 67.893 ÷ 2.513

2. Jay is a motor cyclist. His times for each of two warm up laps of a circuit were 45.573 seconds and 45.539 seconds.
(a) What was the difference between his two lap times?

(b) Which was the ***fastest*** time?

(c) Mitchell's fastest lap time was twenty-two thousandths of a second ***slower*** than Jay's fastest time.
What was Mitchell's fastest lap time ?

(d) What was the average time of Jay's two warm up laps?

(e) The race was 26 laps of the circuit and Jay completed the race in 20 minutes 10.352 seconds.
What was Jay's average lap time?

(f) Jay finished the race 2.626 seconds in front of Mitchell. What was Mitchell's average lap time for the race?

3. (a) A box of oranges weighed 38.4 kg.
The average box contained 150 oranges.
What is the mass of the average orange?

(b) How many oranges would be expected to be in a 3 kg bag? Round answer to the nearest orange.

4. 500 sheets of paper was 56.8 mm thick.
What is the thickness of one sheet of paper.
Give answer correct to the nearest thousandth of a millimetre.

5. A scientist took a photo of a cell and after it was enlarged by a factor of 1000 it measured 3.68 mm. What was the actual size of the cell?

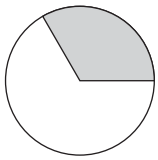
6. The length of a stalactite would increase by one tenth every year (its length at the end of a year was one tenth longer than its length at the start of the year).
A stalactite was 87.5 cm long. Find its length three years later.
Round the final length to one decimal place.

Master Maths 9 Worksheet 8
Percentages

8

Name: _____

1. Choose which is the best estimate of the percentage of this circle that is shaded.



A 10% **B** 30%
C 60% **D** 90%

2. A survey found that 43% of people had visited a zoo. What percentage of people had not visited a zoo?

3. A sample of gas contained 27.6% oxygen, 53.8% nitrogen, 6.4% hydrogen and the remainder was methane.
What percentage of the gas was methane?

4. Convert the following fractions to percentages.

(a) $\frac{1}{4}$ (b) $\frac{4}{5}$ (c) $\frac{5}{8}$

5. Change the following percentages to fractions in their simplest form.

(a) 20% (b) 76% (c) 18.75%

6. Write the first quantity as a percentage of the second.

(a) \$50, \$400 (b) 30 minutes, 5 hours

(c) 54 cm, 3 m (d) 250 g, 5 kg

7. Convert the following decimals to percentages.

(a) 0.39 (b) 0.845 (c) 0.028

8. Convert the following percentages to decimals.

(a) 61% (b) 7.5% (c) 21.6%

9. Without using a calculator find the following quantities.

(a) 50% of \$500 (b) 10% of 750 kg

(c) $33\frac{1}{3}$% of 60 m (d) 20% of \$400

10. Use a calculator to find the following quantities.

(a) 34% of \$4500 (b) 65.5% of 8000 kg

11. Hervey invested \$5200 earning 5.6% interest per year. How much interest will he earn in one year?

12. Out of 4000 people surveyed, 250 had needed surgery. What percentage of the people had needed surgery?

13. Chris had taken 12 minutes to complete 15% of an assignment. How much longer will it take Chris to complete the assignment?

Master Maths 9 Worksheet 9
Discounts, Profit and Commission

9

Name: _____

1. Find the discounted prices for the following items.

(a) A $850 washing machine discounted by 20%.

(b) A $120 jacket discounted by 15%.

(c) A $325 bed discounted by 12%.

(d) A $65 phone discounted by 15%.

2. Find the original price of the following items.

(a) A drum kit was selling for $520 after a discount of 20%.

(b) A car was selling for $14 260 after a discount of 8%.

(c) A television was selling for $1276 after a discount of 12%.

(d) A computer was selling for $1320 after a discount of $17\frac{1}{2}$%.

3. An antique dealer buys a chair for $250 and sells it for $400.

(a) What is the profit made on the chair?

(b) Find the profit as a percentage of the cost price.

(c) Find the profit as a percentage of the selling price.

4. Terry sells computers and receives a commission of 10% of what he sells. If Terry sells the following computers, find the total commission he will earn.
Two AXB40's each worth $1600 and one laptop worth $2200.

5. A real estate agent earns a weekly wage of $350 plus a 0.5% commission of all the properties she sells. In one week she sells a house for $250 000.
What is the real estate agent's earnings for the week?

6. Teddy sells toys and earns a commission of 15% of all he sells. Find the total commission earned if he sells the following toys:
5 giant teddy bears each worth $65
4 puzzle boxes each worth $120
6 Tilly dolls each worth $70

Master Maths 9 Worksheet 10
Simple and Compound Interest

10

Name: _____

1. The formula used to calculate simple interest is shown here. Under the formula state what each term in the formula represents.

$$SI = \frac{PRT}{100}$$

SI = _____

P = _____

R = _____

T = _____

Calculate the simple interest earned on the following investments.

(a) $5000 invested for 3 years at 5% per year.

(b) $650 invested for 4 years at 6.5% per year.

2. Feurk borrows $3000 for 2 years at a simple interest rate of 8%.

(a) How much interest will he need to pay back?

(b) What is the total amount of money he will need to repay?

3. Write the formula that can be used to find the amount an investment is worth if its interest is compounded.

4. Lars invests $4000 for 5 years at an interest rate of 6% that is compounded yearly.
Find the value of his investment after 5 years.

5. Jackson receives an inheritance of $20 000 and decides to invest it for 10 years.
His local bank is offering to options.

Option A - 6.5% simple interest
Option B - 5.25% compound interest

Calculate which option Jackson should choose.

Master Maths 9 Worksheet 11
Ratio

11

Name: _____

1. If the following quantities are divided into the given number of parts, find the size of each part.

(a) $45 divided into 9 parts

(b) 660 kg divided into 3 parts

(c) 72 m divided into 12 parts

2. Abbey and Casey divided $80 so that Abbey received 3 parts and Casey received 1 part.

(a) What is the size of each part?

(b) How much did each receive?

Abbey Casey

3. Divide the following amounts into the given ratios.

(a) $36 in the ratio 3:1

(b) $80 in the ratio 7:1

(c) 64 kg in the ratio 5:3

(d) 54 m in the ratio 4:5

(e) $400 in the ratio 5:3

(f) 720 kg in the ratio 2:7

(g) $810 in the ratio 5:4

4. Write the following amounts as ratios in their simplest form.

(a) $56 : $72 (b) 24 m : 72 m (c) $27 : $90

5. Sand and cement need to be mixed in the ratio of 5:1.

(a) What fraction of the final mix is sand?

(b) What fraction of the final mix is cement?

6. In a science experiment a solution of acid and water is mixed so that 20% of the solution was acid.
What is the ratio of acid to water in the solution?

7. In a climbing club there were 50 people. 15 of these were girls.
What is the ratio of girls to boys in the club?

8. A farmer was mixing rye and clover seed in the ratio 2:5 to plant in his paddocks.

(a) If he needed a total of 280 kg of seed, how many kg of each variety would he need?

Rye Clover

(b) If he used 50 kg of rye seed, how many kg of clover would he need to make a mixture with this ratio?

(c) The farmer had 200 kg of rye and clover mixture in the ratio 1:3. He wanted to add one type of seed to make this ratio 2:5. What seed would he need to add and how many kg of this seed would be needed?

Seed type

Amount

Master Maths 9 Worksheet 12
Rates

12

Name: _____

1. Using the abbreviations shown complete the three formulae relating speed, distance travelled and time taken.

s = speed
d = distance travelled
t = time taken

s =	d =	t =

2. (a) A cyclist rides 50 km in 2 hours. What is the average speed?

(b) A jogger runs at a speed of 200 metres per minute (m/min) for 20 minutes. How far has he/she jogged?

(c) A skier completes a 500 m ski run travelling at a speed of 20 m/s. How long did this take?

(d) Jodie jogged at a speed of 3 m/s for 30 minutes. How far did she jog?

(e) Harry competed in a 12 km fun-run. It took him 50 minutes to complete. At what speed (m/s) was Harry running?

2. After a severe storm bananas cost $12 per kg. There were 4 bananas per kg.
(a) Find the cost of one banana.

(b) Find the cost of buying 4 kg of bananas.

3. Sonia's favourite licorice cost 80 cents for 100 g.
(a) Find the cost of the following amounts of licorice.
(i) 300 g (ii) 2 kg (iii) 3.5 kg

(b) Find how many grams of licorice could be bought for the following amounts of money.
(i) $4 (ii) $10 (iii) $15

4. Water purifying tablets can be added to unclean water to make it safer to drink. If four tablets have to be added to every litre of water, how many tablets would need to be added to the following amounts of water?
(a) 4 L (b) 2.5 L (c) 500 mL

5. Crystal's car can travel 12 km per litre of petrol.
(a) How many litres would be used in travelling the following distances?
(i) 60 km (ii) 186 km (iii) 300 km

(b) How many km could she travel on the following amounts of petrol?
(i) 7 L (ii) 10.5 L (iii) 26 L

(c) Use the current price of petrol to calculate how much it would cost Crystal to travel 300 km.

Master Maths 9 Worksheet 13
Directed Numbers

13

Name: _____

1. Complete this addition table.

+	1		3			
	-5					1
		-6			-2	
-9			-6	2		
			15	23		
-5		-13			-9	
	11					17

2. Complete this multiplication table.

×	-4					
		84			-21	
					33	110
			-8			-80
	-8			12		
	-36		-9			
		-60		-30		

3. Fill in the missing numbers.

(a) $8 + \square = 2$ (b) $-2 + \square = 6$

(c) $-6 - \square = 5$ (d) $\square - 7 = -15$

(e) $-8 + \square = -1$ (f) $5 - \square + 2 = 13$

(g) $-9 - \square = -2$ (h) $-3 + \square - 4 = -5$

4. Find the following numbers:

(a) 6 more than -8 (b) 4 less than -3

(c) mid way between -5 and 1 (d) 6 more than half of -8

5. Solve the following problems without using a calculator. Remember to use BODMAS.

(a) $3 + -4 \times -2$ (b) $-2 \times -5 - -16 \div 2$

(c) $5 - (6 - 8) \times -3$ (d) $(3 - -4) \times (-2 - 5)$

6. Solve the following problems without using a calculator.

(a) -3.5 - 4.8 (b) -4.7 - -5.8

7. Use a calculator to solve this problems.

$$\left(\frac{-81 + 137}{-96 + 124}\right) - \left(\frac{-195 + 138}{-19 \times 3}\right)$$

8. Find the minimum temperature in three towns Alfa, Beeta and Charley given the following information.
The average of the three temperatures was 0^{o}.
Alfa's temperature was 7^{o} colder than Beeta's temperature.
Beeta's temperature was 10^{o} colder than Charley's minimum temperature.

Alfa Beeta Charley

Master Maths 9 Worksheet 14
Surds

14

Name: _____

1. ***Circle*** the ***rational*** numbers in this list.

5 -7.1 π $\sqrt{16}$ $\sqrt{18}$ $\frac{3}{5}$

2. ***Without using a calculator*** find the following.

(a) $\sqrt{25}$ (b) $\sqrt{81}$ (c) $\sqrt{169}$ (d) $\sqrt{\frac{49}{64}}$

3. (a) ***Guess*** the value of the following square roots to one decimal place.
(b) Use a calculator to find the correct values to one decimal place.

(i) $\sqrt{40}$ (ii) $\sqrt{7}$ (iii) $\sqrt{82}$ (iv) $\sqrt{98}$

Guess				
Actual value				

4. Find the following square roots.

(a) $\sqrt{36 \times 25}$ (b) $\sqrt{16 \times 81}$ (c) $\sqrt{6400}$

5. Simplify the following surds.

(a) $\sqrt{8}$ (b) $\sqrt{18}$ (c) $\sqrt{28}$ (d) $\sqrt{72}$

(e) $\sqrt{160}$ (f) $3\sqrt{125}$ (g) $5\sqrt{48}$

6. Write the following as entire surds.

(a) $2\sqrt{5}$ (b) $3\sqrt{10}$ (c) $4\sqrt{3}$ (d) $5\sqrt{6}$

7. Simplify the following

(a) $\sqrt{7} \times \sqrt{10}$ (b) $3\sqrt{5} \times 2\sqrt{6}$

8. Simplify each surd before multiplying.

(a) $5\sqrt{18} \times 3\sqrt{20}$ (b) $2\sqrt{50} \times 2\sqrt{32}$

9. Simplify the following expressions.

(a) $\frac{\sqrt{60}}{\sqrt{10}}$ (b) $\frac{3\sqrt{88}}{2\sqrt{32}}$ (c) $\frac{5\sqrt{72}}{3\sqrt{48}}$

10. Simplify the following expressions.

(a) $5\sqrt{2} + 6\sqrt{2}$ (b) $10\sqrt{3} - 7\sqrt{3}$

(c) $\sqrt{7} + \sqrt{7}$ (d) $5\sqrt{11} - \sqrt{11}$

(e) $3\sqrt{2} + 5\sqrt{2} - 2\sqrt{2}$ (f) $6\sqrt{3} - 2\sqrt{3} + 5\sqrt{3}$

(g) $2\sqrt{3} + \sqrt{5} + 3\sqrt{3}$ (h) $3\sqrt{7} + 4\sqrt{7} + 3\sqrt{5}$

Master Maths 9 Worksheet 15
Algebraic Terms, Simplification

15

Name: _____

1. Write the following statements as algebraic expressions.

(a) The sum of A and B

(b) The product of m and n

(c) The sum of $6p$ and $3q$

(d) 6 more than b

(e) 5 less than x

(f) Half of y

2. From the following expressions list all the terms.

(a) $3x^2 + 5xy - 6y^2$

(b) $7mn + 8pqr - n$

3. Circle all the sets of like terms from the following list. Use a different colour for each set.

xy $3x^2$ $5y^2$ $7xy$ $-x^2$ $3x$ y $-3y^2$

$x/4$ $12y^2$ $9xy$ $-2x^2$ $15y$ $\frac{1}{4}x$ $-\frac{2}{5}y^2$

4. Write the coefficient of each of the following terms.

(a) $4x^2$ (b) mnp (c) $-3y^4$ (d) $\frac{3}{4}ab^3$ (e) $H/8$

5. Simplify the following expressions.

(a) $7a + 6a$

(b) $3x + x$

(c) $4b + 6b + 7b - 2b$

(d) $3x^2 + 8x^2 - x^2$

(e) $3m - 7m + 8m$

(f) $-7y - 5y$

(g) $-2p + 8p - 11p$

6. Simplify the following expressions.

(a) $7x + 6y + 3x + 5y$

(b) $3a + 4b + 8a + 7b$

(c) $7m + 2n - 3m - n$

(d) $6c + 5d - 4c - 9d$

(e) $5x^2 + 2y^2 - 5x^2 - 3y^2$

(f) $-3m + 5n - 6m - n$

(g) $6x - y - 11x - 3y$

(h) $-2a + 5b - 4a + b - a - 12b + 4a + 3a + 7b$

(i) $5xy + 7yx + 3xy - 5yx$

(j) $-2ab^2 + a^2b - 3b^2a + ba^2$

(k) $6m^2n + 2mn^2 + 3nm^2 - 5n^2m - 3\,m^2n + m^2n$

7. Simplify the following expressions.

(a) $3a \times 4b$

(b) $2m \times 6n \times p$

(c) $3y \times 5x \times 2z$

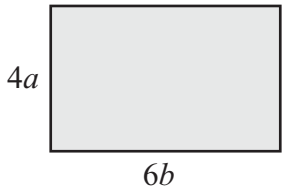
(d) $4bc \times 6a$

(e) $2s \times 3r \times p \times 10q$

(f) $2abc \times 5a \times 3c$

(g) $2y \times 3x \times 5z \times x \times yz$

8. Find the perimeter and area of this rectangle.



Perimeter

Area

Master Maths 9 Worksheet 16
Expanding Algebraic Expressions

16

Name: _____

1. Expand the following algebraic expressions.

(a) $3(5x + y)$

(b) $4(a - 6)$

(c) $2(7m - 3n)$

(d) $-3(a + b)$

(e) $-2(6 - m)$

(f) $-4(5p - 2q)$

(g) $3(2a + 3b - 5c)$

(h) $-5(x - 4y - 7z)$

2. Expand the following algebraic expressions.

(a) $x(2x + 7)$

(b) $a(4 - b)$

(c) $m(m - 3n)$

(d) $-a(a + 3b)$

(e) $-2x(6x - y)$

(f) $-4p(5p - 2q)$

(g) $3a(2a + 5b - 3c)$

(h) $-5y(x - 4y - 7z)$

3. Expand the following algebraic expressions and simplify by collecting like terms

(a) $2(x + 3) + 4(x + 5)$

(b) $3(a + 2) + 5(a - 4)$

(c) $2(3m + 4) - 4(2m - 1)$

4. Expand the following algebraic expressions and simplify by collecting like terms

(a) $2x(x + 5) + 3x(x + 2)$

(b) $3n(n - 4) + 5n(2n - 4)$

(c) $4m(3m + 2) - 4(2m - 1)$

(d) $2x(2x + 3y) - 4x(3x + y)$

5. Expand the following algebraic expressions and simplify by collecting like terms

(a) $(x + 5)(x + 3)$

(b) $(n + 4)(2n - 3)$

(c) $(3m - 2)(2m + 5)$

(d) $(2x + 3y)(3x + y)$

(e) $(3m - 4)^2$

(f) $(2x + 3y)^2$

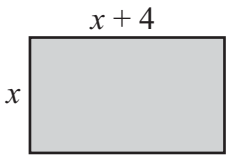
Master Maths 9 Worksheet 17
Finding Algebraic Expressions

17

Name: _____

1. Find the ***perimeter*** and ***area*** of the following shapes.

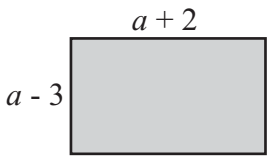
(a)



Perimeter

Area

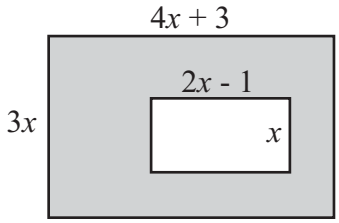
(b)



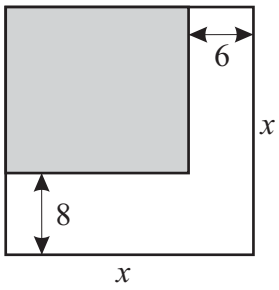
Perimeter

Area

2. Find an expression in its simplest form for the area of the shaded region in this shape.



3. A square sheet of board has a side length of x. 6 cm is cut from one side and 8 cm from the other side. Find an expression for the area of the smaller board.



4. Evan decided to save some money over a four month period.
He saved x dollars in the first month. In each of the following three months he increased the amount he saved by $20 each month.
(a) Write expressions, in terms of x, for the amount he saved each month.

1st month	2nd month	3rd month	4th month

(b) Write an expression, in its simplest form, for the total amount he saved in the four months.

5. Sukie also decide to save some money over a four month period.
She saved x dollars in the first month and for each of the following three months she saved twice the amount she had saved in the previous month.
(a) Write expressions, in terms of x, for the amount she saved each month.

1st month	2nd month	3rd month	4th month

(b) Write an expression, in its simplest form, for the total amount she saved in the four months.

6. Bobby is y years old. His brother is three years older than Bobby. Bobby's sister is five years younger than Bobby. Bobby's father is three times Bobby's age and four years older than Bobby's mother.
Find an expression, in its simplest form, for the sum of all their ages.

Master Maths 9 Worksheet 18
Factorisation 1

18

Name: _____

1. List all the factors of the following terms.

(a) $16mn^2$ (b) $-20ab$

2. Find the highest common factor in the following sets of terms.

(a) 24, 36 (b) $3x$, $12x^2$ (c) $8ab$, $12b^2$

(d) $12x^2y$, $18xy^2$ (e) $-15ab^2$, $-30ab$

3. Factorise the following expressions by finding the highest common factor.

(a) $8a + 12$

(b) $9x - 27$

(c) $36 + 24y$

(d) $12a + 16b$

(e) $24xy - 18x$

(f) $20mn - 32m$

(g) $-14 - 21p$

(h) $-6a - 18$

(i) $-8x^2 - 20x$

(j) $4mn - n$

(k) $-3a^2 - 15a$

(l) $18xy - 40x^2$

(m) $36ab + 20ab^2$

4. Factorise the following expressions.

(a) $3(x + 2) + y(x + 2)$

(b) $6(3 - n) - m(3 - n)$

(c) $6n + 12 + np + 2p$

(d) $7ab - 14a + bc - 2c$

(e) $3x + 2xy + 6y + 9$

(f) $4a + 6ab - 10 - 15b$

(g) $8a^2 - 21b - 14ab + 12a$

Master Maths 9 Worksheet 19
Factorising DOPS and Quadratic Trinomials

19

Name: _____

1. Factorise the following expressions.

(a) $x^2 - y^2$

(b) $p^2 - 64$

(c) $1 - m^2$

(d) $16a^2 - 49b^2$

(e) $25x^2 - y^2$

(f) $18m^2 - 2n^2$

(g) $48a^2 - 75b^2$

2. Factorise the following expressions.

(a) $x^2 + 8x + 15$

(b) $a^2 - 14a + 24$

(c) $m^2 + 16m + 48$

(d) $y^2 - 17y + 72$

(e) $n^2 - 37n + 36$

3. Factorise the following expressions.

(a) $x^2 + 4x - 12$

(b) $a^2 - 6a - 27$

(c) $m^2 + 3m - 40$

(d) $y^2 + y - 72$

(e) $x^2 + 23x - 24$

(f) $a^2 - 15a + 56$

(g) $m^2 - 20m + 36$

(h) $y^2 + 18y + 81$

(i) $n^2 - 16n + 64$

Master Maths 9 Worksheet 20
Algebraic Fractions 1

20

Name: _____

1. Simplify the following algebraic fractions.

(a) $\frac{8}{10}$

(b) $\frac{12a}{36a}$

(c) $\frac{10x}{15}$

(d) $\frac{24n}{18}$

2. Factorise and then simplify.

(a) $\frac{3x + 15}{6}$

(b) $\frac{9a - 21}{9}$

(c) $\frac{3a - 9}{4a - 12}$

(d) $\frac{a^2 - 9}{a - 3}$

(e) $\frac{x^2 + 7x + 12}{4x + 12}$

(f) $\frac{n^2 - 3n - 18}{3n - 18}$

(g) $\frac{x^2 + 2x - 15}{x^2 - 7x + 12}$

(h) $\frac{a^2 - 25}{a^2 - 11a + 30}$

3. Simplify the following.

(a) $\frac{2c}{9} + \frac{5c}{9}$

(b) $\frac{5a}{7} - \frac{3a}{7}$

(c) $\frac{5c}{9} - \frac{c}{3}$

(d) $\frac{2a}{5} + \frac{3a}{4}$

(e) $\frac{x + 1}{4} + \frac{x + 4}{4}$

(f) $\frac{x + 2}{3} + \frac{x}{6}$

(g) $\frac{2x + 3}{4} + \frac{3x + 2}{5}$

(h) $\frac{4x + 1}{3} - \frac{x - 2}{5}$

(i) $\frac{2x + 5}{7} + \frac{3x - 4}{8}$

(j) $\frac{3x + 4}{9} - \frac{5x - 3}{7}$

Master Maths 9 Worksheet 21
Algebraic Fractions 2

21

Name: _____

1. Simplify the following.

(a) $\frac{3}{5} \times \frac{2}{7}$

(b) $\frac{4}{9} \times \frac{27}{32}$

(c) $\frac{6x}{21} \times \frac{7x}{12}$

(d) $\frac{3x}{5} \times \frac{10}{x}$

(e) $\frac{x+2}{8} \times \frac{4}{x+2}$

(f) $\frac{3}{x-1} \times \frac{x-1}{5}$

2. Simplify the following.

(a) $\frac{1}{2} \div \frac{1}{4}$

(b) $\frac{4}{5} \div \frac{1}{10}$

(c) $\frac{x}{5} \div \frac{x}{2}$

(d) $\frac{3x}{4} \div \frac{3x}{10}$

(e) $\frac{4a}{7} \div \frac{8a}{21}$

(f) $\frac{x+1}{6} \div \frac{x+1}{3}$

3. Factorise where possible and then simplify.

(a) $\frac{2x+8}{15} \times \frac{10}{3x+12}$

(b) $\frac{m+1}{3} \times \frac{m-2}{5} \times \frac{15}{2m+2}$

(c) $\frac{3(e-2)}{2e} \times \frac{10e}{9e-18}$

(d) $\frac{c^2-12c}{3c} \times \frac{2}{c-12}$

(e) $\frac{y^2-4}{y-2} \times \frac{6}{7y+14}$

(f) $\frac{2x+8}{x^2-16} \times \frac{3x}{8}$

(g) $\frac{5n}{n+3} \div \frac{15n}{2n+6}$

(h) $\frac{6n^2}{n^2-25} \div \frac{3n}{n+5} \div \frac{5n}{2n-10}$

Master Maths 9 Worksheet 22
Exponentials 1

22

Name: _____

1. Write the following in exponent form.

(a) $3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3$

(b) $m \times m \times m \times m \times m$

(c) a to the power of 8

(d) -7 to the power of 11

(e) $x \times y \times 2 \times x \times y \times y \times y \times 5$

2. Write the following in factor form.

(a) 5^6

(b) x^8

(c) $5a^2bc^4$

3. Evaluate the following ***without*** using a calculator.

(a) 2^5 (b) 10^4 (c) $(-3)^3$

4. Use a calculator to evaluate the following.

(a) 8^4 (b) 7^6 (c) $(-4)^7$

5. Use a calculator to evaluate the following. Give answers correct to one decimal place.

(a) 7.1^5 (b) $5.3^4 + 2.8^3$ (c) $(-3.8)^5$

(d) $\dfrac{(7.8^5 + 8.7^6)^4}{9.77^{22}}$

6. Find the value of x if $9^x = 531\,441$.

7. Simplify the following.

(a) $a^4 \times a^7$ (b) $3a^4 \times 5a^7 \times 2a$

(c) $2m^4n^3 \times 4m^7n^4 \times 3m^6n$

(d) $x^9 \div x^3$ (e) $12m^8 \div 6m$

(f) $\dfrac{18a^6b^7c^5}{12a^2b^3c}$ (g) $(3m^2)^5$

(h) $(2x^4y^3)^4$ (i) $\left(\dfrac{3a^2b^5}{2c^8d}\right)^3$

(j) x^0 (k) $6a^0b$ (l) $(2m^3n)^0$

(m) $\dfrac{36a^8b^5}{12a^8b^5}$ (n) $\dfrac{45x^7y^5z}{30xy^5z}$

8. Write the following with positive indices.

$\frac{3}{5}\, m^5n^{-3}p^{-1}$

Master Maths 9 Worksheet 23
Exponentials 2

23

Name: _____

1. Simplify.

(a) $\dfrac{(x^2y^3)^4}{xy^6}$

(b) $\dfrac{(x^2y^3)^3\times(xy^2)^6}{(x^3y^2)^3}$

(c) $\dfrac{6a^2b^3}{(a^2b^2)^3}\times\dfrac{(a^5b^2)^3}{10ab}$

(d) $\dfrac{(3x^2y^3)^2}{5(x^2)^2y^6}\div\dfrac{3x^2y^5}{10x^5y^8}$

(e) $\left(\dfrac{2x^2y^3}{3xy}\right)^3\div\left(\dfrac{4x^2y^3}{9x^3y}\right)^2$

2. Convert the following numbers into scientific notation.

(a) 800 000

(b) 500 000 000

(c) 561 000 000 000

(d) 7 892 000 000

(e) 0.000 000 6

(f) 0.000 04

(g) 0.000 000 675 2

(h) 0.000 000 803 4

3. Convert the following numbers into numeral form.

(a) 8×10^5

(b) 6.7×10^3

(c) 8.93×10^7

(d) 1.207×10^4

(e) 3.7×10^{-6}

(f) 9.925×10^{-4}

(g) 1.15×10^{-8}

(h) 7.8165×10^{-3}

Master Maths 9 Worksheet 24
Solving Linear Equations 1

24

Name: _____

1. Solve these equations.

(a) $2x = 8$

(b) $3x = 5$

(c) $a + 3 = 8$

(d) $a + 8 = 3$

(e) $m - 6 = 2$

(f) $n - 3 = ^-5$

(g) $\frac{y}{4} = 3$

(h) $5 - p = 6$

(i) $2x + 4 = 10$

(j) $3x - 2 = 13$

(k) $\frac{x+2}{3} = 3$

(l) $3(x - 2) = ^-6$

(m) $4x - 2 = ^-1$

(n) $7 - \frac{x}{4} = 4$

2. Solve these equations.

(a) $\frac{2x+5}{3} = 5$

(b) $\frac{4(x+7)}{3} = 8$

(c) $2x - 1 = x - 4$

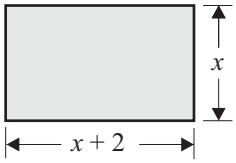
(d) $7x - 5 = 5x + 1$

Master Maths 9 Worksheet 25
Solving Linear Equations 2

25

Name: _____

1. A farmer owns a rectangular-shaped farm. She knows that the length is 2 km longer than the width and the perimeter is 16 km. Find x, the width of her farm.



2. A grandfather set this puzzle for his three grandchildren.

"If you add your three ages, the total is one-half of what my age was 5 years ago."

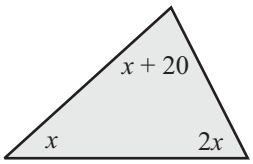
(a) If the children's ages are 8, 10 and 12 years, write an equation to fit the information in the puzzle above. Use x as the grandfather's age.

$\frac{x - 5}{\quad} =$

(b) Solve the equation to find grandfather's age.

$x =$

3. Solve for x.



4. Four teenagers have CD collections.
Naomi has twice as many in her collection as Julian.
Greg has 6 CDs less than Julian.
Adele has 3 more than Julian.

(a) If Julian has n CDs, write expressions for the number owned by each of the other three people.

Naomi

Greg

Adele

(b) If they have a total of 77 CDs between them, how many does each person have?

Julian

Naomi

Greg

Adele

5. Ms. I. N. Stine set her Year 9 science class a puzzle to find the capacity of two different sized containers.
She gave this information to her class:

It requires 15 litres of water to completely fill containers A and B.
Container A holds 3 litres more than container B.

Find the capacity of container A and container B.

Container A

Container B

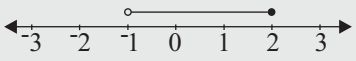
Master Maths 9 Worksheet 26
Inequations 1

26

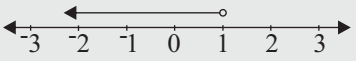
Name: _____

1. Describe the regions represented on each number line.

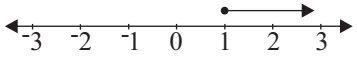
Examples:

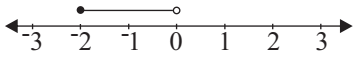


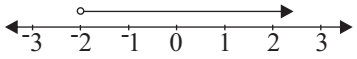
$x : -1 < x \leq 2$

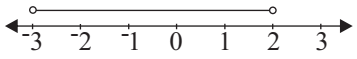


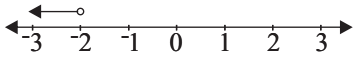
$x : x < 1$

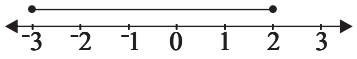
(a) 

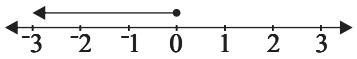
(b) 

(c) 

(d) 

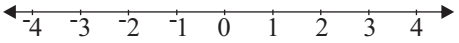
(e) 

(f) 

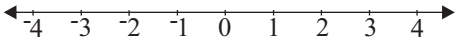
(g) 

2. Draw the following regions on the number lines provided.

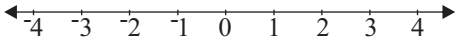
(a) $\{x : x \geq 2\}$



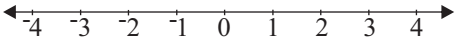
(b) $\{x : 0 < x < 4\}$



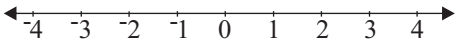
(c) $\{x : 2 \leq x \leq 3\}$



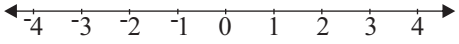
(d) $\{x : x < -1\}$



(e) $\{x : -3 < x \leq 1\}$



(f) $\{x : x > -3\}$



3. Circle the values of x that would be included in the region provided.

Example: $\{x: x \geq 3\}$	-2	1	0	(3)	(6)	(10)
(a) $\{x : x < 2\}$	-3	-1	0	2	5	
(b) $\{x : x \leq -3\}$	-5	-3	0	1	2	
(c) $\{x : -2 \leq x \leq 2\}$	-3	-2	0	1	3	
(d) $\{x : 0 \leq x \leq 4\}$	-8	-6	-1	2	3	

Master Maths 9 Worksheet 27
Inequations 2

27

Name: _____

1. Solve these inequations.

(a) $3x - 1 \geq 2$

(b) $2x + 5 \geq 1$

(c) $2x - 1 > 0$

(d) $3 - x > 2$

(e) $6 - 5x \leq 2$

2. Solve these inequations.

(a) $2x + 5 > x + 1$

(b) $3x - 7 \leq x - 3$

(c) $3y + 5 \geq 5 - y$

(d) $\frac{3x - 4}{5} < x + 1$

(e) $2 < \frac{2(x + 1)}{5} < 4$

Master Maths 9 Worksheet 28
Creating Formulae and Transposition

28

Name: _____

1. Write the following statements to a formulae.

(a) a is equal to two times b.

$a =$

(b) Voltage (V) is equal to the product of current (I) and resistance (R).

$V =$

(c) Area (A) is equal to the volume (V) divided by length (l).

$A =$

(d) Work done (W) is equal to the product of mass (m), gravity (g) and height (h).

$W =$

(e) The intensity of light (I) is equal to a constant (k) divided by the square of the distance (d) from the light source.

$I =$

(f) Energy (E) is equal to the product of the square of the current (I), resistance (R) and time (t).

$E =$

(g) The speed (s) of an object is equal to its distance travelled (d) divided by the time taken (t).

$s =$

(h) Final velocity (v) is equal to the sum of the initial velocity (u) and the product of acceleration (a) and time (t).

$v =$

2. ***Transpose*** each of the following formulae to make the pronumeral in brackets the subject.

(a) $y = x + z \quad (x)$

$x =$

(b) $z = 3A \quad (A)$

$A =$

(c) $b = c^2 \quad (c)$

$c =$

(d) $B = D - A \quad (D)$

$D =$

(e) $B = D - A \quad (A)$

$A =$

(f) $y = 3x + c \quad (x)$

$x =$

(g) $v = u + at \quad (u)$

$u =$

(h) $v = u + at \quad (a)$

$a =$

(i) $E = mc^2 \quad (m)$

$m =$

(j) $E = mc^2 \quad (c)$

$c =$

Master Maths 9 Worksheet 29
Substitution

29

Name: _____

1. $F = ma$
Find F if $m = 12$ and $a = 6$.

2. $v = u + at$
Find v if $u = 6$, $a = 2$ and $t = 3$.

3. $s = ut + \frac{1}{2}at^2$
Find s if $u = 3$, $t = 2$ and $a = 4$.

4. $F = \frac{10m}{x^2}$
Find F if $m = 20$ and $x = 2$.

5. $p = q^2 - r^2$
Find p if $q = 6$ and $r = 3$.

6. $z = \sqrt{b^2 - 4ac}$
Find z if $b = 8$, $a = 2$ and $c = 6$.

7. $s = \frac{1}{2}(a + b)$
Find a if $s = 20$ and $b = 10$.

8. $p = q - r$
Find q if $p = 3.5$ and $r = 2.1$.

9. $x^2 = y^2 + z^2$
Find y if $x = 13$ and $z = 5$.

10. $P = I^2R$
Find R if $P = 10$ and $I = 2$.

11. $E = \frac{1}{2}mv^2$
Find v if $E = 10$ and $m = 5$.

Master Maths 9 Worksheet 30
Linear Relationships 1

30

Name: _____

1. (a) If $y = 2x$ find y when $x = 3$.

(b) If $m = n + 3$ find m when $n = 6$.

(c) If $A = 2B + 1$ find A when $B = 0$.

2. Complete these tables for the rules given.

(a) Rule: $Q = 3P$

P	-3	-2	-1	0	1	2	3
Q							

(b) Rule: $y = 3x - 4$

x	-3	-2	-1	0	1	2	3
y							

(c) Rule: $m = 2 - n$

n	-3	-2	-1	0	1	2	3
m							

3. For the tables of values given, find the rule connecting the variables.

(a)

c	-3	-2	-1	0	1	2	3
d	-6	-4	-2	0	2	4	6

$d =$

(b)

x	-3	-2	-1	0	1	2	3
y	-10	-7	-4	-1	2	5	8

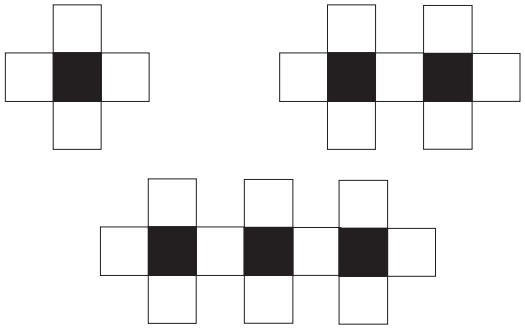
$y =$

(c)

v	-3	-2	-1	0	1	2	3
w	-3	-1	1	3	5	7	9

$w =$

4. The repeating pattern below is made using black and white tiles.



If b represents the number of black tiles and w represents the number of white tiles, complete the table below.

b	1	2	3	4	5
w					

(a) Write a formula connecting b and w

$w =$

(b) Find the number of white tiles if the pattern contains 20 black tiles.

(c) If 22 white tiles have been used in the pattern, how many black tiles are needed?

5. A car is travelling at a speed of 10 metres per second.

(a) Complete this table showing the distance d travelled in metres after t seconds.

t	0	1	2	3	4	5
d						

(b) Find a rule connecting d and t.

$d =$

(c) How far would the car move in 2 minutes?

(d) How long would the car take to travel 1 kilometre?

Master Maths 9 Worksheet 31
Linear Relationships 2

31

Name: _____

1. Sparkey is an electrician who charges \$25 per hour plus \$30 travelling charge.

(a) Complete the table below showing the charge c for working t hours.

t	1	2	3	4	5
c					

(b) Find the ***rule*** connecting t and c.

$c =$

(c) What is his charge for a job taking 8 hours?

2. Another electrician, Plugger, charges \$30 per hour with no travelling charge.

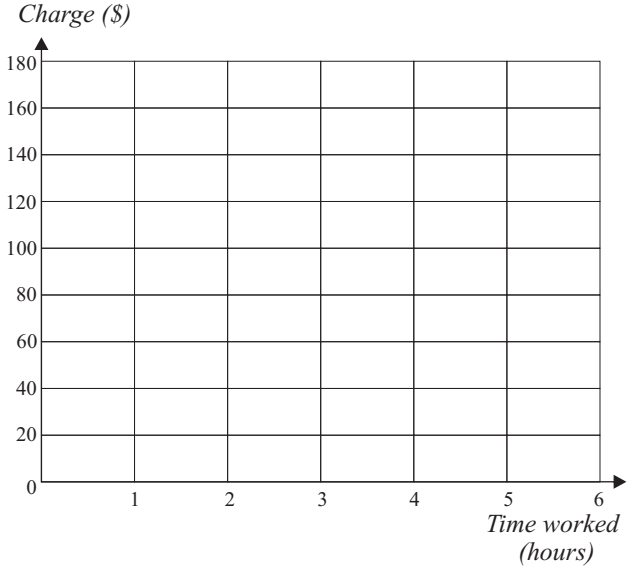
(a) Complete this table showing Plugger's charges.

t	1	2	3	4	5
c					

(b) Find the ***rule*** for Plugger's charges.

$c =$

3. On the axes provided plot each of Sparkey's and Plugger's charges against time worked.



For what ***length of working time*** would each electrician charge the ***same*** amount?

4. The cost of purchasing tickets for a concert was \$60 per ticket together with a \$10 booking fee.

Example: The cost of 8 tickets is $8 \times 60 + 10 = \$490$

(a) Complete the following table showing the cost c for purchasing n tickets.

n	1	2	3	4	5
c					

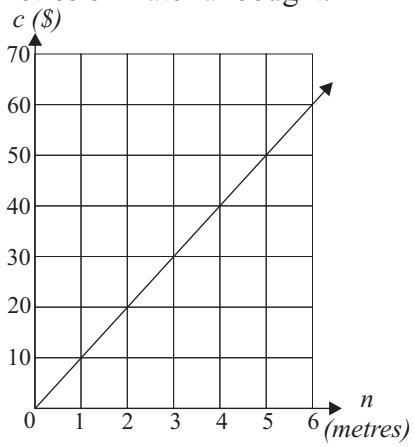
(b) Find the ***rule*** connecting n and c.

$c =$

(c) Use this rule to find the cost of purchasing 25 tickets.

(d) How many tickets could be bought for \$730?

5. The cost c in dollars of buying a length of a particular curtain material is given by the graph below, where n represents the number of metres of material bought.



(a) How much would it cost to purchase 5 metres of material?

(b) Find the ***rule*** connecting 'n' and 'c'.

$c =$

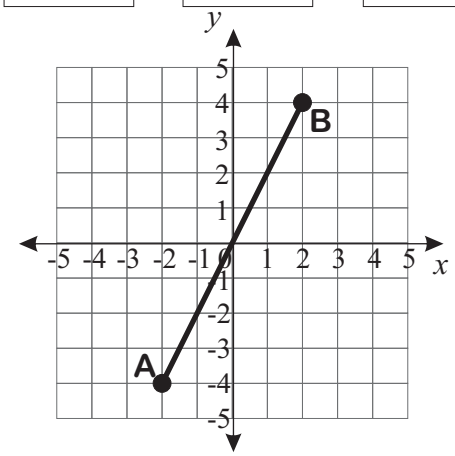
(c) How much material could you buy for \$280?

Master Maths 9 Worksheet 32
Gradient 1

32

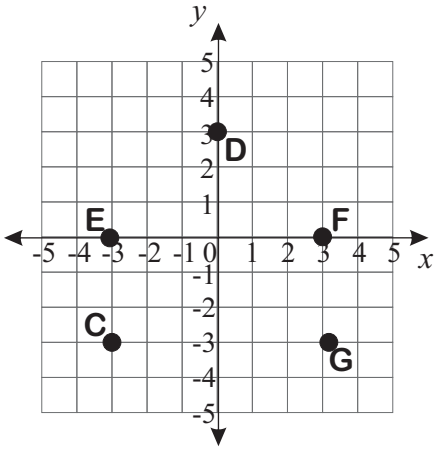
Name: _____

1. For the line joining points A and B on the graph below, find the following:
(a) rise (b) run (c) gradient



2. Find the gradient of the lines joining the following pairs of points on the graph below.
(a) **C** and **D** (b) **C** and **F** (c) **D** and **F**

(d) **D** and **G** (e) **E** and **D** (f) **E** and **G**



3. Calculate the gradient of the lines joining the following pairs of points.
(a) (2,3) and (7, 13) (b) (-1,4) and (2,7)

(c) (-3,4) and (-1,12) (d) (3,-4) and (6,5)

(e) (-4,5) and (3,-2) (f) (1,6) and (4,-3)

(g) (0,-3) and (6,0) (h) (-5,-2) and (5,10)

(i) (-2,-5) and (8,-9) (j) (0,4) and (5,6)

Master Maths 9 Worksheet 33
Gradient 2

33

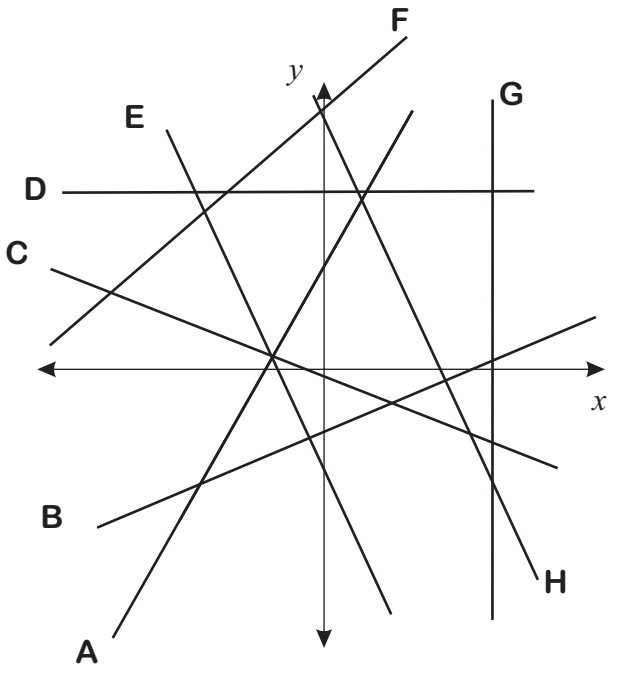
Name: _____

1. On the graph below several lines are drawn.
(a) Which of the lines have a ***positive gradient***?

(b) Which of the lines have a ***negative gradient***?

(c) Which of the lines has a ***zero gradient***?

(d) Which of the lines have the ***same gradient***?



2. On this graph draw two straight lines in ***red*** that have the same gradient as line **B**.

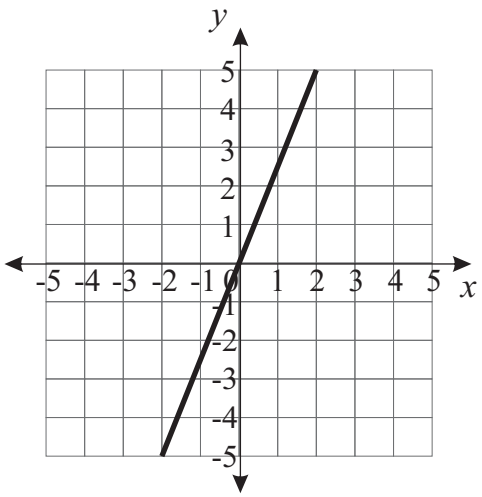
3. Rearrange the letters ***ALL PEARL*** to form a word that would complete this sentence.

Straight lines that have the same gradient are

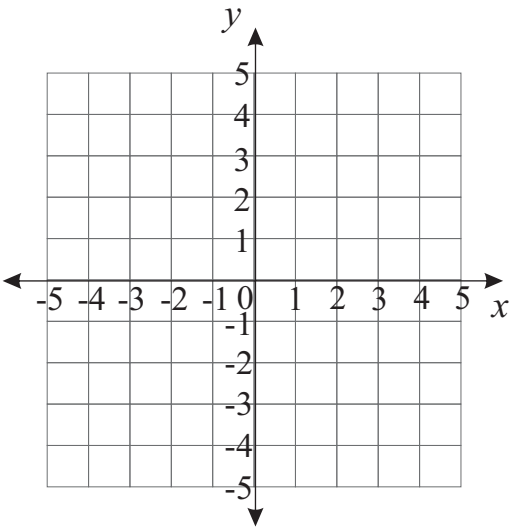
called _____.

4. One line is drawn on the graph below.
(a) What is the gradient of this line?

(b) On the graph draw another two lines such that they are both parallel to this line and one passes through the point (-4,-3) and the other passes through the point (4,2).



5. On the graph below draw and label the following lines.
(a) Line **A** passes through the point (-3,-2) and has a gradient of 1.
(b) Line **B** passes through the point (3,-3) and has a gradient of -1.
(c) Line **C** passes through the point (0,-4) and has a gradient of 2.
(d) Line **D** passes through the point (-4,4) and has a gradient of $-\frac{1}{2}$.

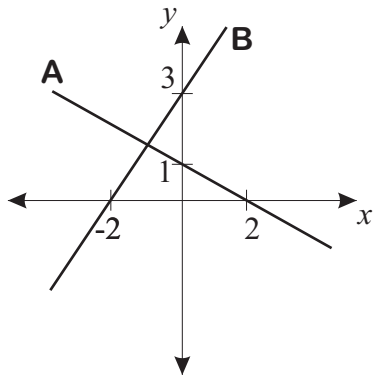


Master Maths 9 Worksheet 34
x- and y- Intercepts

34

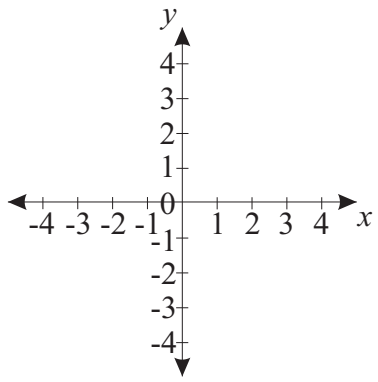
Name: _____

1. For the two lines shown on the graph below, state the ***coordinates*** of the x- and y- intercepts.



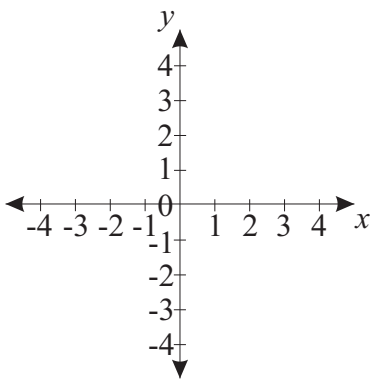
	x-intercept	y-intercept
Line **A**		
Line **B**		

2. On the axes below sketch the straight lines that have the following x- and y- intercepts.
(a) Line **P**: x-intercept = 3, y-intercept = -4
(b) Line **Q**: x-intercept = -3, y-intercept = -2



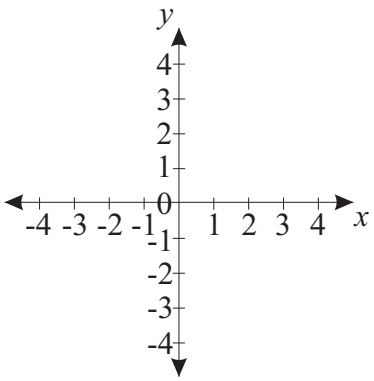
3. Find the x- and y- intercept of the straight line with the following equation and sketch the line.

$x + y = 2$



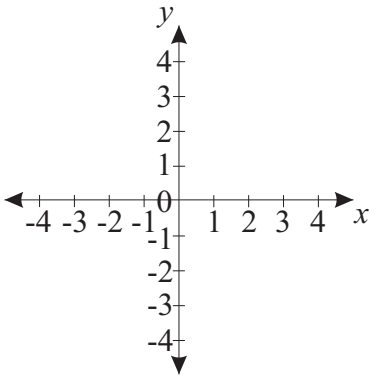
4. Find the x- and y- intercept of the straight line with the following equation and sketch the line.

$3x - 2y = 6$



5. Find the x- and y- intercept of the straight line with the following equation and sketch the line.

$y = -2x - 4$



Master Maths 9 Worksheet 35
y = mx + c

35

Name: _____

1. Complete the following table by stating the gradient and *y*-intercept of each of the straight lines with the equations shown.

Equation	Gradient	*y*-intercept
$y = 3x + 4$		
$y = 2x - 1$		
$y = x + 5$		
$y = -2x + 1$		
$y = 4x$		
$y = 5 - 2x$		
$y = \frac{2}{3}x + 4$		
$y = -3 - x$		
$y = -\frac{3}{4}x - \frac{1}{5}$		

2. Complete the table below by writing the equation of the straight lines with the gradients and *y*-intercepts shown.

Gradient	*y*-intercept	Equation
4	5	
-2	3	
5	-6	
-3	-2	
$-\frac{2}{7}$	0	
$-\frac{1}{3}$	$\frac{3}{4}$	

3. Circle the equations of the straight lines below that would be parallel to the straight line with equation: $y = 2x - 4$

$y = 3x + 2$ $y = 2 - 4x$ $y = -4x + 4$

$y = 2x$ $y = -4$ $y = 2x + 3$

$y = 5 + 2x$ $y = -2x - 4$ $y = x - 4$

4. Transpose the following equations to make *y* the subject and hence find the gradient and *y*-intercept.

(a) $y - 2x + 3 = 0$

Gradient = *y*-intercept =

(b) $y + 4x - 1 = 0$

Gradient = *y*-intercept =

(c) $3y - 6x + 8 = 0$

Gradient = *y*-intercept =

(d) $4y + 3x + 5 = 0$

Gradient = *y*-intercept =

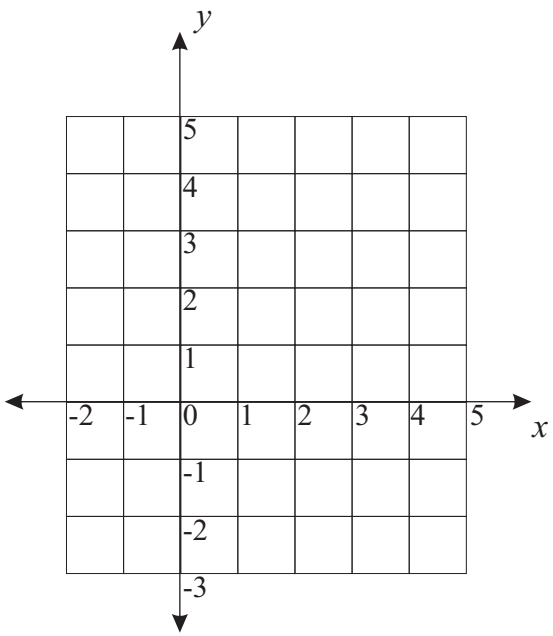
Master Maths 9 Worksheet 36
Simultaneous Equations

36

Name: _____

1. Accurately draw the following pair of straight lines on the axes shown and state the coordinates of the point where they intersect.

$y = -x + 4$ and $y = 2x - 2$



Point of intersection =

2. Solve the following simultaneous equations by using the most appropriate method - substitution or elimination.

(a) $y = 2x$ and $y = 4x - 2$

(b) $y + 3x = 11$ and $y = x - 1$

(c) $3y + 2x = 5$ and $y - 2x = 7$

(d) $4x + 3y = 3$ and $3x - 2y = -19$

Master Maths 9 Worksheet 37
Parabolas 1

37

Name: _____

For each of the following equations complete the table of values. Plot and label each graph on the axes below. The graph of $y = x^2$ is drawn as a guide.

A $y = 2x^2$

x	-3	-2	-1	0	1	2	3
y							

B $y = x^2 + 9$

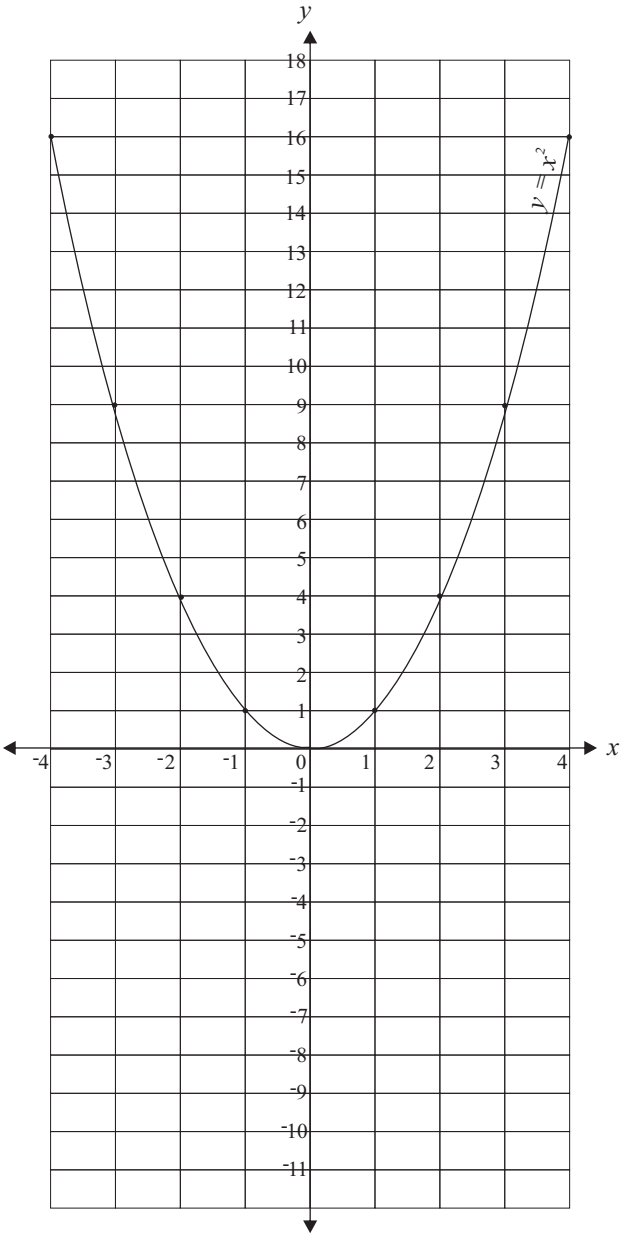
x	-3	-2	-1	0	1	2	3
y							

C $y = (x - 2)^2$

x	-2	-1	0	1	2	3	4
y							

D $y = -x^2$

x	-3	-2	-1	0	1	2	3
y							



Master Maths 9 Worksheet 38
Parabolas 2

38

Name: _____

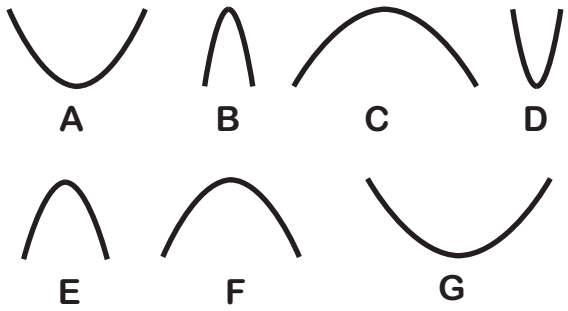
1. The curve shown here is $y = x^2$.

Compare this curve to the curves below and match them with the following equations.

$y = 2x^2$ ☐ $y = \frac{1}{2}x^2$ ☐ $y = -x^2$ ☐

$y = \frac{1}{3}x^2$ ☐ $y = -\frac{1}{2}x^2$ ☐ $y = -2x^2$ ☐

$y = -\frac{1}{3}x^2$ ☐



2. For the parabolas below state whether each would have a ***minimum*** or ***maximum*** turning point and whether they would be ***thinner*** or ***flatter*** than the graph of $y = x^2$.

Equation	***Minimum*** or ***Maximum*** Turning Point	***Thinner*** or ***Flatter*** Than $y = x^2$
$y = 3x^2$		
$y = -2x^2 + 3$		
$y = \frac{1}{4}x^2 - 4$		
$y = 5x^2 + \frac{1}{2}$		
$y = -\frac{2}{3}x^2$		
$y = 3 - 4x^2$		
$y = 2 + \frac{3}{7}x^2$		

3. Sketch the following parabolas clearly showing all known points.

(a) This parabola has x-intercepts of -1 and 4 and its y-intercept at 1.

(b) This parabola has its axis of symmetry at $x = 2$, one x-intercept at 5 and its y-intercept at -2.

(c) This parabola has its turning point at (-1,3) and its y-intercept at 1.

(d) This parabola has x-intercepts at 0 and 5, and it passes through the point (-1,2).

Master Maths 9 Worksheet 39
Parabolas 3

39

Name: _____

Find the x- and y-intercepts and the coordinates of the turning point for the parabolas with the following equations. Sketch the parabolas.

1. $y = x^2 - 4x - 5$

2. $y = x^2 - 8x + 12$

Master Maths 9 Worksheet 40
Parabolas 4

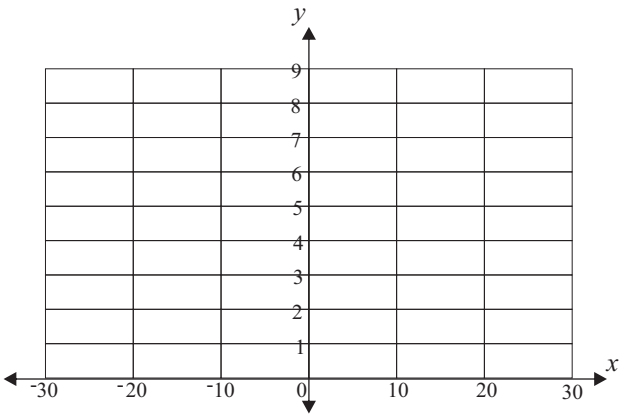
40

Name: _____

1. The shape of a TV satellite dish can be found by plotting the following points on the axes below. All dimensions are in centimetres.

x	-30	-20	-10	0	10	20	30
y	9	4	1	0	1	4	9

Use these points to draw the shape of the satellite dish on the axes below.



(a) How ***wide*** is the satellite dish?

(b) How ***deep*** is the dish?

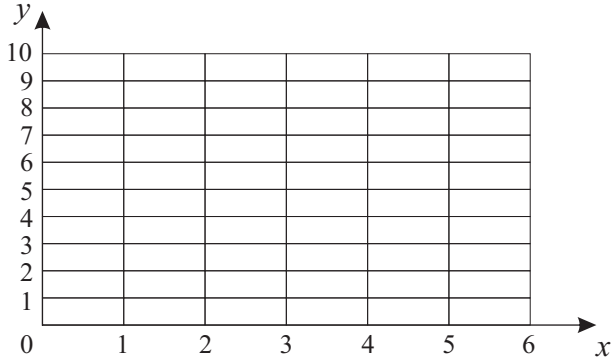
2. The equation for the curve formed by the ropes of a suspension bridge was:

$$y = x^2 - 6x + 10$$

(a) Complete this table of values for this equation.

x	0	1	2	3	4	5	6
y							

(b) Plot these points on graph below.



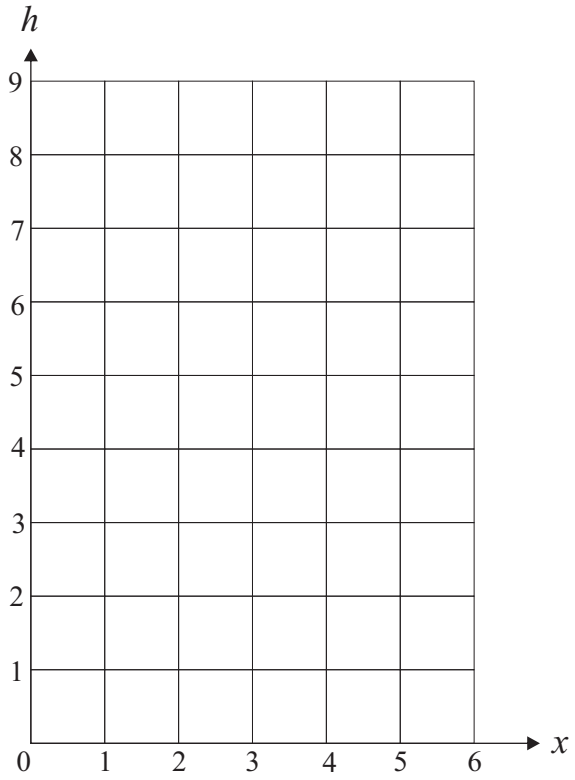
3. A child throws a ball into the air.
The path of the moving ball is given by the equation: $h = -x^2 + 6x$

where h = the height of the ball in metres.
and x = the horizontal distance, in metres, of the ball from the child .

Complete this table using the above equation.

x	0	1	2	3	4	5	6
h							

Plot the points from the table and draw the path of the ball on the axes below.



(a) What was the maximum height of the ball?

(b) How far from the child did the ball land?

Master Maths 9 Worksheet 41
Sets

41

Name: _____

1. Write the following sentences using symbols.

(a) 6 is an element of set A

(b) Set P is a subset of set Q

(c) The union of sets X and Y

(d) The intersection of sets C and D

(e) All elements not in set L

(f) A set with no elements

2. $A = \{1, 2, 3, 4, 5, 6\}$
$B = \{2, 4, 6, 8, 10\}$
$C = \{4, 5, 6, 7, 8, 9, 10\}$
$D = \{9, 10, 11\}$

Use these sets to find the following:

(a) $A \cap B$

(b) $A \cup B$

(c) $B \cap C$

(d) $A \cap C$

(e) $A \cup C$

(f) $B \cap D$

3. $\varepsilon = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$
$P = \{2, 4, 6, 8, 10, 12\}$
$Q = \{1, 2, 3, 4, 5, 6\}$
$R = \{6, 7, 8, 9, 10, 11, 12\}$

Use these sets to find the following:

(a) $P \cap R$

(b) P'

(c) Q'

(d) $P' \cap Q'$

(e) $Q' \cap R'$

(f) $P' \cap R$

4. Find the following sets of numbers.

(a) All even numbers between 0 and 20 that are factors of 36.

(b) All odd numbers between 20 and 50 that are divisible by 3.

(c) All numbers between 60 and 90 that are prime numbers or square numbers.

5. Write the symbol that represents each of the following sets of numbers.

(a) The set of real numbers

(b) The set of rational numbers

(c) The set of natural numbers

(d) The set of whole numbers

(e) The set of integers

(f) The set of irrational numbers

6. State if the following statements are true (T) or false (F).

(a) $Q \subset R$ (b) $N \subset W$ (c) $Z \subset I$

(d) $R \subset W$ (e) $W \subset Z$ (f) $N \subset Z$

(g) $6.5 \in Z$ (h) $\sqrt{7} \in R$ (i) $3\pi \in I$

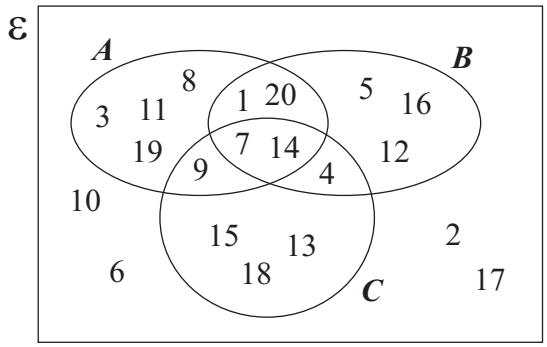
(j) $-5.3 \in Q$ (k) $-3.7 \in Z$ (l) $8 \in W$

Master Maths 9 Worksheet 42
Venn Diagrams

42

Name: _____

1. List the elements in the universal set and all other sets in the following Venn diagram.



ε =	
A =	
B =	
C =	

2. (a) Construct a Venn diagram representing the following sets.

ε = {1, 2, 3, 4, ...20}
X = {2, 3, 4, 9, 13, 14, 16, 17}
Y = {3, 5, 7, 11, 13, 15, 16, 19}
Z = {4, 5, 8, 12, 13, 15, 16, 17, 18}

(b) Use this Venn diagram to find the following sets.

(i) $X \cap Y$ (ii) $X \cap Z$ (iii) $X \cap Y \cap Z$

3. Use the information below to construct a Venn diagram showing the number of elements in all of the sections.

n(ε) = 20, n(*K*) = 9, n(*L*) = 9, n(*M*) = 12, n($K \cap L$) = 5, n($L \cap M$) = 5, n($K \cap M$) = 6, n($K \cap L \cap M$) = 2

4. There were 100 students in year 9 at a school.
33 wanted to study technology.
39 wanted to study graphics.
32 wanted to study art.
8 wanted to study graphics and art but not technology.
12 wanted to study technology and art.
5 wanted to study all three subjects.
15 wanted to study only technology.
Construct a Venn diagram representing this information completing all sections of the diagram.

How many students did not want to study any of these three subjects?

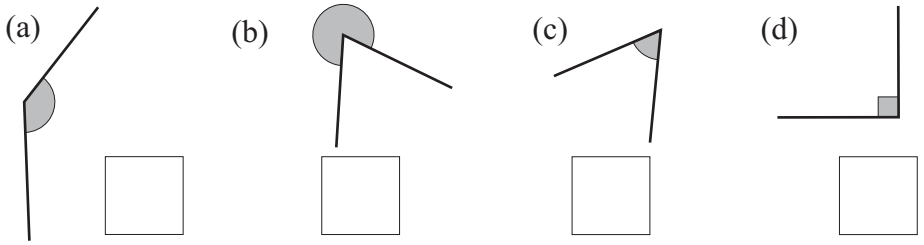
Master Maths 9 Worksheet 43
Angles - Labelling / Measuring

43

Name: _____

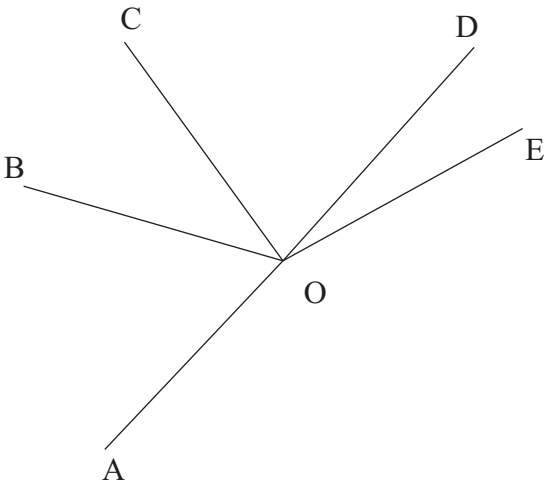
1. In the boxes next to the following angles state if each angle is:

A - an acute angle
B - a right angle
C - an obtuse angle
D - a straight angle
E - a reflex angle



(e) 75° (f) 180° (g) 223° (h) 97° (i) 90° (j) 301°

2. (a) Use a protractor to measure (to the nearest degree) the size of the following angles from this diagram.



(i) ∠COD (ii) ∠DOE

(iii) ∠AOE (iv) ∠AOB

(v) ∠BOC (vi) ∠BOE

(b) Which three angles should add to give ∠BOE?

_____ , _____ , _____ .

(c) What ***should*** be the ***sum*** of the five angles ∠COD, ∠DOE, ∠EOA, ∠AOB and ∠BOC?

(d) Find the sum of your measurements of these five angles.

3. (a) Draw lines connecting the points shown here to enable the size of the following angles to be measured.
∠PQR ∠TQR ∠TRP
(b) Estimate the size of these angles then measure them.
(c) Record your estimates and measurements in this table.

P • • R

Q • • T

Angle	Estimate	Measurement
∠PQR		
∠TQR		
∠TRP		

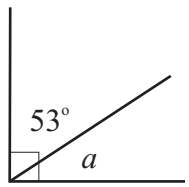
Master Maths 9 Worksheet 44
Calculating Angles

44

Name: _____

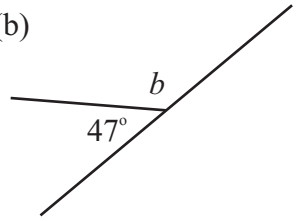
1. Calculate the unknown angles.

(a)



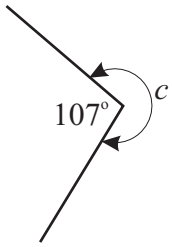
$a =$

(b)



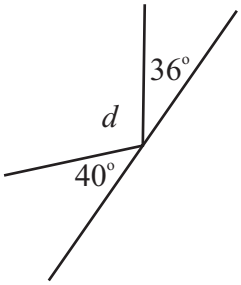
$b =$

(c)



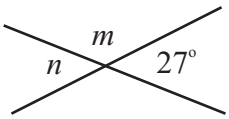
$c =$

(d)



$d =$

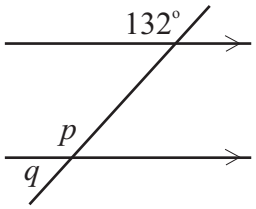
(e)



$m =$

$n =$

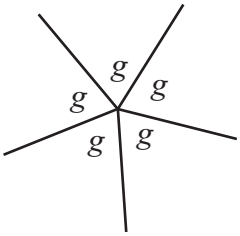
(f)



$p =$

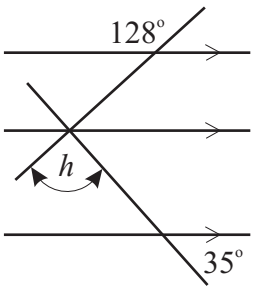
$q =$

(g)



$g =$

(h)

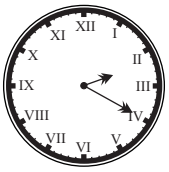


$h =$

2. A wheel of a bicycle has 15 spokes that are equally spaced.
What is the angle between two adjacent spokes?

3. Through what angle does the hour hand move in the following times?
(a) 1 hour (b) 3.5 hours (c) 20 minutes

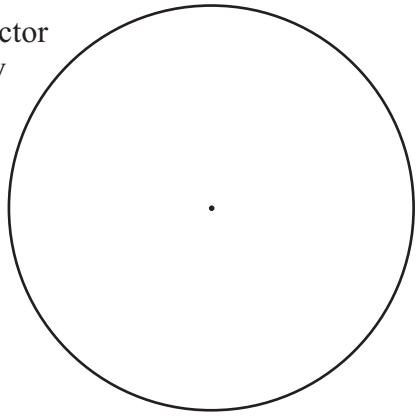
4. What is the angle between the the hour and minute hands of a clock at 2:20?



5. 100 people were asked where they would go for a holiday. The results are shown in the table below.
If this information was to be displayed accurately on a pie graph, complete this table by calculating the angle of each section of the pie graph.

Holiday	Number	Angle
Beach	45	
Snow	20	
Bush	30	
City	5	

Use a protractor to accurately complete the pie graph.

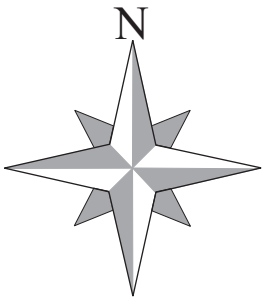


Master Maths 9 Worksheet 45
Compass Directions

45

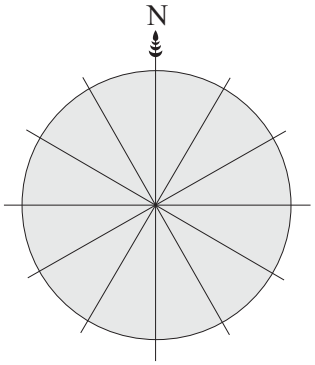
Name: _____

1. Write the directions on each point of the compass shown here.



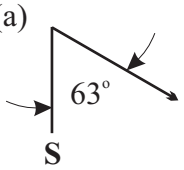
2. Show the directions given in the table on the compass below.

Point	Compass direction
A	N 60° E
B	N 30° W
C	S 30° W
D	S 60° E

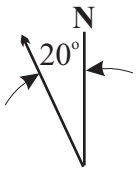


3. State the following compass directions. Remember to start from ***north*** **(N)** or ***south*** **(S)**.

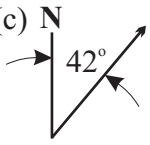
(a)



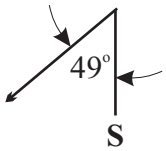
(b)



(c)



(d)



4. (a) Using a protractor and the diagram below, find the compass directions of the following points from point **A**. The north-south and east-west lines through point **A** are shown.

B _____ **C** _____

D _____ **E** _____

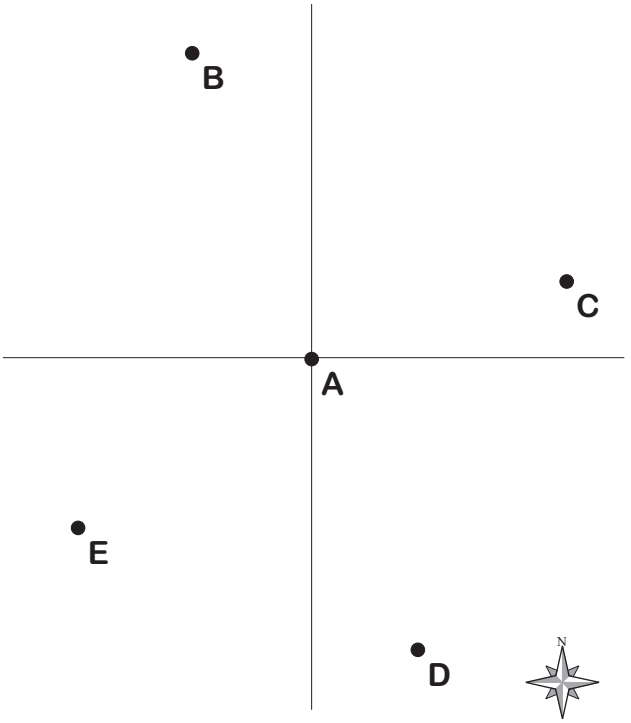
(b) On the diagram accurately show the position of the following points.

(i) point **F** - 5 cm from point **A** in a direction of N 28° E.

(ii) point **G** - 3 cm from point **A** in a direction of S 65° E.

(iii) point **H** - 2 cm from point **A** in a direction of S 71° W.

(iv) point **I** - 4 cm from point **A** in a direction of N 57° W.



Master Maths 9 Worksheet 46
True Bearings

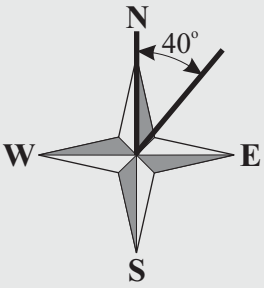
46

Name: _____

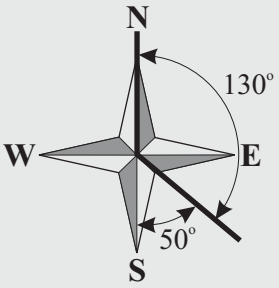
Compass directions may be given as ***true bearings*** (°T) - the angle measured from North in a ***clockwise*** direction.

Examples

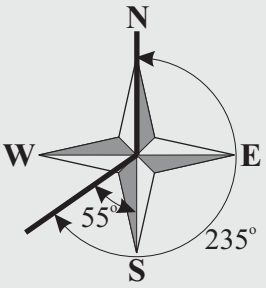
1. N 40° E = **40° T**



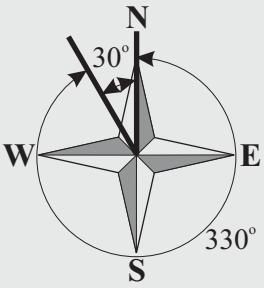
2. S 50° E = **130° T**



3. S 55° W = **235° T**



4. N 30° W = **330° T**



1. Complete the table below showing conversions between compass directions and true bearings.

Compass Direction	True Bearing
E	
S 20° W	
W	
S 20° E	
NW	
N 84° E	
S 37° W	
S 11° E	
N 68° W	
	50° T
	135° T
	180° T
	350° T
	232° T
	156° T

2. A yacht is located at point O shown below.

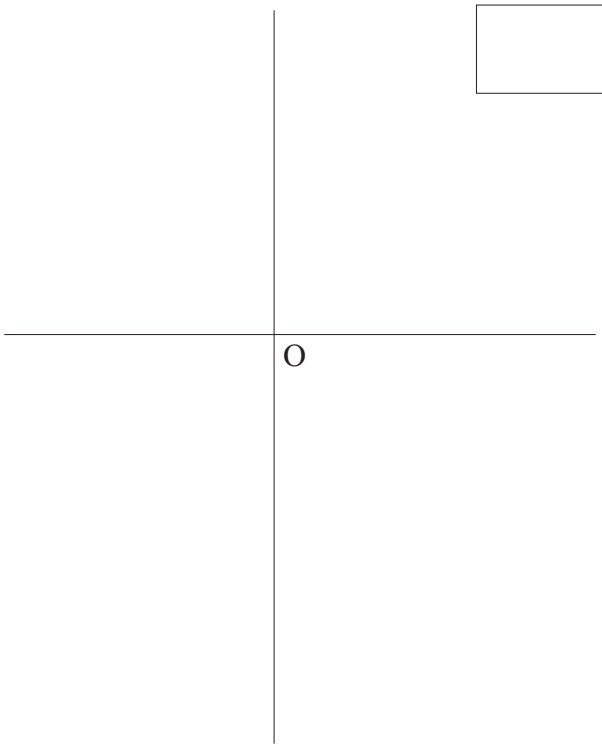
(a) Using the scale of 1 cm = 1 km and a protractor, draw the path of the yacht if it sails in the following directions.

(i) It sails at a true bearing of 323° T for 5 km.

(ii) It then sails at a true bearing of 126° T for 9 km.

(iii) It then sails at a true bearing of 230° T until it is due south of point O.

(b) How far is the yacht from point O?



Master Maths 9 Worksheet 47
Polygons

47

Name: _____

1. (a) Circle the following shapes that are ***polygons***.
(b) Colour in the shapes that are ***regular*** polygons.

2. The letters of each of the following phases when rearranged spell a type of triangle. Rearrange the letters to find the names of the different triangles and give a brief description of each triangle.

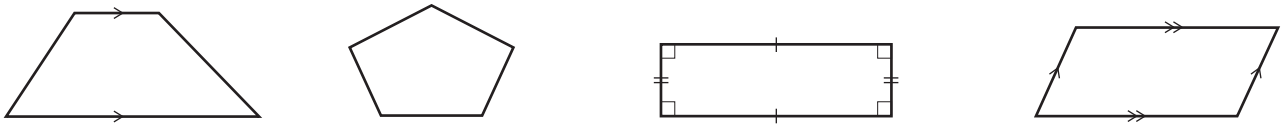
(a) ALL ARE QUIET _____

(b) GARDEN LIGHT _____

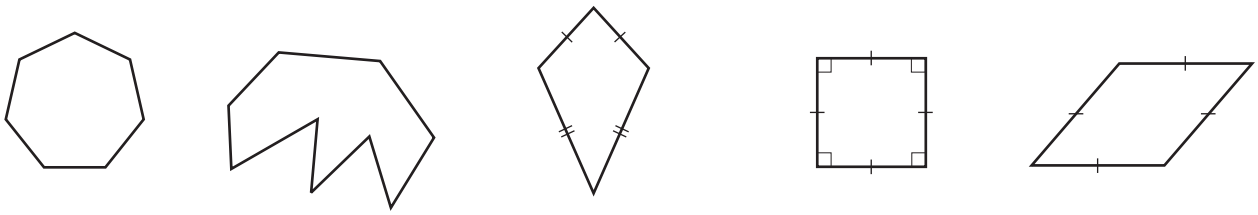
(c) EEL SCAN _____

(d) ICE LOSSES _____

3. Find the names of each of the following polygons in the word puzzle and write the name under each shape.



_____ _____ _____ _____



_____ _____ _____ _____ _____

A	D	P	A	R	A	L	N	A	T	C	E	R	L	K	K	K	I	T	T	E	N
K	N	O	G	A	N	O	N	O	R	E	E	A	M	U	I	Z	E	P	A	R	T
P	T	M	A	R	G	O	L	H	G	C	R	A	N	T	T	T	I	K	R	A	P
Y	E	N	O	A	N	L	O	R	M	A	R	G	O	L	E	L	L	A	R	A	P
H	O	N	T	A	A	M	A	U	P	G	T	O	G	O	N	O	G	E	C	A	O
M	C	P	G	R	B	U	Q	A	O	P	E	N	T	A	G	O	C	R	C	E	H
C	E	R	A	U	Q	S	E	N	O	G	E	R	E	C	T	A	N	G	L	E	R
H	A	P	S	S	Q	U	A	R	T	A	T	N	E	P	E	N	T	A	N	O	G

Master Maths 9 Worksheet 48
Polygons - Calculating Angles

48

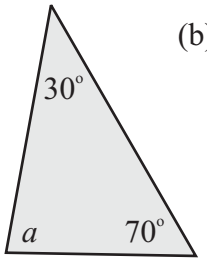
Name: _____

1. Complete this table by writing the sum of the interiors angles for the polygons shown.

Polygon	Sum of Interior Angles
Triangle	
Quadrilateral	
Pentagon	
Hexagon	
Heptagon	
Octagon	
Nonagon	
Decagon	

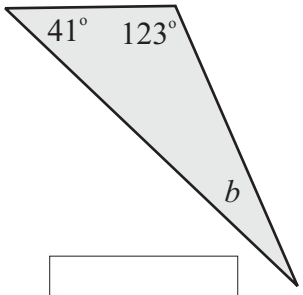
2. Use these values to calculate the unknown angles in the following polygons.

(a)



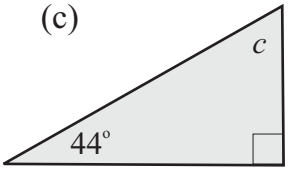
$a =$

(b)



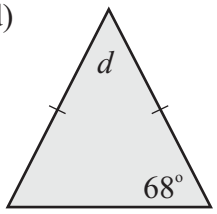
$b =$

(c)



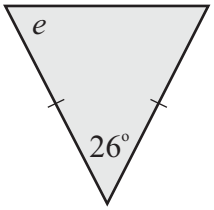
$c =$

(d)



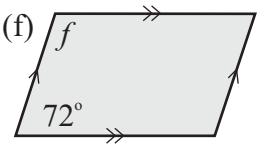
$d =$

(e)



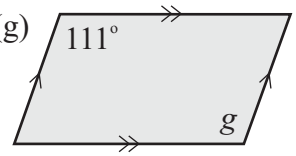
$e =$

(f)



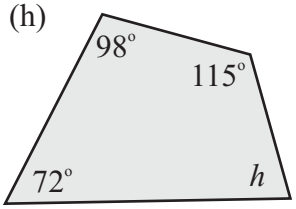
$f =$

(g)



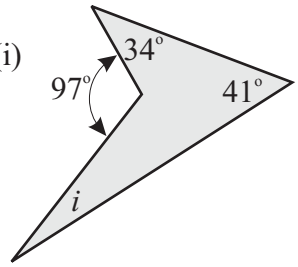
$g =$

(h)



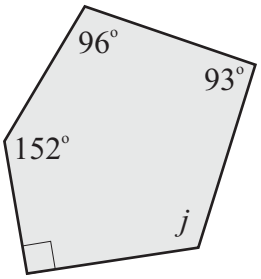
$h =$

(i)



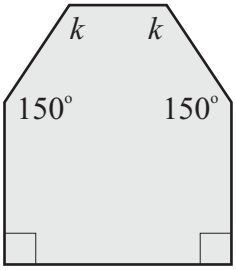
$i =$

(j)



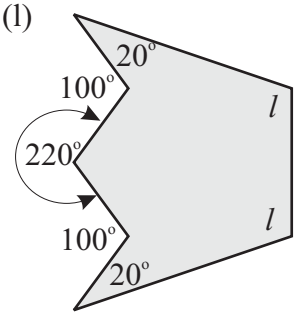
$j =$

(k)



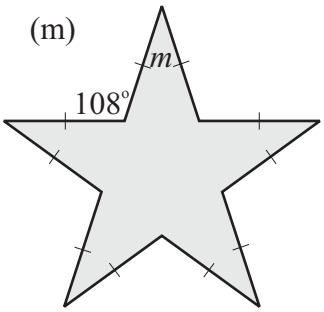
$k =$

(l)



$l =$

(m)



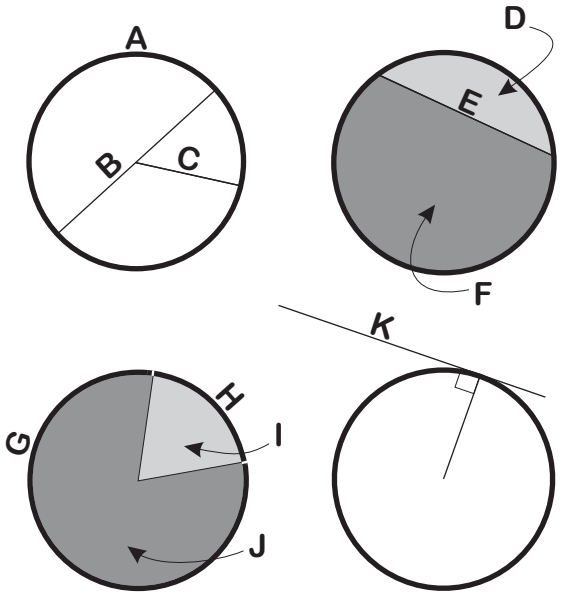
$m =$

Master Maths 9 Worksheet 49
Circles

49

Name: _____

1. Match the terms below with the labels shown on the diagrams.
CHORD MAJOR SEGMENT RADIUS
CIRCUMFERENCE MAJOR ARC
MINOR SEGMENT MAJOR SECTOR
MINOR SECTOR MINOR ARC
DIAMETER TANGENT



A _____

B _____

C _____

D _____

E _____

F _____

G _____

H _____

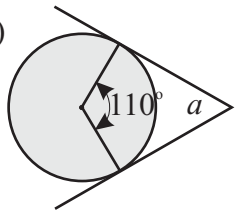
I _____

J _____

K _____

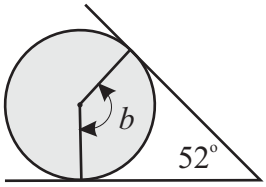
2. Find the unknown angles in the following diagrams.

(a)



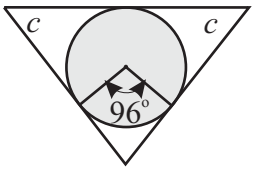
$a =$

(b)



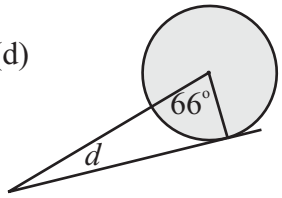
$b =$

(c)



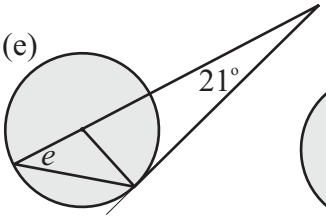
$c =$

(d)



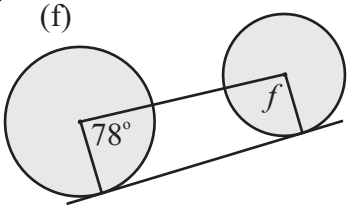
$d =$

(e)



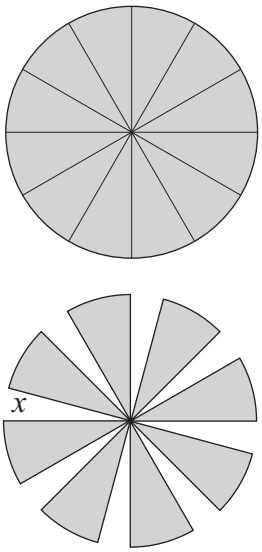
$e =$

(f)



$f =$

3. A circular piece of board is cut into 12 equal sectors.
8 of these sectors are arranged as shown below. The angles between the sectors are equal.
Find this angle, x°.



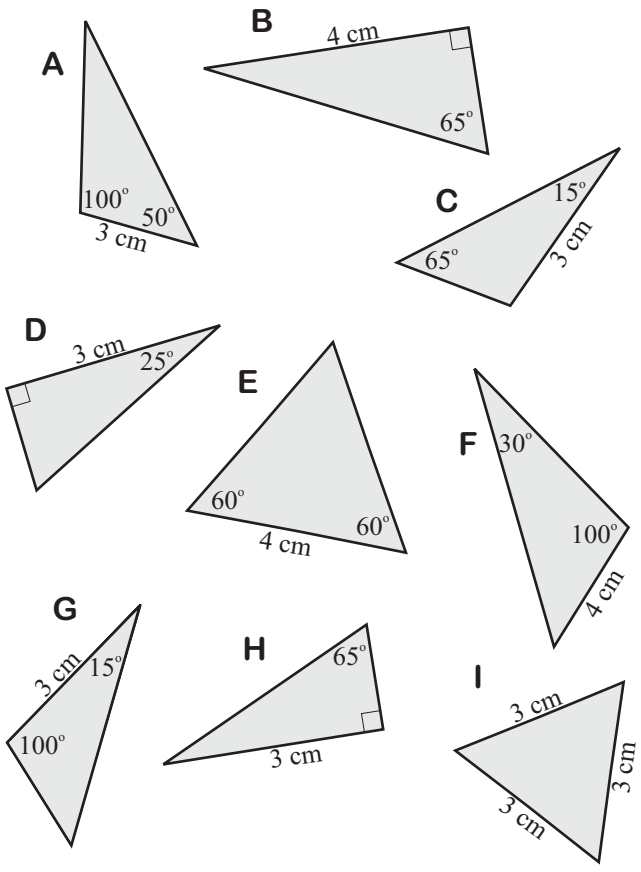
$x =$

Master Maths 9 Worksheet 50
Similar and Congruent Triangles

50

Name: _____

1. From the triangles below find ***four*** pairs of ***similar*** triangles and ***two*** pairs of ***congruent*** triangles.



Pairs of similar triangles:

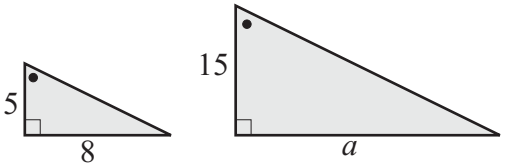
&	&	&	&

Pairs of congruent triangles:

&	&

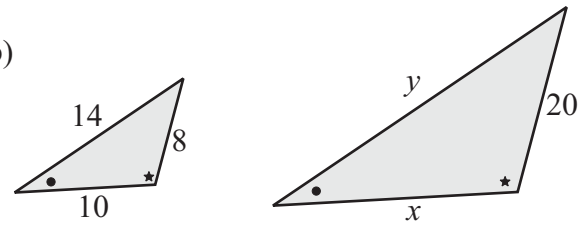
2. Find the unknown lengths.

(a)



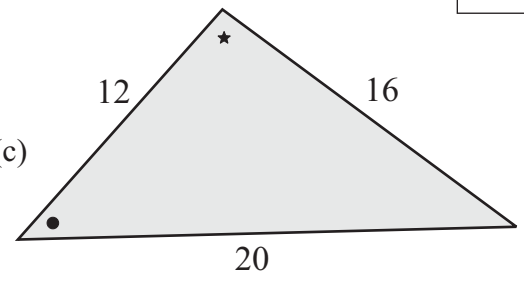
$a =$

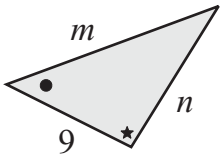
(b)



$x =$
$y =$

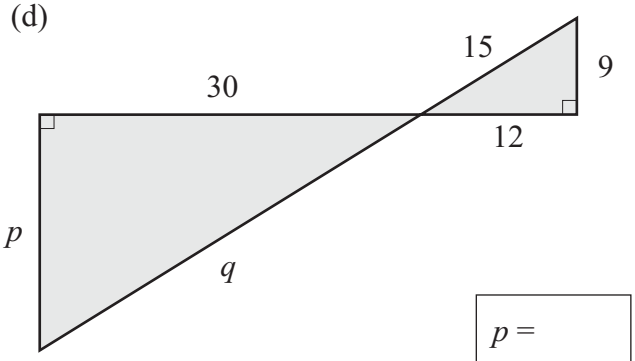
(c)





$m =$
$n =$

(d)



$p =$
$q =$

3. Evie is 165 cm tall. She measured her shadow on a sunny day to be 80 cm long.
The shadow of a tree near Evie was 3.2 m long. How tall is the tree (in metres)?

Master Maths 9 Worksheet 51
Constructions

51

Name: _____

1. (a) Construct a triangle ABC such that:

$\overline{AB}$ = 5 cm, $\angle BAC = 60^{o}$ and $\overline{AC}$ = 4 cm

(b) Measure the length of $\overline{BC}$ and the angles $\angle ABC$ and $\angle ACB$.

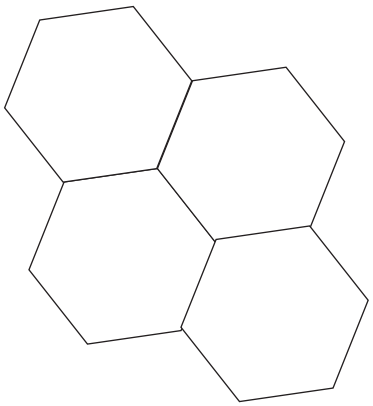
$\overline{BC}$ =	$\angle ABC$ =	$\angle ACB$ =

2. (a) Construct a triangle PQR such that:

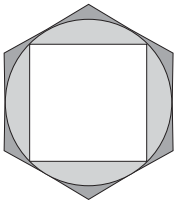
$\overline{PQ}$ = 5 cm, $\angle RPQ = 100^{o}$ and $\angle PQR = 40^{o}$

(b) Construct the perpendicular bisectors of each side of the triangle.
(c) Find the point where the perpendicular bisectors meet.
(d) Use this point as the centre of a circle and draw a circle that passes through the points P, Q and R.

3. Add several more hexagons to this pattern and colour in.



3. Construct this shape which consists of a square with its vertices touching a circle which is inside a regular hexagon.
Start the shape with a regular hexagon that has sides of length 4 cm.

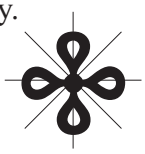
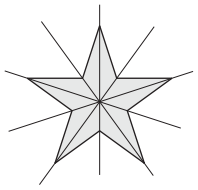


Master Maths 9 Worksheet 52
Symmetry and Reflections

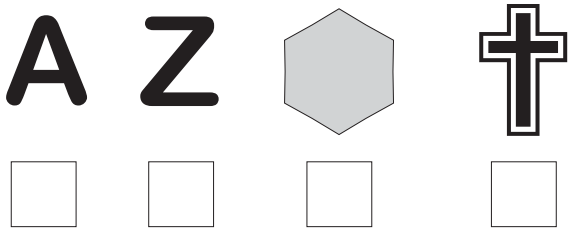
52

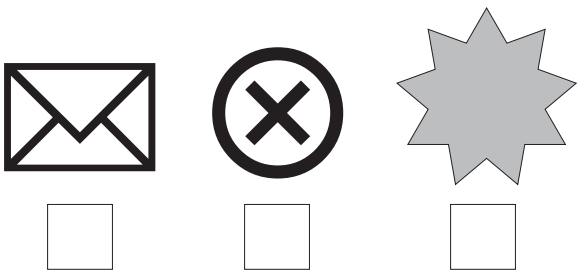
Name: _____

1. On the shapes below draw lines representing all the axes of symmetry (if there are any). Under each shape state the number of axes of symmetry.

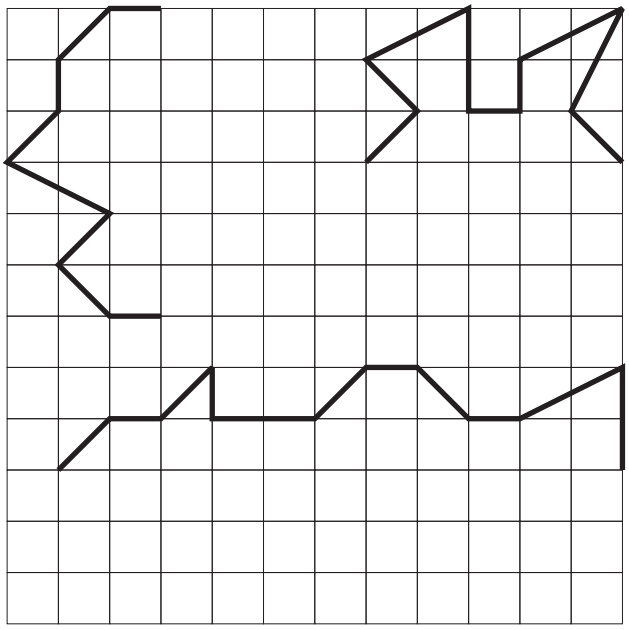
Examples  

4 5

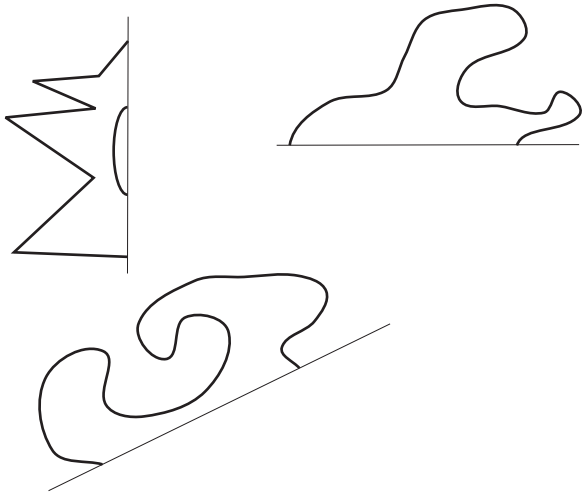




2. On the grid below are drawn several halves of symmetrical shapes. Complete the shapes by drawing the other half of each shape and colour in each shape.



3. One half of three symmetrical shapes are drawn below. Complete the shapes by drawing the other halves.



4. Emergency vehicles often have the name of the emergency service written as a mirror image on the front of the vehicle.
(a) Why is this done?

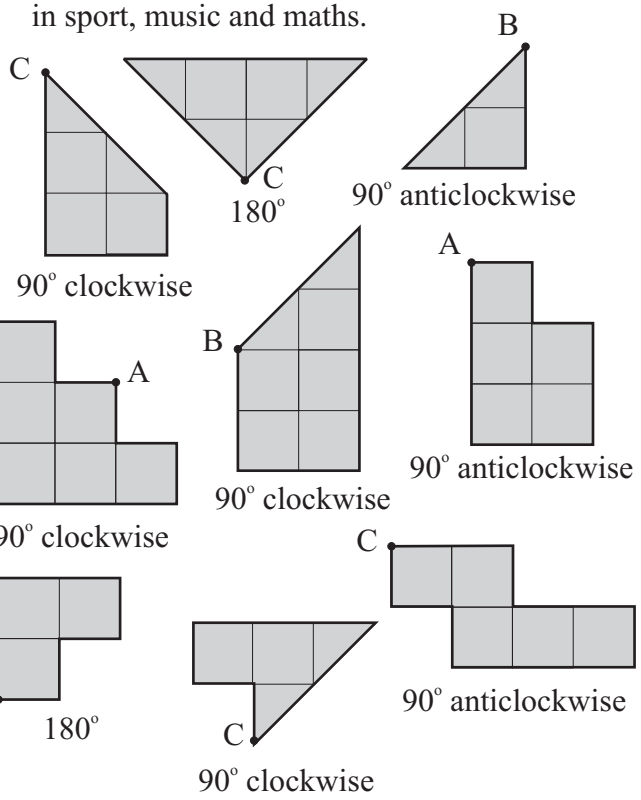
(b) How should the words POLICE, FIRE and AMBULANCE be written in this reflected way?

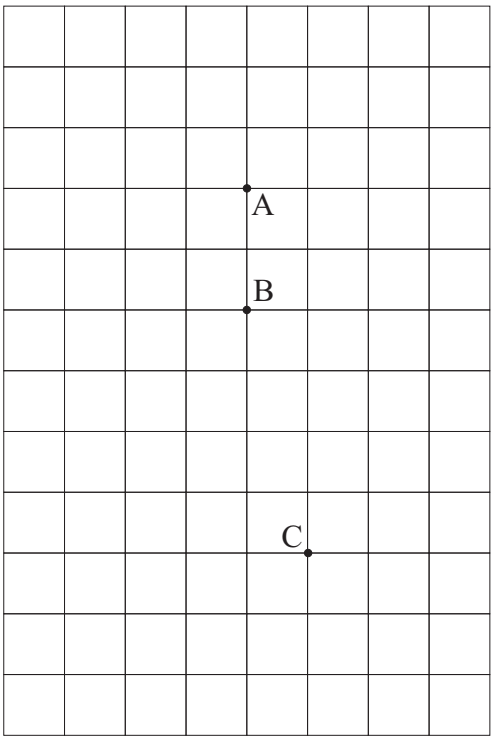
Master Maths 9 Worksheet 53
Rotations and Translations

53

Name: _____

1. Rotate each of the shapes below through the stated angle then align them with the points on the grid.
The resultant shape is something that is found in sport, music and maths.



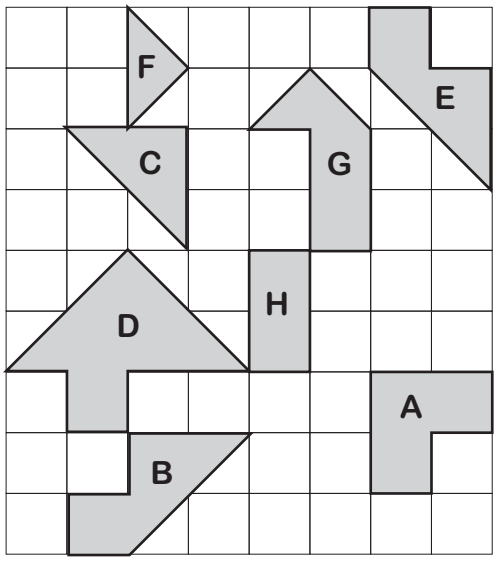


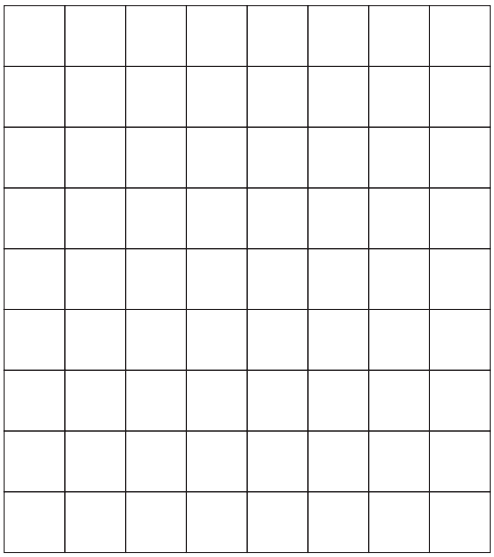
2. Move the shapes on the grid below by the amounts shown in this table and redraw them on the lower grid.
U = UP
D = DOWN
R = RIGHT
L = LEFT

Example:
U3, R2 means move the shape UP 3 squares and RIGHT 2 squares

Shape	Movement
A	U5, L5
B	U6, R1
C	U1, R4
D	U3, R3
E	D3, L3
F	D4, R1
G	D4, L1
H	D2, L1

The resultant shape is something that is found in football, golf and cricket.





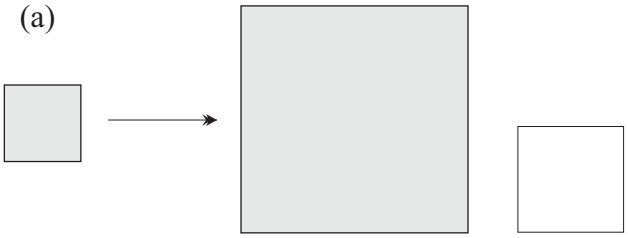
Master Maths 9 Worksheet 54
Enlargements and Reductions

54

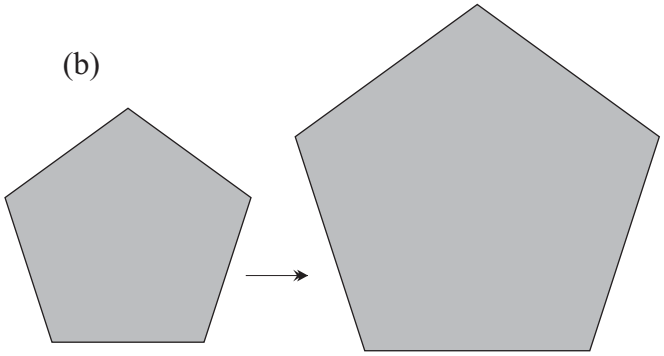
Name: _____

1. Find the scale factors in the following enlargements and reductions by measuring and comparing equivalent dimensions.

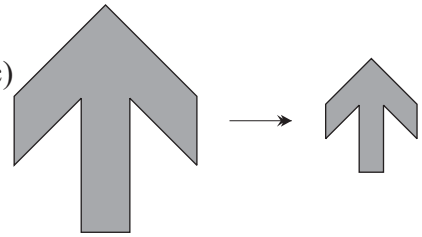
(a)



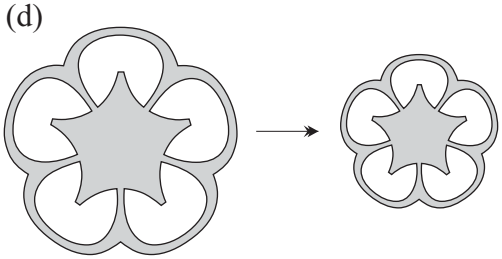
(b)



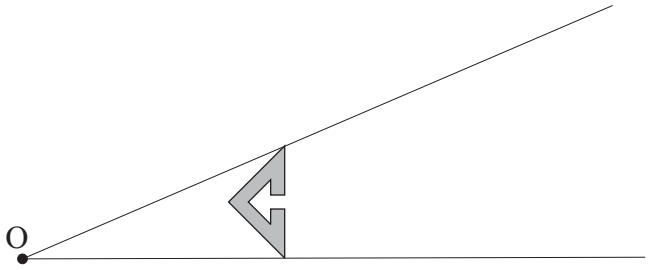
(c)



(d)



2. Use projection lines to draw the shape below enlarged by a factor of 2.
Two of the projection lines are drawn.



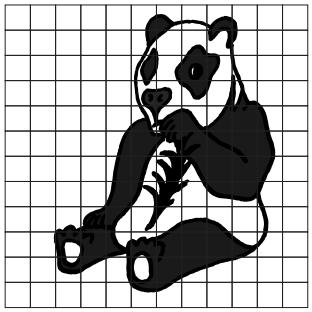
3. Locate an appropriate position of point O from which projection lines can be drawn to redraw the shape below enlarged by a factor of 3.
Draw the enlarged version of this shape.

Master Maths 9 Worksheet 55
Enlarging Using a Grid

55

Name: _____

1. Redraw this picture on the grid below.
2. What is the scale factor?

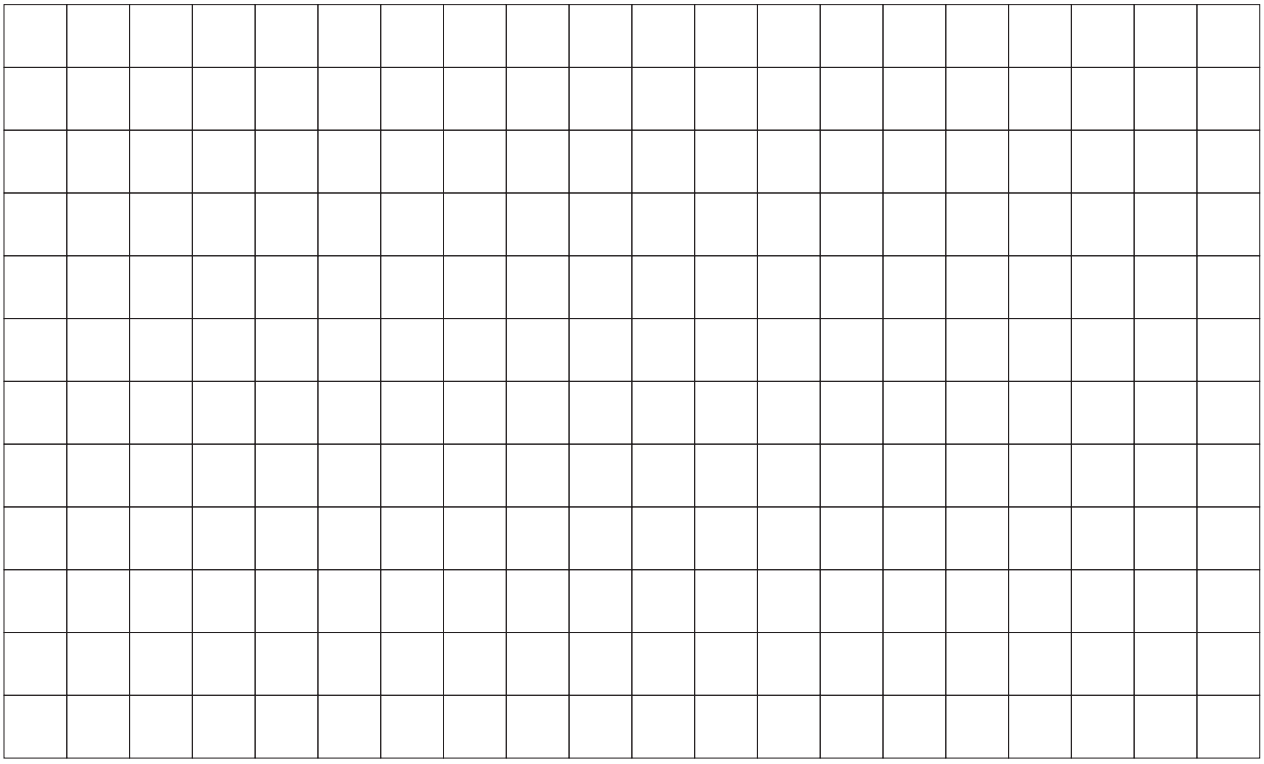


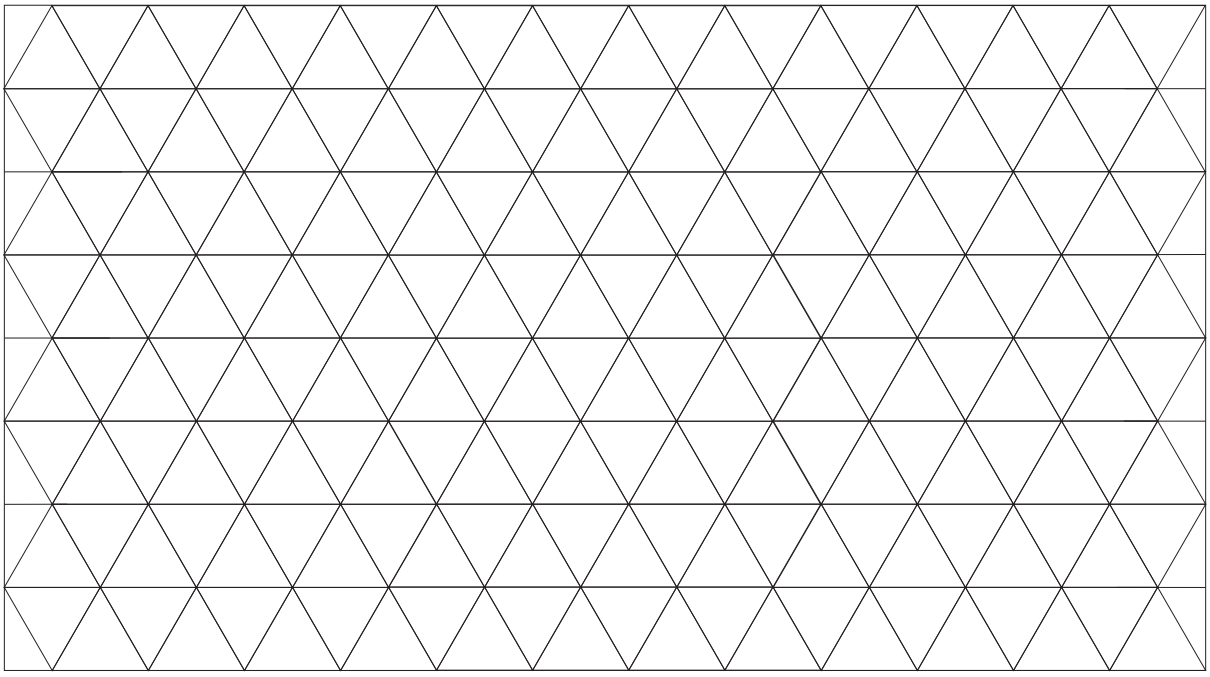
Master Maths 9 Worksheet 56
Tessellations

56

Name: _____

On the grids below create a regular, semi-regular and non-regular tessellation.
Be creative with shapes and colours.





Master Maths 9 Worksheet 57
3D Objects and Nets

57

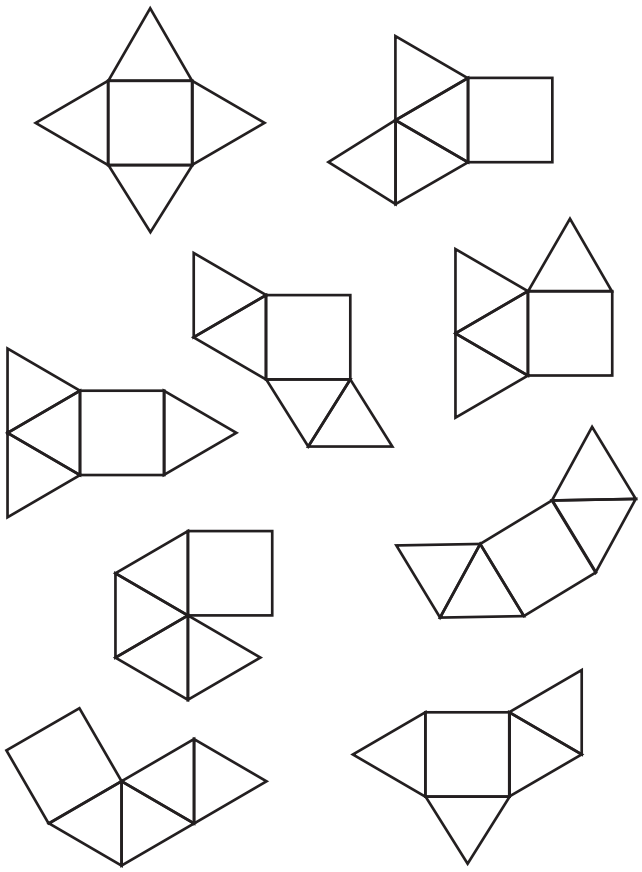
Name: _____

1. Sketch the objects below freehand clearly showing hidden edges with dotted lines.

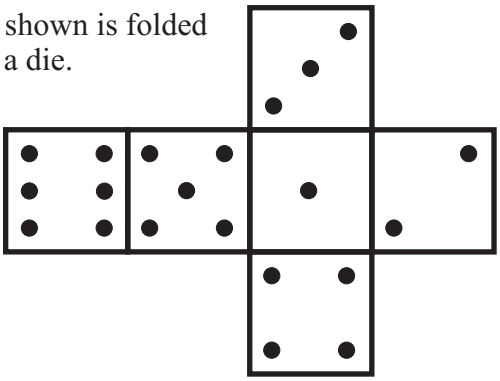
CUBE CYLINDER

TRIANGULAR PRISM PYRAMID

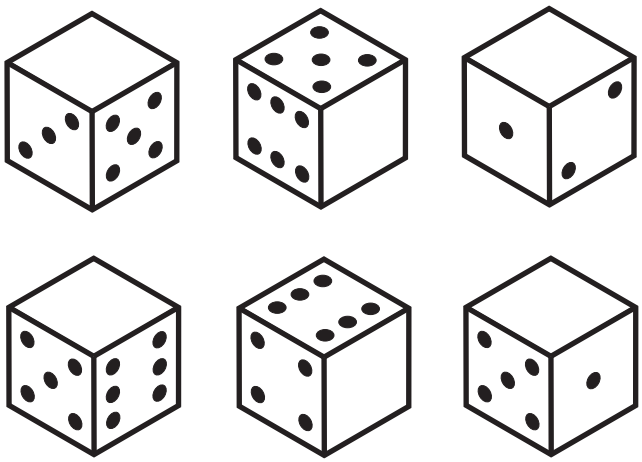
2. Colour in the nets below that ***could*** form a pyramid.



3. The net shown is folded to form a die.



Complete the blank face on each of the following dice formed from this net.



4. (a) Name the five platonic solids.

_____

_____

_____

_____

_____

(b) Research the name of the person who the platonic solids were named after and give some information about that person.

_____

_____

_____

_____

_____

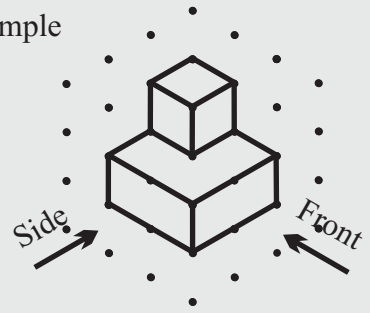
Master Maths 9 Worksheet 58
Views on 3 Dimensional Objects 1

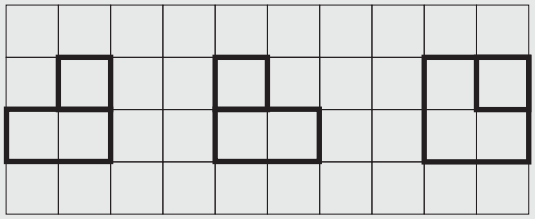
58

Name: _____

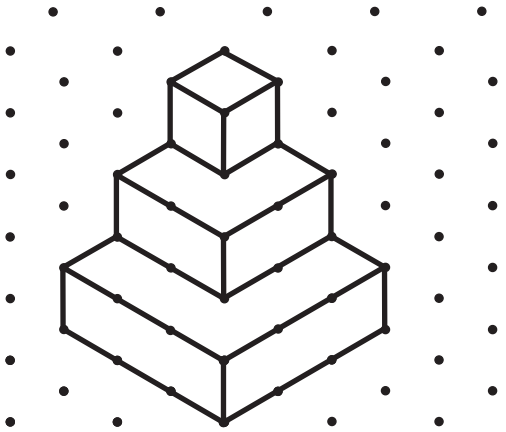
Draw the front, side and top views of the following objects.

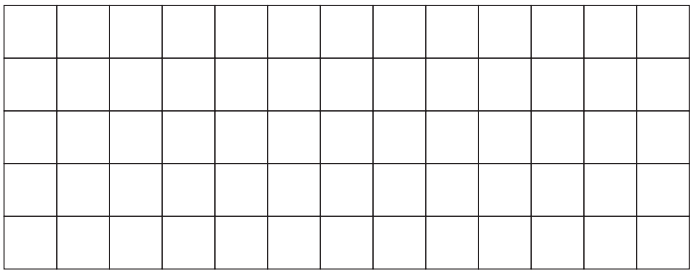
Example



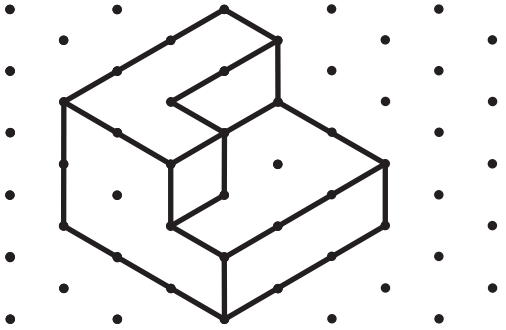


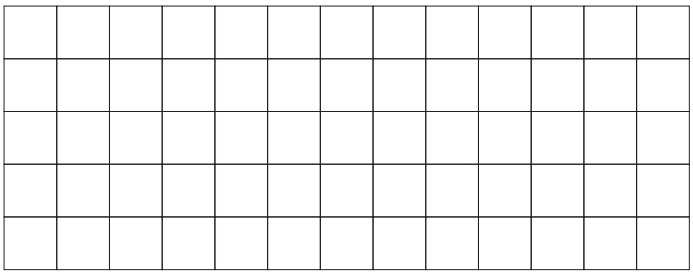
Front View | Side View | Top View



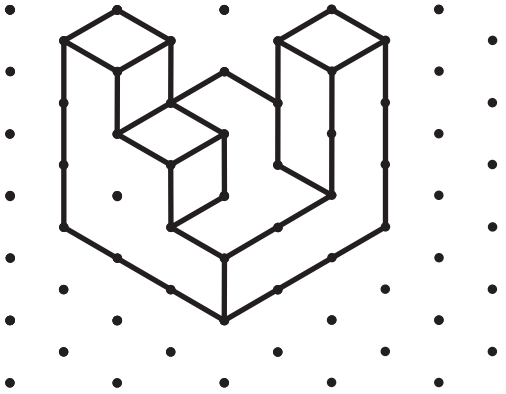


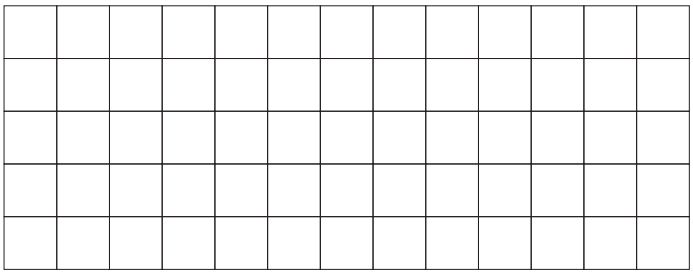
Front View | Side View | Top View





Front View | Side View | Top View





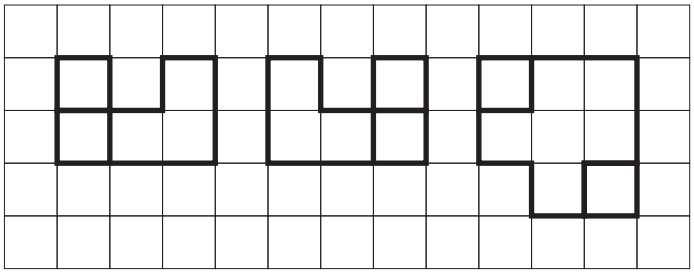
Front View | Side View | Top View

Master Maths 9 Worksheet 59
Views on 3 Dimensional Objects 2

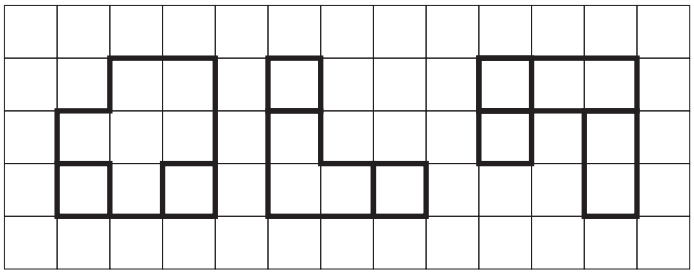
59

Name: _____

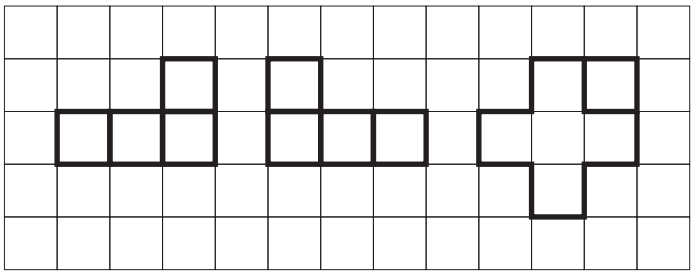
The front, side and top views of several objects are shown below. Draw these objects on the isometric dot grid.



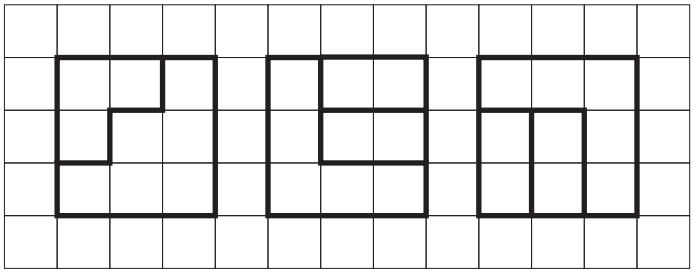
Front View | Side View | Top View



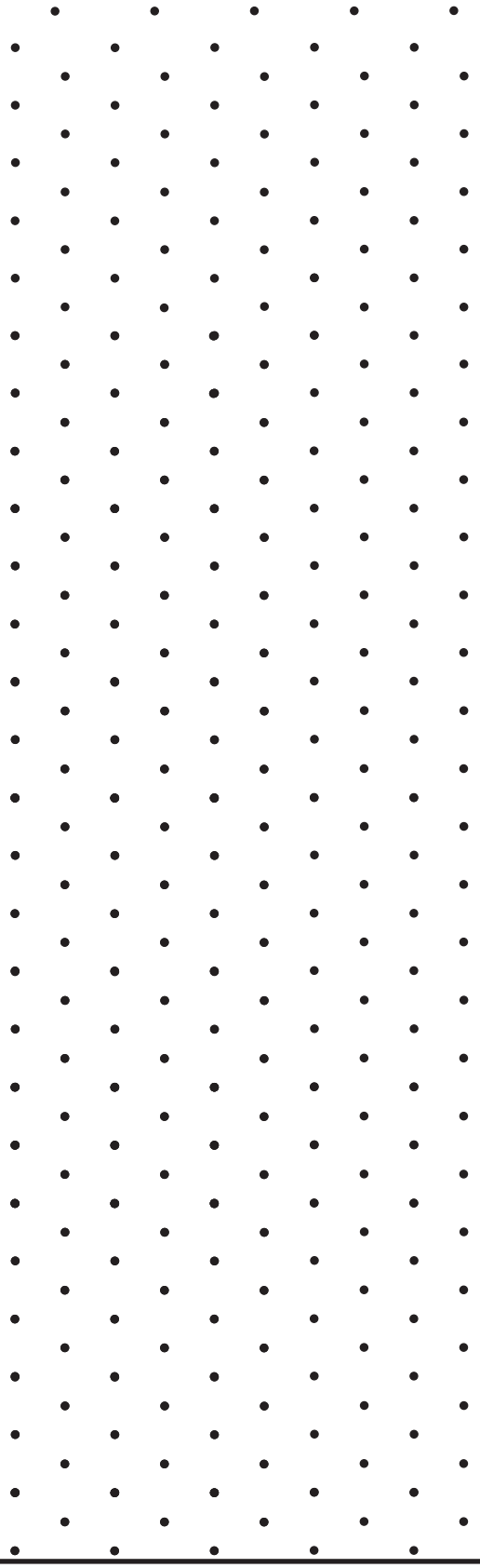
Front View | Side View | Top View



Front View | Side View | Top View



Front View | Side View | Top View



Master Maths 9 Worksheet 60
Length - Conversions

60

Name: _____

1. Which unit (mm, cm, m or km) would be the most appropriate to measure the following objects.

(a) The length of a room

(b) The circumference of a basketball

(c) The diameter of a 10 cent piece

(d) The length of the Swan River

2. Complete the following conversion table. One line is completed as an example.

mm	cm	m	km
4500	450	4.5	0.0045
	6000		
79 000			
		0.95	
			0.31

3. Change the following lengths to the units shown in the brackets.

(a) 3cm 8 mm (mm)

(b) 8 m 52 cm (m)

(c) 13 cm 4 mm (cm)

(d) 2 m 6 cm (cm)

(e) 5 m 68 mm (m)

4. Round the following lengths to the nearest metre.

(a) 8.7 m (b) 39.6 m (c) 16.3 m

5. Round the following lengths to the nearest metre.

(a) 5 m 29 cm (b) 7 m 83 cm (c) 6 m 93 mm

(d) 3 m 9 cm (e) 8 m 611 mm (f) 2 m 459 mm

6. Arrange these lengths in order from the shortest to the longest.

A 9543 mm **B** 953 cm **C** 9.551 m
D 9 m 51 cm **E** 959 mm **F** 9 m 541 mm
G 0.0095 km **H** 94 cm 5 mm

7. Danielle measured one of her steps to be 80 cm. How many steps would she take in walking 1 km?

8. Kevin grew a zucchini that was 1.4 m long? It took 16 weeks to reach this length. How many millimetres (on average) did it grow each day?

9. A snail was sliding at a rate of 2 mm/second. How many ***minutes*** would it take the snail to travel 3 metres?

Master Maths 9 Worksheet 61
Scales

61

Name: _____

1. The scale on a map is 1:1000.
(a) Find the actual distances (in ***metres***) of the following lengths that were measured off the map.
(i) 8 cm (ii) 46 mm (iii) 13.5 cm

(b) Find the lengths on the map (in ***mm***) of the following distances.
(i) 25 m (ii) 8 m (iii) 115 m

2. The scale on a map is 1:500 000.
(a) Find the actual distances (in ***km***) of the following lengths on the map.
(i) 4 cm (ii) 56 mm (iii) 14.5 cm

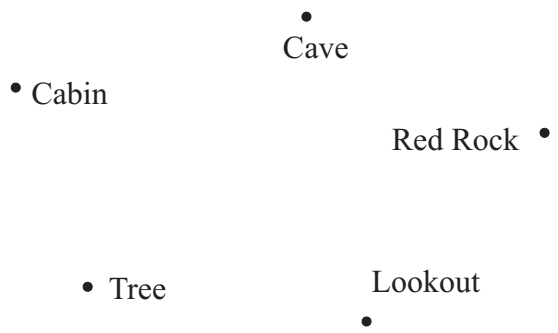
(b) Find the lengths on the map (in ***mm***) of the following distances.
(i) 10 km (ii) 25 km (iii) 34 km

3. The model of a train was 35 cm long. If the scale of the model was 1:200, find the actual length of the train (in ***m***).

4. An architect built a model of a bridge she designed. The model was 80 cm long and the actual bridge was 400 m long.
What is the scale of the model?

5. A map is shown below.
The scale of the map is 1:200 000.
(a) Measure the distance between the following features and use the scale to calculate the actual distances in ***kilometres***.

Features	Actual Distance (km)
Cabin and Cave	
Tree and Red Rock	
Lookout and Cave	



(b) Someone left the cabin and visited the cave, red rock, lookout, tree and then returned to the cabin. They walked in straight lines between the all features. What is the total distance (in km) that they have walked?

6. Find the dimensions of a soccer field and use an appropriate scale to draw the field below. What scale have you chosen?

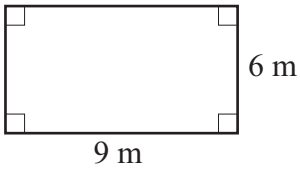
Master Maths 9 Worksheet 62
Perimeter 1

62

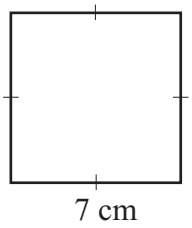
Name: _____

1. Find the perimeter of the following shapes.

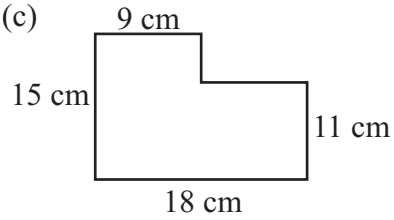
(a)



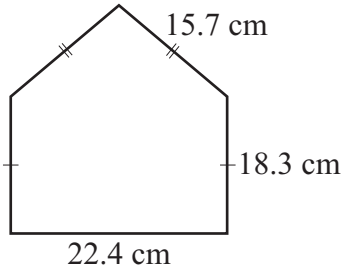
(b)



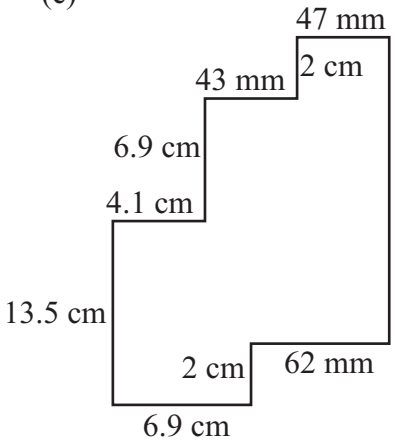
(c)



(d)

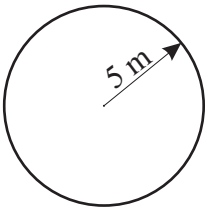


(e)

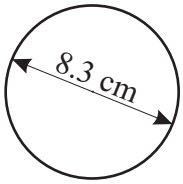


2. Find the circumference of these circles.
Write answers correct to ***one decimal place***.

(a)

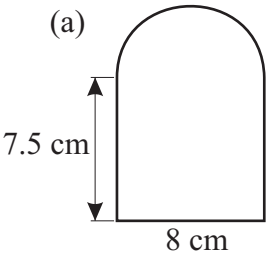


(b)

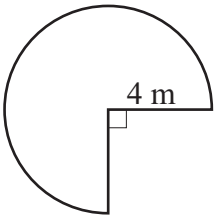


3. Find the perimeter of these shapes.
Write answers correct to ***one decimal place***.

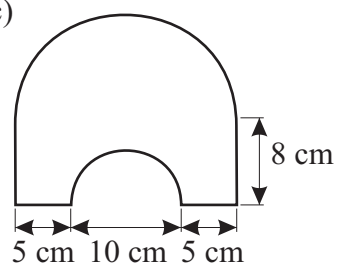
(a)



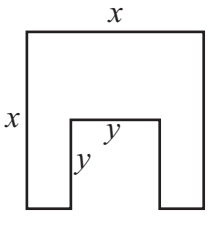
(b)



(c)



4. Write an expression for the perimeter of this shape.



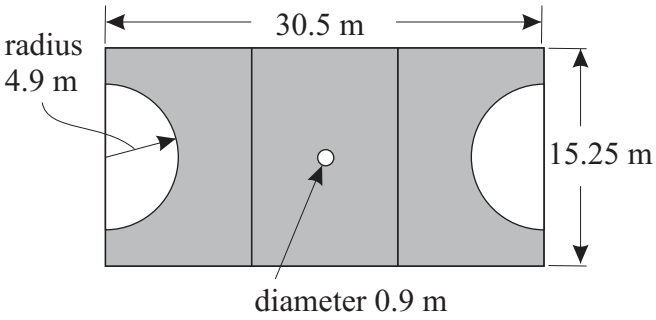
Master Maths 9 Worksheet 63
Perimeter 2

63

Name: _____

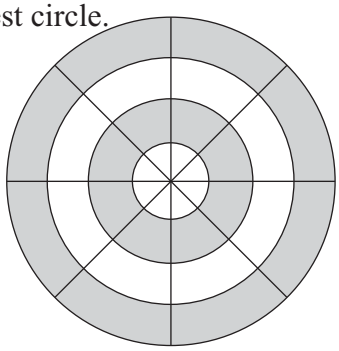
1. A ***square*** room has a perimeter of 15.2 m. What is the length of each wall in the room?

2. The dimensions of a netball court are shown below. All the lines are shown.



What is the total length of all the lines on a netball court? Give answer correct to one decimal place.

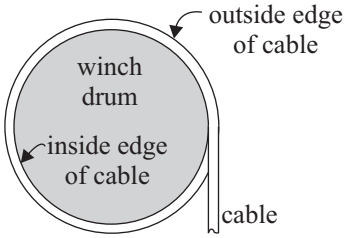
3. The diagram below is of a dart board.
The centre circle is to have a diameter of 10 cm.
Each circle is to have a diameter 10 cm larger than the next smallest circle.
The dart board is to be divided into 8 equal sections.
All the lines are to be made of wire.
What is the total length of wire needed?
Give answer in ***cm*** correct to one decimal place.



4. Alex used a piece of string wrapped around a tree to find its circumference. He measured a tree's circumference to be 4.474 m.
(a) Use this measurement to find the diameter of the tree. Give answer to the nearest ***mm***.

(b) There is a growth ring for each year of a tree's age. If the growth rings are 2 mm wide, find the age of the tree.

5. When a cable is wrapped around a winch drum, the outside edge of the cable is longer than the edge closer to the drum of the winch.



Find the difference in length, to the nearest ***mm***, between the inside and outside edges of a cable 10 mm in diameter that is wrapped around a winch drum of 75 cm diameter.

Master Maths 9 Worksheet 64
Area 1

64

Name: _____

1. Convert the following areas to the units shown in the brackets.

(a) 3 m^2 (cm^2)

(b) 4500 mm^2 (cm^2)

(c) 0.79 cm^2 (mm^2)

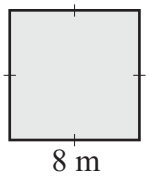
(d) 89 000 cm^2 (m^2)

(e) 250 000 m^2 (ha)

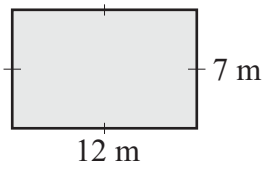
(f) 0.031 ha (m^2)

2. Find the area of the following shapes.

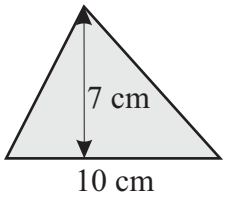
(a)



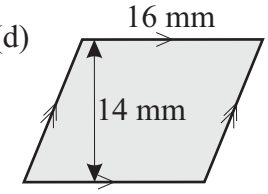
(b)



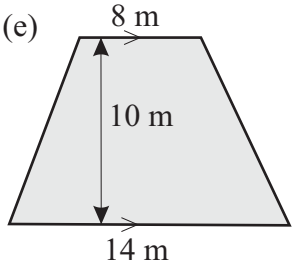
(c)



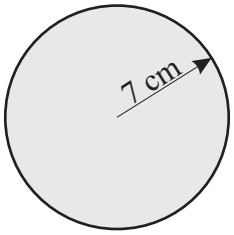
(d)



(e)



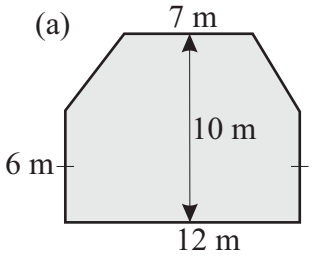
(f)



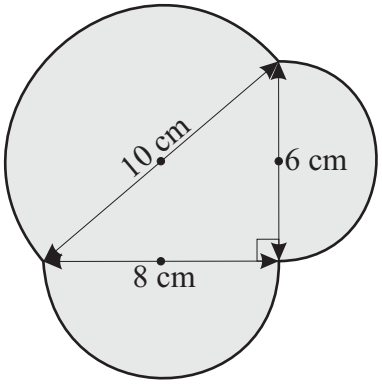
(one decimal place)

3. Calculate the area of the following shapes. Give answers to one decimal place where appropriate.

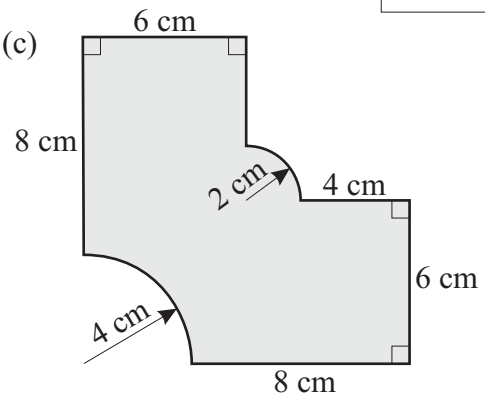
(a)



(b)



(c)



Master Maths 9 Worksheet 65
Area 2

65

Name: _____

1. Choose the best estimate of the area of the following objects.

(a) The playing surface of an AFL football ground.

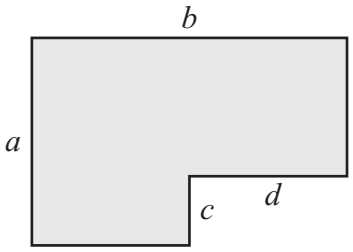
A 200 m^2 **B** 2000 m^2
C 20 000 m^2 **D** 200 000 m^2

(b) A postage stamp.

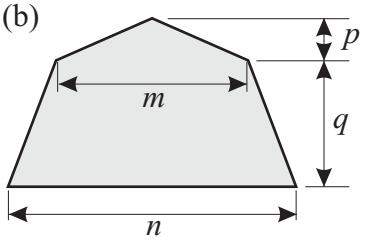
A 1 cm^2 **B** 10 cm^2
C 50 cm^2 **D** 100 cm^2

2. Write a rule that could be used to find the shaded area of the following shapes.

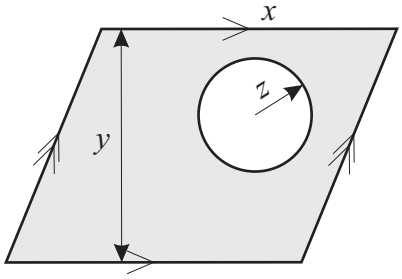
(a)



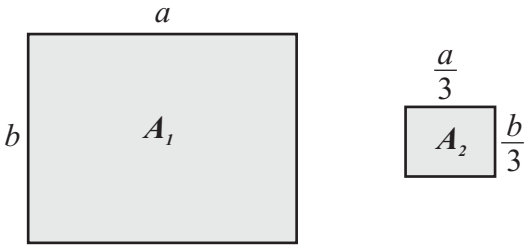
(b)



(c)



3. A rectangular sheet of paper with dimensions a and b has an area of A_1.
The area of a sheet of paper with dimensions that are one third these is A_2.



Which one of the following statements is correct?

A $A_2 = \frac{1}{3}A_1$ **B** $A_2 = \frac{2}{3}A_1$

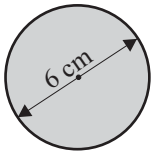
C $A_2 = \frac{1}{9}A_1$ **D** $A_2 = \frac{2}{9}A_1$

4. Dough is rolled out to make biscuits.
The rolled-out dough is in the shape of a rectangle, 30 cm by 24 cm. The biscuit cutter is a circle of diameter 6 cm.

(a) What is the ***area*** of this rectangular piece of dough?

(b) What is the maximum ***number of biscuits*** that could be ***cut*** from this sheet of dough?

(c) Find the ***area*** of the top of a biscuit. Write the answer correct to ***one decimal place***.



(d) What ***area*** of dough remains after the biscuits are cut from it?

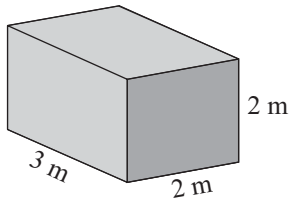
Master Maths 9 Worksheet 66
Total Surface Area 1

66

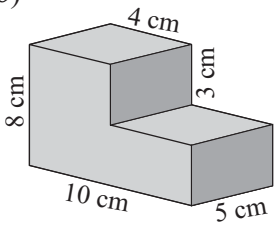
Name: _____

1. Find the ***total surface area*** of these objects.

(a)

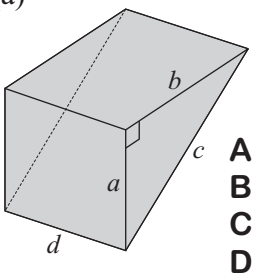


(b)



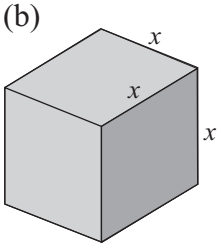
2. Select the correct formula for the ***total surface area*** of these two objects.

(a)



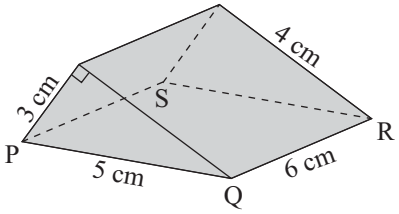
A $abcd$
B $ab + bd + cd$
C $2ab + bd + cd + ad$
D $ab + bd + ad + cd$

(b)

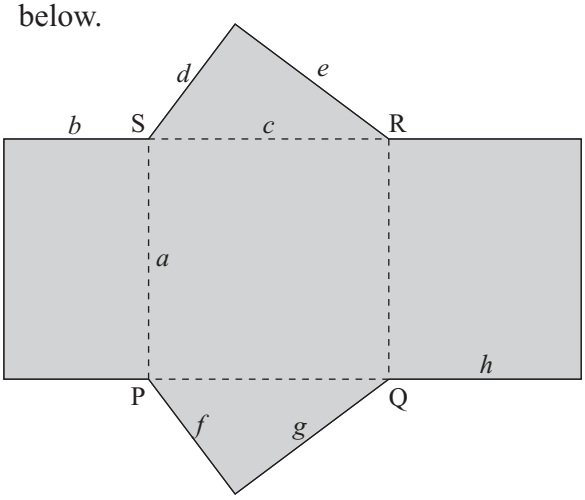


A $12x$
B $6x^2$
C x^3
D $3x^2$

3. Xavier wants to make this ***triangular prism*** from a piece of cardboard.



The ***net*** for this triangular prism is shown below.

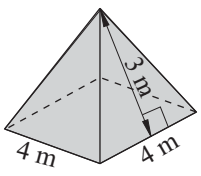


Complete this table giving the dimensions of the net for the cardboard cut-out.
All dimensions are in centimetres.

a	b	c	d	e	f	g	h
6							

4. Meredith wants to make a tent in the shape of a ***square based pyramid*** as shown.

(a) Find the total ***area*** of canvas required to make the tent if the base is ***not*** included.



(b) If canvas costs $35 per square metre find the total cost of the canvas.

Master Maths 9 Worksheet 67
Total Surface Area 2

67

Name: _____

1. Adrian makes a large rectangular box from sheet metal to store food for his horses.
The box is to have a lid.
The box is to be 2 m by 2 m by 1 m high.

(a) Find the ***total surface area*** of the box.

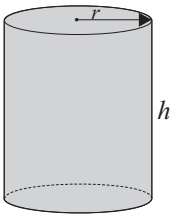
(b) Adrian's sister, Natasha, discovers that the pieces for the box may be cut from a ***square*** sheet of metal with no wastage.
What is the ***side length*** of this square?

(c) On the square below mark out the pieces for the box.

2. The ***total surface area*** of a ***cylinder*** may be calculated using the formula:

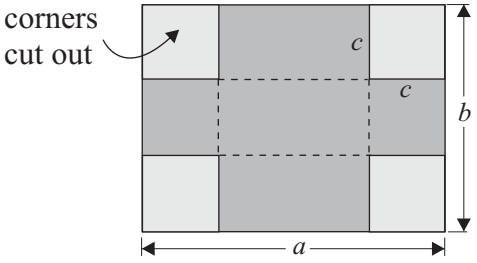
T.S.A. = $2\pi r(r + h)$

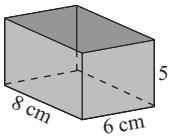
where r = radius
and h = height of cylinder



Find the ***total surface area*** of a water tank in the shape of a cylinder with a radius of 1 m and a height of 3 m.
Give answer correct to ***one decimal place.***

3. A rectangular box ***without a top*** is to be made from the piece of cardboard shown, by cutting square pieces out of the corners and folding along the dotted lines.





Dimensions of the box are 8 cm × 6 cm × 5 cm high.

(a) Find the ***dimensions*** of the piece of cardboard from which the box is to be made.

a =

b =

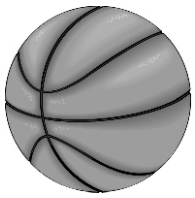
(b) Find the ***side length,*** c, of the squares to be cut from the corners of the cardboard.

c =

4. The ***total surface area*** of a ***sphere*** (ball) is calculated using the formula:

T.S.A. = $4\pi r^2$

where r is the radius



(a) Calculate the ***total surface area*** of a basketball with a radius of 12 cm.
Give your answer correct to ***the nearest cm^2.***

(b) If the basketball was to be made from a piece of leather 50 cm square, find the ***area*** of leather ***not*** used.

Master Maths 9 Worksheet 68
Volume 1

68

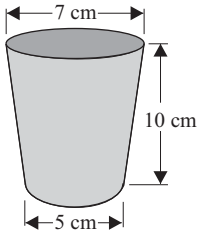
Name: _____

1. Complete these conversions.

(a) 1 litre	cm^3	(b) 1 m^3	litres
(c) 1 cm^3	mm^3	(d) 150 ml	litres
(e) 75 cm^3	mL	(f) 1500 cm^3	litres
(g) 8 cm^3	mm^3	(h) 0.05 ml	mm^3

2. Choose the best estimate of the capacity of this plastic drink cup.

A 3 cm^3
B 30 cm^3
C 300 cm^3
D 3000 cm^3



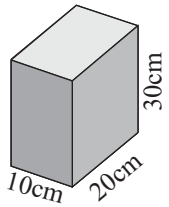
3. How many 375 mL cans of water would it take to fill a 3 litre saucepan?

4. A kettle filled with two litres of water is emptied into eight cups, equally.
What volume of water, in cm^3, is in each cup?

5. Kumkleen detergent is sold in three different sizes.
Which is the ***cheapest per millilitre***?

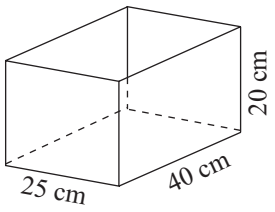
A $1.15 for 500 ml.
B $2.75 for 1.25 litres.
C $11.20 for 5 litres.

6. Calculate the ***volume,*** in cm^3, of this object.



7. In a science experiment, hydrochloric acid is diluted with distilled water in the ratio of one part of acid to five parts of water.
What ***volume*** of acid should be added to 3 litres of water?
Write answer in ***millilitres***.

8. (a) Find the ***capacity***, in ***litres***, of a fish tank with the dimensions shown.



(b) If the tank is filled to 2 cm from the top with water, how much water is required?
Write answer in ***litres***.

(c) If the recommended stocking rate is 1 fish per 3 litres of water, how ***many fish*** could be placed in the tank if the water level is 2 cm from the top of the tank?

(d) If fish-tank rocks have an average volume of 100 cm^3, how ***many rocks*** would it take to ***raise*** the water level 1 cm?

Master Maths 9 Worksheet 69
Volume 2

69

Name: _____

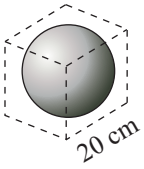
Where appropriate, give answers on this worksheet correct to one decimal place.

1. Write the formula that can be used to calculate the volume of a ***sphere*** with radius *r*.

Calculate the ***volume*** of a tennis ball with a radius of 3.3 cm.

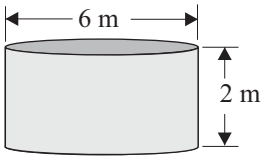
2. A sculptor makes balls (spheres) from stone ***cubes*** of side length 20 centimetres.

(a) Calculate the ***volume*** of the ***cube***.

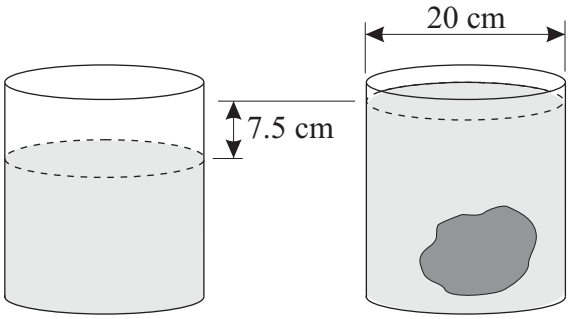


(b) What is the ***volume*** of the ***largest ball*** she could make from the cube?

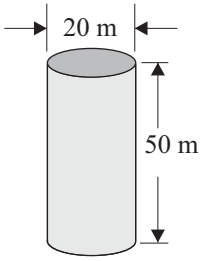
3. Calculate the ***volume***, in m^3, of this cylinder.



4. A rock is dropped into a cylinder with a diameter of 20 cm and the water level rises by 7.5 cm.
What is the volume of the rock?



5. (a) Calculate the ***capacity,*** in m^3, of the wheat silo with the dimensions shown.



(b) A rectangular railway truck has inside dimensions of 8 m long, 3 m wide and 2 m high.
What is the ***capacity***, in m^3, of one of these railway trucks?

(c) How ***many railway trucks*** could be filled from the silo?

Master Maths 9 Worksheet 70
Time

70

Name: _____

1. Complete the following conversions.

(a) 3 minutes = _____ seconds

(b) 5 hours = _____ minutes

(c) 1 week = _____ minutes

(d) 270 minutes = _____ hours

(e) 2.8 hours = _____ minutes

(f) 1476 seconds = _____ minutes

2. Complete this table showing conversions between 12 hour and 24 hour time.

12 hour	24 hour
3.40 am	
	0230
2.15 pm	
	1345
8.25 pm	
	2155

3. ***Circle*** the following years that are ***leap years***.

1956 1231 2800 1822 2200 830 1566 2116 1760 1500

4. How many days are in the following months?

(a) September (b) August (c) July

(d) January (e) February (2056)

5. How many days after Christmas is Australia Day?

6. Albert is going to walk 4000 km to raise money. He plans to walk 50 km every day. He is going to start his walk on Monday June 14.
What day and date will he finish his walk?

7. The table below shows the time in several cities around the world when it is 9 am on Tuesday in Melbourne.

London	Singapore	Melbourne	Christchurch
11 pm Mon	6 am Tues	9 am Tues	11 am Tues

Use this table to find the following times.
What time will it be in Melbourne when it is:
(a) 3 pm on Monday in London?

(b) 6 am on Friday in Christchurch?

(c) 2 pm on Saturday in Singapore?

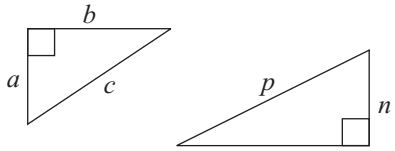
8. Garth has run the following times in his last four 1500 metre races.
Times are in minutes:seconds.
3:48.6 3:56.9 4:08.9 3:52.8
What is his average time for these four races?

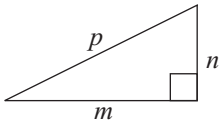
Master Maths 9 Worksheet 71
Pythagoras' Theorem 1

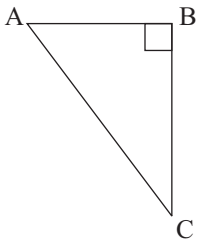
71

Name: _____

1. Highlight, in red, the hypotenuse of these triangles.

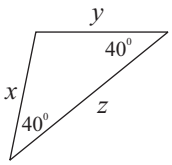






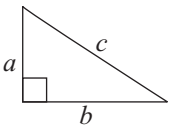
2. State whether the following are true or false.

(a)



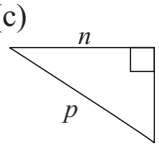
$x^2 + y^2 = z^2$ ☐

(b)



$a^2 + b^2 = c^2$ ☐

(c)



$m^2 + n^2 - p^2 = 0$ ☐

(d) The hypotenuse is always the longest side of a right-angled triangle. ☐

(e) It is impossible to have an equilateral right-angled triangle. ☐

(f) It is impossible to have an isosceles right-angled triangle. ☐

(g) The right angle in a right-angled triangle is always opposite the hypotenuse. ☐

(h) The sum of the lengths of the shortest sides of a right-angled triangle is equal to the length of the hypotenuse. ☐

3. Use a ruler, pencil and compass to draw a triangle with side lengths of 3 cm, 4 cm and 5 cm.

Measure the angle between the 3 cm and 4 cm sides.

The angle is ☐

4. A Pythagorean triad is a set of whole numbers that fits Pythagoras' theorem.
For example: 3, 4 and 5 is a Pythagorean triad because $3^2 + 4^2 = 5^2$.
Each of the following tables contains a set of Pythagorean triads.
Look for a pattern in each set of triads.

Use the pattern to help you complete the next two triads in each set.

(a)

3, 4, 5
5, 12, 13
7, 24, 25
9, 40, 41
11, 60, 61

(b)

6, 8, 10
8, 15, 17
10, 24, 26
12, 35, 37
14, 48, 50

Master Maths 9 Worksheet 72
Pythagoras' Theorem 2

72

Name: _____

Give all answers on this worksheet correct to <u>one</u> decimal place.

1. Circle three numbers in the following set that form a Pythagorean triad.

15 17 21 36 38 39

2. Perform these calculations.

(a) $\sqrt{3^2 + 8^2}$

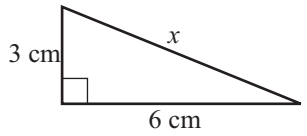
(b) $\sqrt{2.1^2 + 7.1^2}$

(c) $\sqrt{9.3^2 - 1.4^2}$

(d) $\sqrt{0.2^2 - 0.01^2}$

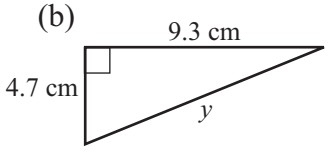
3. Find the unknown sides in these triangles.

(a)



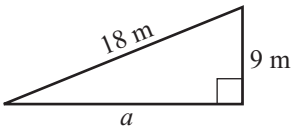
$x =$ cm

(b)



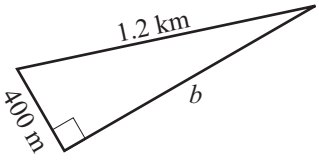
$y =$ cm

(c)



$a =$ m

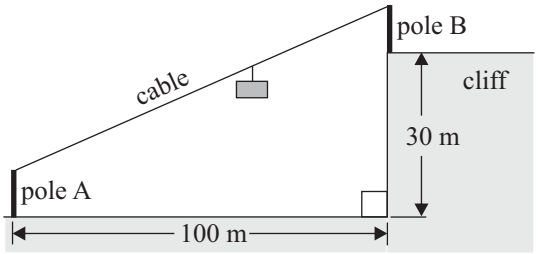
(d)



$b =$ km

4. Mary went bushwalking. She walked 7.2 km due north and then 8.4 km due east. How far was she from her starting point?

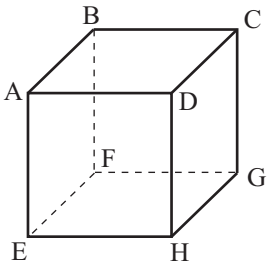
5. A flying fox is to be made between pole A on the ground and pole B on top of a 30 m high cliff. Pole A is 100 m from the base of the cliff and both poles are 3 metres long.



What length of cable is required between the tops of poles A and B?

6. A ***cube*** of side length 5 cm is shown below.

(a) Calculate the length of diagonal EG.



(b) Calculate the length of the body diagonal AG.

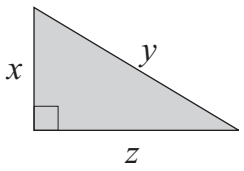
Master Maths 9 Worksheet 73
Trigonometry - Right-angled Triangles

73

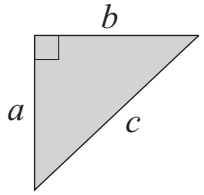
Name: _____

1. State which side of each of the following triangles is the hypotenuse.

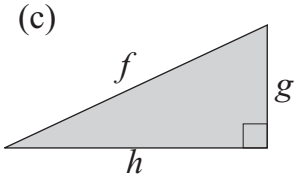
(a)



(b)

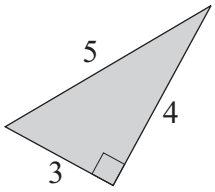


(c)

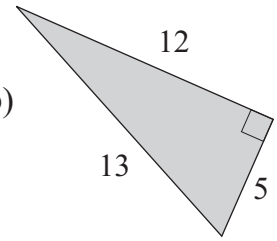


2. What is the length of the hypotenuse in the following triangles?

(a)



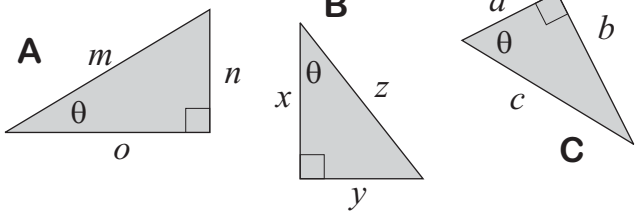
(b)



3. The three side lengths of two right-angled triangles are listed below. For each triangle state the length of the hypotenuse.

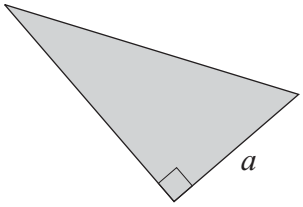
(a) 35, 12, 37 (b) 60, 61, 11

4. For the following triangles list the sides that are opposite and adjacent to the angle θ, and state the hypotenuse.

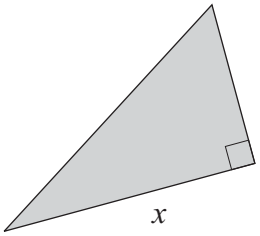


Triangle	Side Opposite θ	Side Adjacent to θ	Hypotenuse
A			
B			
C			

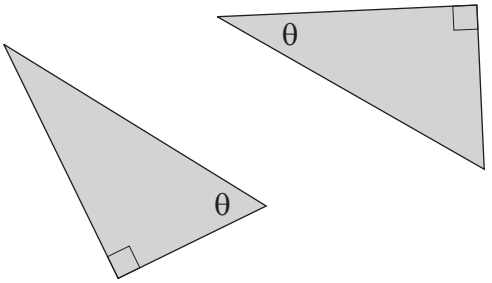
5. On this triangle mark angle, θ, so that side *a* is opposite θ.



6. On this triangle mark angle, α, so that side *x* is adjacent to α.



7. On the triangles below label the sides *O* (opposite), *A* (adjacent) and *H* hypotenuse for the angle shown.



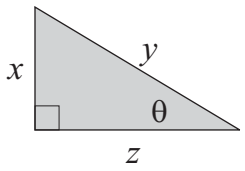
Master Maths 9 Worksheet 74
Sine

74

Name: _____

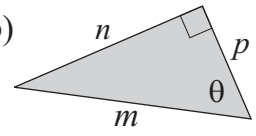
1. Find sin θ in the following triangles and write in fraction form

(a)



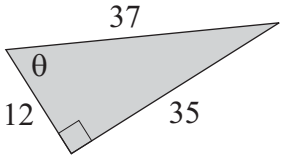
sin θ = ____

(b)



sin θ = ____

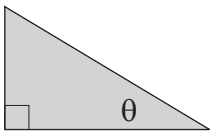
2. Find sin θ in the following triangle, write as a fraction and then calculate correct to four decimal places.



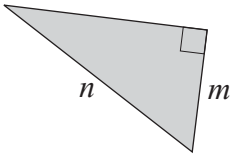
sin θ = ____

= _____

3. If sin θ = $\frac{c}{d}$ mark sides c and d on this triangle.



4. If sin θ = $\frac{m}{n}$ mark the angle θ on this triangle.



5. Use a calculator to find the following values correct to four decimal places.

(a) sin 74°

(b) sin 25°

(c) sin 38°

(d) sin 51.8°

6. Rearrange the following equation to make x and y the subject.

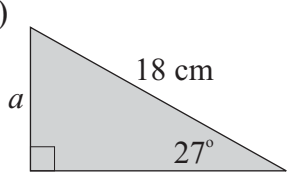
sin θ = $\frac{x}{y}$

x = _____

y = _____

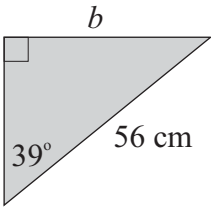
7. Find the unknown lengths in the following triangles.
Give answers correct to one decimal place.

(a)



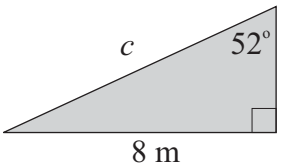
a = _____

(b)



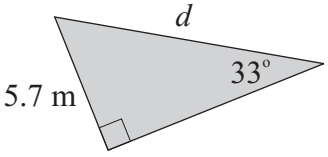
b = _____

(c)



c = _____

(d)



d = _____

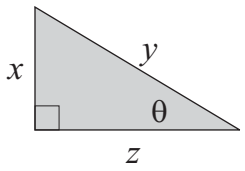
Master Maths 9 Worksheet 75
Cosine

75

Name: _____

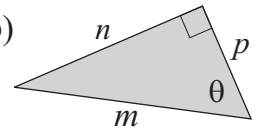
1. Find cos θ in the following triangles and write in fraction form

(a)



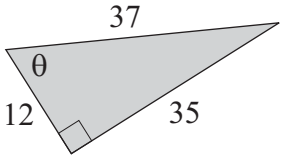
cos θ = ____

(b)



cos θ = ____

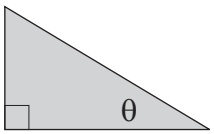
2. Find cos θ in the following triangle, write as a fraction and then calculate correct to four decimal places.



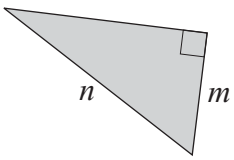
cos θ = ____

= _____

3. If $\cos\theta = \frac{c}{d}$ mark sides c and d on this triangle.



4. If $\cos\theta = \frac{m}{n}$ mark the angle θ on this triangle.



5. Use a calculator to find the following values correct to four decimal places.

(a) cos 74°

(b) cos 25°

(c) cos 38°

(d) cos 51.8°

6. Rearrange the following equation to make x and y the subject.

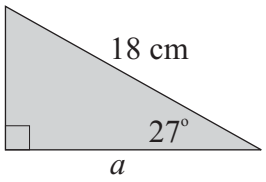
$\cos\theta = \frac{x}{y}$

$x =$

$y =$

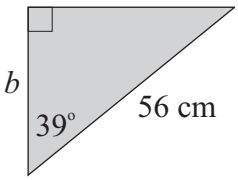
7. Find the unknown lengths in the following triangles.
Give answers correct to one decimal place.

(a)



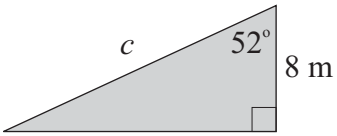
$a =$

(b)



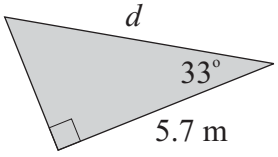
$b =$

(c)



$c =$

(d)



$d =$

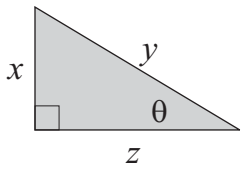
Master Maths 9 Worksheet 76
Tangent

76

Name: _____

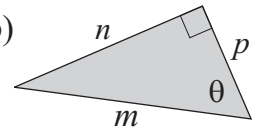
1. Find tan θ in the following triangles and write in fraction form

(a)



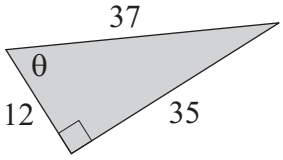
tan θ = ____

(b)



tan θ = ____

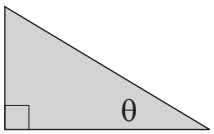
2. Find tan θ in the following triangle, write as a fraction and then calculate correct to four decimal places.



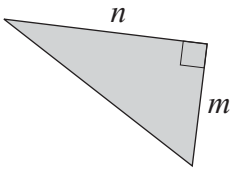
tan θ = ____

=

3. If tan θ = $\frac{c}{d}$ mark sides c and d on this triangle.



4. If tan θ = $\frac{m}{n}$ mark the angle θ on this triangle.



5. Use a calculator to find the following values correct to four decimal places.

(a) tan 74°

(b) tan 25°

(c) tan 38°

(d) tan 51.8°

6. Rearrange the following equation to make x and y the subject.

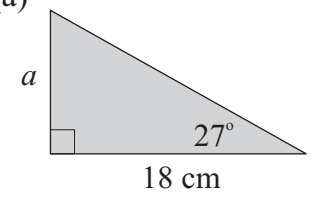
$\tan\theta = \frac{x}{y}$

$x =$

$y =$

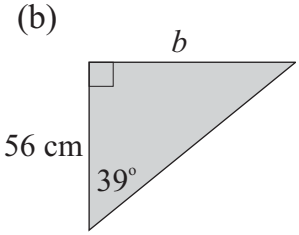
7. Find the unknown lengths in the following triangles.
Give answers correct to one decimal place.

(a)



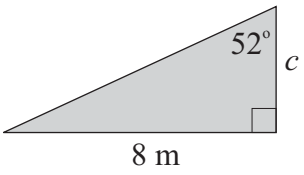
$a =$

(b)



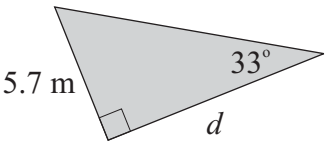
$b =$

(c)



$c =$

(d)



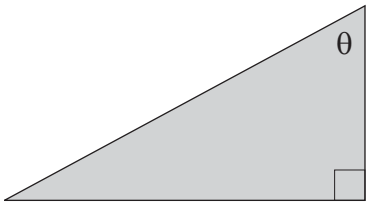
$d =$

Master Maths 9 Worksheet 77
Trigonometry - Mixed Problems

77

Name: _____

1. On this triangle, for the angle θ shown, indicate which sides are ***O*** (opposite), ***A*** (adjacent) and ***H*** (hypotenuse).

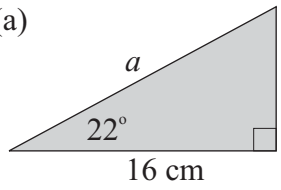


2. Use the abbreviations ***O***, ***A*** and ***H*** to complete the following relationships.

sin θ = ——	cos θ = ——	tan θ = ——

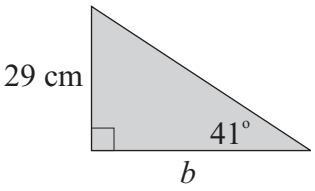
3. Find the unknown lengths in the following triangles.
Give answers correct to one decimal place.

(a)



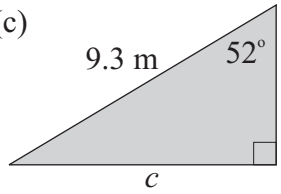
a =

(b)



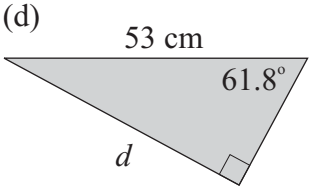
b =

(c)



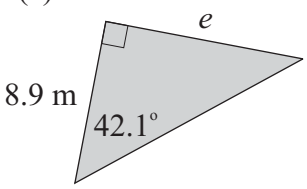
c =

(d)



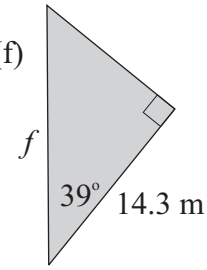
d =

(e)



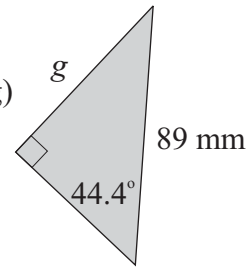
e =

(f)



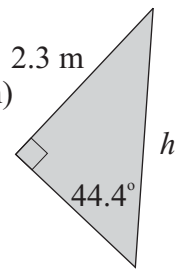
f =

(g)



g =

(h)



h =

Master Maths 9 Worksheet 78
Trigonometry - Applications

78

Name: _____

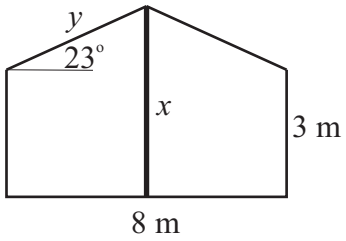
Give all answers correct to one decimal place.

1. A 3.5 m long ladder is resting against a wall making an angle of 70° to the ground.

(a) How far is the foot of the ladder from the wall?

(b) How far up the wall is the top of the ladder?

2. The angle of the roof on a shed is 23° as shown below. The shed is 8 m wide and the walls are 3 m high.



(a) Find the length, y, of one side of the roof.

(b) Find the height, x, of the centre pole in the shed.

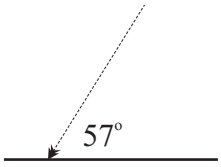
3. A plane flies 4500 km in a direction N 38° W.

(a) Draw a diagram showing the direction taken by the plane.

(b) How far north has the plane travelled?

(c) How far west has the plane travelled?

4. On a particular day the sun's rays made an angle of 57° with the ground.



(a) Gemma is 163 cm tall. How long was her shadow?

(b) The shadow of a tree was 6.7 m long. How tall was the tree?

Master Maths 9 Worksheet 79
Trigonometry - Calculating Angles

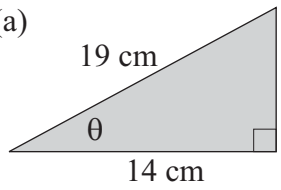
79

Name: _____

Give all answers correct to one decimal place.

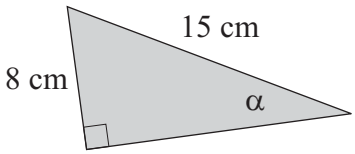
1. Find the unknown angles in the following triangles.

(a)



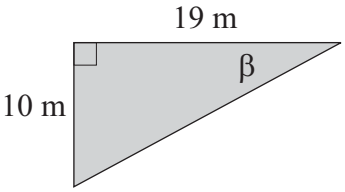
θ =

(b)



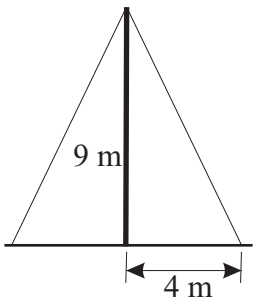
α =

(c)



β =

2. Cables fixed to the top of a 9 m pole are fixed to the ground 4 m from the pole. What angle do these cables make with the ground?



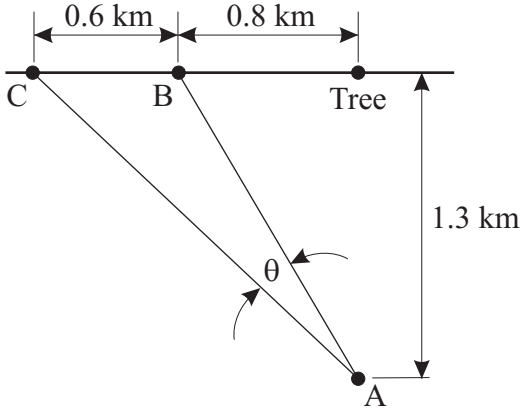
3. Two hikers walk 5 km south from their camp then walk 3 km east.

(a) Draw a diagram showing the path walked by the hikers.

(b) Calculate the direction the hikers need to take to walk in a straight line back to their camp.

4. A cameraman is positioned at point A which is 1.3 km south of a tree as shown on the diagram below. He spots an elephant at point B which is 0.8 km west of the tree. He films it as it moves to point C, 0.6 km from B.

Through what angle, θ, does he need to move his camera?



θ =

Master Maths 9 Worksheet 80
Data

80

Name: _____

1. Classify the following data as one of the following categories:

A continuous numerical
B discrete numerical
C categorical

(a) Price of petrol
(b) Type of car driven
(c) Water temperature
(d) Length of hair
(e) Population of a country
(f) Favourite football team
(g) Marks for a maths test

2. List the population that would be affected by the following surveys.

(a) The local council for the town of Walla want to find out if the town needs a library.

(b) A farmer wants to find out how many of his fruit trees are diseased.

(c) A school wants to find out how many year 9 students plan to complete year 12.

(d) The state government wants to find out how many young people have their driving learner's permits.

3. A community centre is deciding whether to install an internet chat room. They intend to conduct a survey.
From the alternatives below, choose which sample group would give the most accurate result and give reasons.

Sample Group **A** - 100 people chosen randomly
Sample Group **B** - 100 people between the ages of 15 and 35
Sample Group **C** - 100 people between the ages of 35 and 60
Sample Group **D** - 100 people older than 60

4. Choose one of the surveys from question 2 and describe an appropriate sample group.

5. At a music concert where three bands played there were 6000 in the audience.
50 people were asked which was their favourite band.
20 chose ***Stealth***, 12 chose ***Cradle*** and the remainder of the 50 chose ***Moshy***.

(a) What percentage of the 50 people surveyed chose each band?

Stealth	
Cradle	
Moshy	

(b) Using these percentages, how many people at the concert would have chosen each band as their favourite?

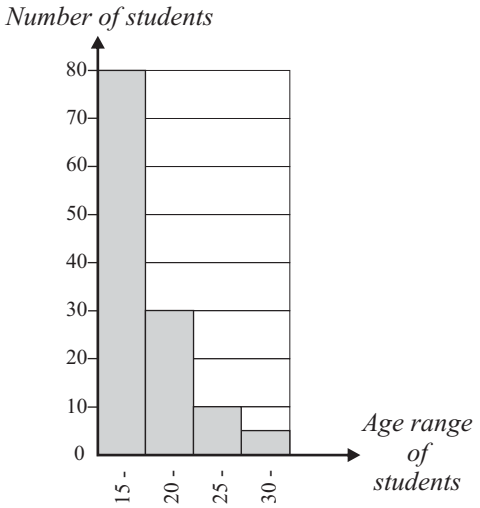
Stealth	
Cradle	
Moshy	

Master Maths 9 Worksheet 81
Interpreting Column Graphs

81

Name: _____

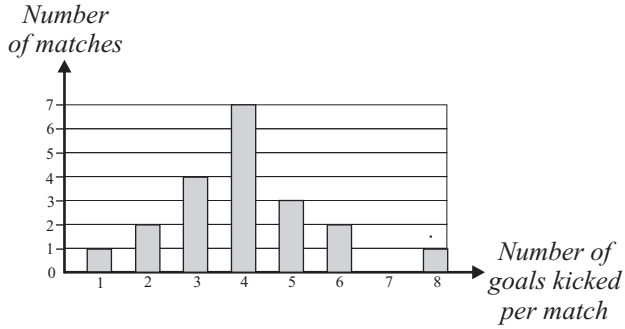
1. The ages of students enrolled in a particular course at a university is shown in this histogram.



(a) What was the ***total number of students enrolled*** in the course?

(b) What ***percentage of students*** were ***under*** twenty-five?

2. Jimmy Surd is the full forward for the Baynton Battlers. The number of goals he scored in each game of a season was recorded and is represented in the column graph shown.



Use the graph to help you answer these questions.

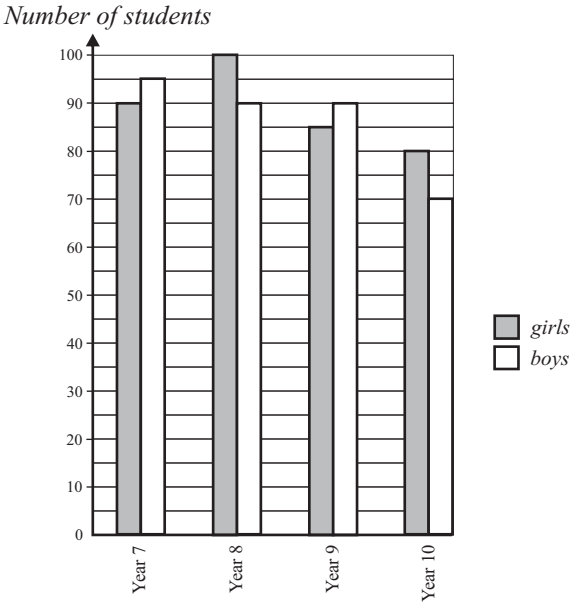
(a) ***How many games*** did Jimmy play over the season?

(b) ***How many goals*** did Jimmy kick for the season?

(c) What was the ***average number of goals*** he kicked per match?

(d) In what ***percentage of matches*** did he kick ***more*** than 4 goals?

3. The number of girls and boys in each level at Green Lakes Junior Secondary College is shown on this column graph.



(a) How many students attend the school?

(b) Which year levels have more girls than boys?

(c) How many girls are at the school?

(d) What is the ***percentage*** of boys at the school?

Master Maths 9 Worksheet 82
Representing Data on Column Graphs

82

Name: _____

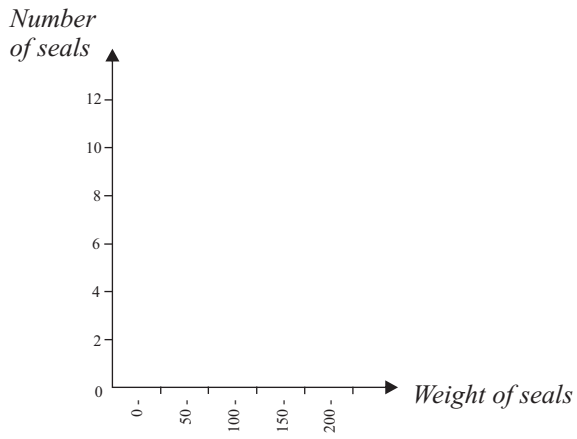
1. Scientists conducted research into the weight of seals on Lady Julia Percy Island. They weighed a number of seals and these weights (in kg) are shown below.

108 160 46 82 173 210 235 97
95 146 140 167 35 138 108 185
15 93 86 153 205 119 63 134
119 178 136 39 138 20 123 223
213 79 127 58 161 153 28 74

(a) Complete this tally sheet.

Weight (kg)	Tally	Frequency
0 -		
50 -		
100 -		
150 -		
200 -		
	Total	

(b) Complete the column graph below.



(c) What percentage of the seals weighed were in each weight range?

Weight (kg)	Percentage
0 -	
50 -	
100 -	
150 -	
200 -	

2. The scientists also tagged a number of mutton birds. The number of mutton birds tagged on each day is shown below.

16 15 5 17 25 32 45 58 21 9
26 18 29 11 28 21 22 17 33 41
19 42 31 31 33 28 39 27 34 20
35 44 50 51 22 38 25 36 28 38

(a) Complete this tally sheet.

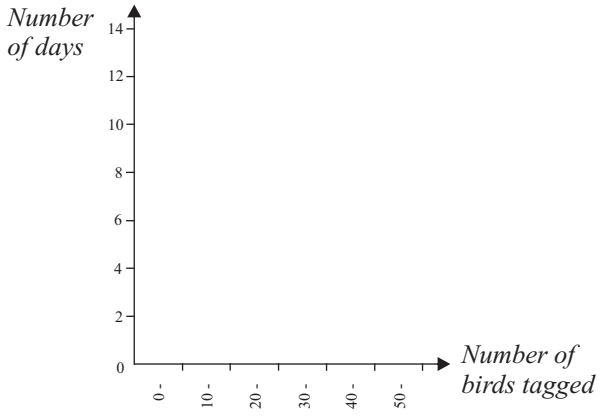
Number tagged	Tally	Frequency
0 -		
10 -		
20 -		
30 -		
40 -		
50 -		
	Total	

(b) On how ***many days*** did the scientists tag mutton birds?

(c) How ***many mutton birds*** were tagged?

(d) What was the ***average number*** tagged per day?

(e) Complete the column graph below.



(f) If there were twice as many scientists and they worked for 80 days, approximately how many mutton birds would you expect to be tagged?

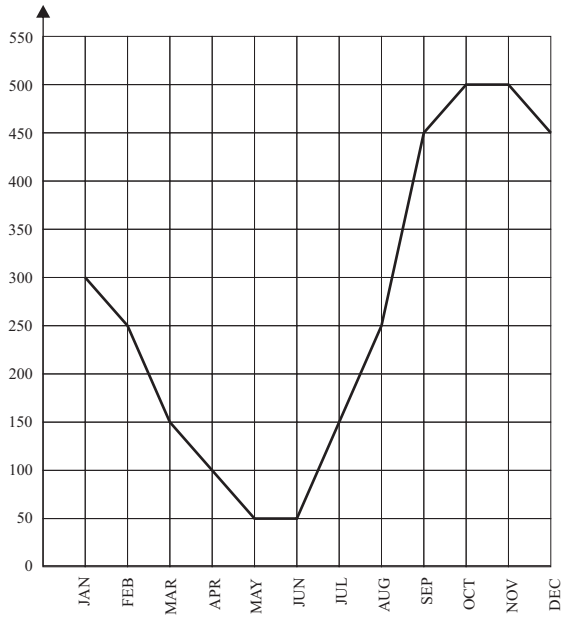
Master Maths 9 Worksheet 83
Line Graphs

83

Name: _____

1. The line graph below shows the volume of water (in ML) in a reservoir at the ***end*** of each month over a year.

Volume of Water (ML)



(a) What was the volume of water in the reservoir at the end of the following months?

March	
October	

(b) During which months did the volume of water remain unchanged?

_____

(c) During which month did the volume ***increase*** by the largest amount and by how much did it increase?

_____

(d) What was the change in volume between the end of January and the end of December?

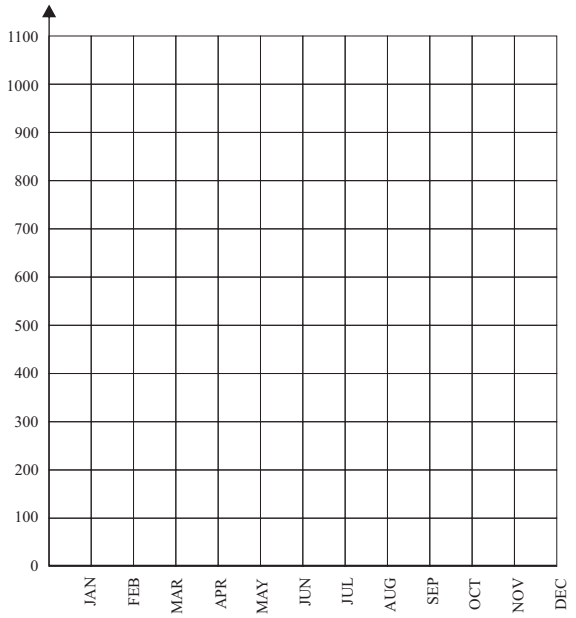
_____

2. Thrifty Theo is a Year 9 student who saves ***all the money*** he earns from his pocket money and his part-time job.
Thrifty banked his earnings.
The table shows his statement balance at the ***end of each month*** of the year.

Jan	Feb	Mar	Apr	May	Jun
$ 100	$200	$300	$400	$100	$200
Jul	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
$500	$600	$700	$800	$900	$1000

Represent this information as a ***line graph*** on the axes shown.

Bank balance ($)



(a) Thrifty bought himself a bike during the year. In which month did this happen?

(b) During the year his grandparents gave him money for his birthday. In which month is his birthday?

(c) If Thrifty earns $10 per month in pocket money, how much do you think he earns from his part-time job each month?

Master Maths 9 Worksheet 84
Bivariate Data

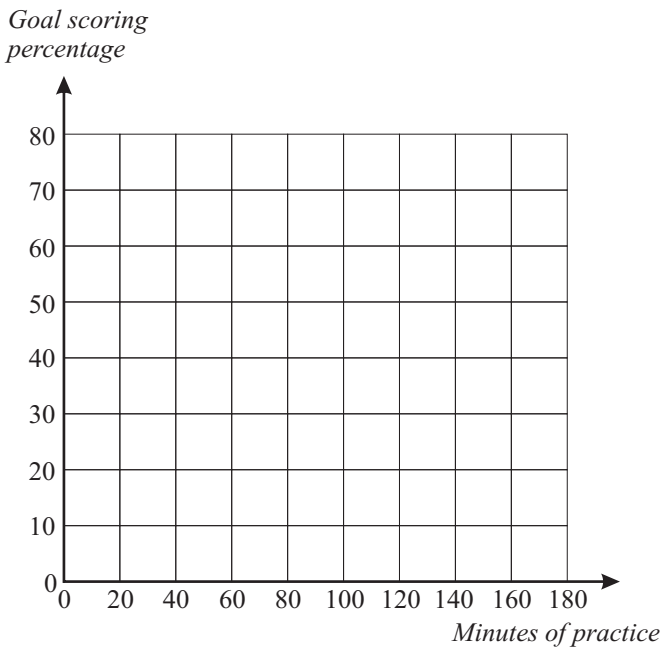
84

Name: _____

1. A basketball coach asked 10 players of equal ability to practice their goal shooting for different times each week over a season. The goal scoring percentage of each player was recorded and these figures are shown below.

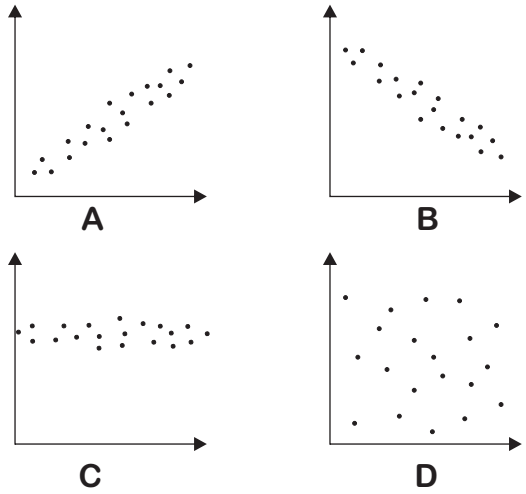
Player Name	Number of minutes practising each week	Goal scoring percentage
Andy	0	38
Bob	20	41
Chad	40	42
Dean	60	45
Eric	80	50
Floyd	100	54
Gary	120	53
Henry	140	58
Ian	160	60
Jarod	180	63

Plot this information on the graph below.



Did the time spent practising improve the goal scoring percentage?

2. Select one of these four graphs to best illustrate the shape of the graph you would expect as a result of graphing the information shown below (a to k).



(a) Amount of money spent on advertising a product versus the sales of the product. ☐

(b) Time spent watching TV versus time spent on doing homework. ☐

(c) Police numbers in the state versus amount of crime. ☐

(d) Amount of fertilizer used by a gardener versus number of flowers produced. ☐

(e) The age of people versus the number of people wearing spectacles. ☐

(f) The number of feral cats versus the number of native animals in that area. ☐

(g) The age of people versus the number of pets they own. ☐

(h) The daily temperature versus the number of students attending school. ☐

(i) The number of people wearing seat belts versus the number of road fatalities. ☐

(j) The amount of money spent on drug education versus the number of drug overdoses. ☐

(k) The amount of exercise done per week versus a person's standing pulse rate. ☐

Master Maths 9 Worksheet 85
Mean, Median and Mode

85

Name: _____

1. For each of the following sets of numbers find the mean, median and mode.

Numbers	Mean	Median	Mode
2, 4, 6, 6, 7, 8, 9			
2, 5, 7, 7, 11, 15, 16			
2, 3, 3, 8, 8, 8, 8, 8			
6, 8, 11, 13, 13, 15			
3, 3, 3, 4, 4, 4, 14			
2, 5, 8, 15, 17, 28			

2. Find the mean and median of the following sets of numbers.
Give answers correct to one decimal place.
(a) 13, 17, 15, 28, 34, 22, 11, 27, 36

Mean	Median

(b) 78, 18, 27, 67, 33, 45, 51, 80, 47, 53

Mean	Median

3. The heights (in cm) of the eight players in a basketball team were:
203, 195, 183, 179, 194, 200, 191, 196
Find the mean and median height of the players.
Give answers correct to one decimal place.

Mean	Median

4. Ten people played golf. Five had scores of 78, two had scores of 80 and the other scores were 81, 83 and 88.
Find the mean and median scores.

Mean	Median

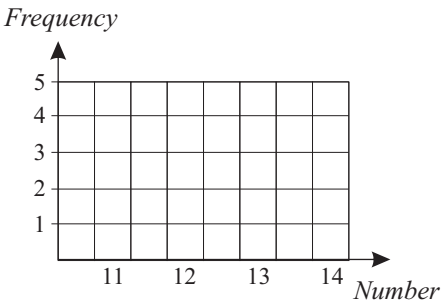
5. Complete the frequency table and frequency graph for the following data.

11, 11, 12, 12, 12, 12, 13, 13, 13, 13, 13, 14, 14, 14

Frequency Table

Number	Frequency
Total	

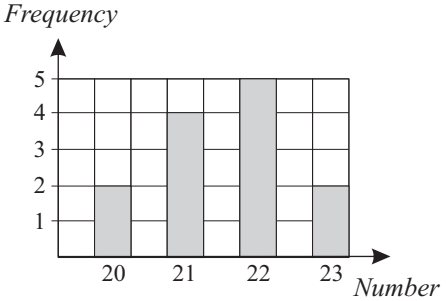
Frequency Graph



Find the mean, median and mode for this data.
Give answers correct to one decimal place.

Mean	Median	Mode

6. Find the mean, median and mode for the data shown on this frequency graph.
Give answers correct to one decimal place.



Mean	Median	Mode

Master Maths 9 Worksheet 86
Stemplots

86

Name: _____

1. For the following data:
(a) construct a non-ordered stemplot
(b) construct an ordered stemplot

15, 25, 23, 19, 34, 27, 30, 26, 18, 21, 42, 36, 41

(a) non-ordered stemplot (b) ordered stemplot

Stem	Leaf
1	
2	
3	
4	

Stem	Leaf
1	
2	
3	
4	

2. The people in a restaurant were asked their ages. These ages are listed below.

27, 34, 21, 33, 45, 26, 30, 20, 40, 49, 18, 19, 46, 51, 42, 37, 53, 41, 33, 29, 38, 20, 50, 27, 39, 22

(a) Construct a non-ordered stem plot

(b) Construct an ordered stemplot.

Stem	Leaf

(c) What was the age of the oldest person in the restaurant? ☐

(d) What is the age of the youngest person in the restaurant? ☐

(e) What is the range of ages? ☐

(f) How many people were in the restaurant? ☐

(g) What is the mean age? (one decimal place) ☐

(h) What is the median age? ☐

3. The losing and winning scores for 12 netball games are shown below.

Losing scores: 23, 29, 38, 18, 42, 36, 20, 45, 36, 40, 22, 19

Winning scores: 58, 47, 63, 51, 49, 68, 39, 51, 46, 60, 41, 33

(a) Construct an ordered back-to-back stemplot for this data.

Leaf	Stem	Leaf

(b) What is the mean losing score? (one decimal place) ☐

(c) What is the mean winning score? (one decimal place) ☐

(d) What is the median losing score? ☐

(e) What is the median winning score? ☐

(f) Is it possible to calculate, from the stemplot, the mean winning margin? (Give reason)

_____

_____

_____

Master Maths 9 Worksheet 87
Boxplots

87

Name: _____

1. Under each set of numbers below construct a boxplot clearly showing the median, Q_1, Q_3, smallest number and largest number.

(a) 4, 6, 8, 11, 13, 16, 18, 20, 23, 28, 29

(b) 9, 13, 16, 18, 19, 21, 21, 25, 26, 27

(c) 21, 23, 25, 26, 28, 29, 30, 33, 35, 37, 38, 40

(d) 26, 19, 37, 25, 30, 18, 27, 39, 21, 33

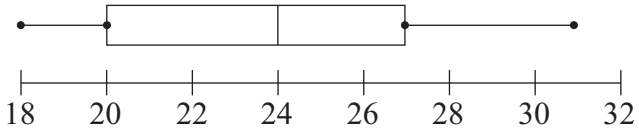
2. State the interquartile range for each boxplot from question 1.

(a) ☐ (b) ☐ (c) ☐ (d) ☐

3. For the data shown in this stemplot construct a boxplot clearly showingthe median, Q_1, Q_3, smallest number and largest number.

Stem	Leaf
1	4 5 7 7 9
2	2 3 4 5 5 8 9
3	0 1 3 3 5 7 9
4	0 1 2 2

4. The boxplot below shows the number of cars that passed over a point in a road every minute.



From this data:

(a) What was the most number of cars that passed over the point in the road in a minute? ☐

(b) What was the least number of cars that passed over the point in the road in a minute? ☐

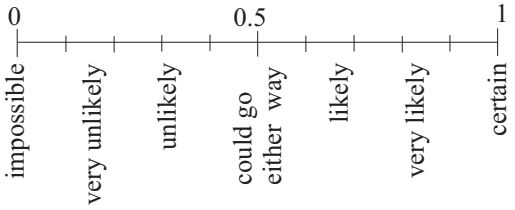
(c) What was the median number of cars that passed over the point in the road in a minute? ☐

Master Maths 9 Worksheet 88
Probability 1

88

Name: _____

1. Rate the probability of the following events, occuring, from 0 to 1, according to this scale.



(a) It will rain on the first day in December of this year.

(b) You will be hit by lightning tomorrow.

(c) Your family car will start tomorrow morning.

(d) You will pass your next maths test.

(e) You will pick the winner of the next Melbourne Cup.

(f) Next year you will walk on the moon.

Write all probabilities as fractions in Question 2

2. (a) There are 9 puppies in a litter and 4 are females. What is the probability of randomly choosing a female?

(b) What is the probability of randomly choosing a male puppy from this litter?

(c) In a bag of chocolates there are 5 peppermint, 3 caramel, 4 strawberry and 2 nougat. What is the probability of randomly choosing a caramel?

(d) After one caramel has been taken from this bag of chocolates, what is the probability of choosing another caramel?

(e) What is the probability that your birthday next year will fall on a Saturday?

(f) What is the probability that your best friend will have the same birthday as you?

3. There are 13 hearts, 13 diamonds, 13 clubs and 13 spades in a deck of cards.

(a) What is the probability of randomly drawing a heart from a deck of cards? Write answer as a fraction in its simplest form.

(b) If a person is dealt a hand of 12 cards, how many hearts would be expected in the hand?

4. Bennie is the full forward for his football team. Before the season started he had 400 shots at goal and kicked 280 goals.

(a) Based on these figures, what is the probability (as a decimal) that Bennie will, when he shoots for goal, kick a goal?

(b) If Bennie has 10 shots at goal in a game, based on this probability, how many goals would expect to kick?

(c) If Bennie has 180 shots at goal during the season, how many goals would he expect to kick?

5. Tim is tree planter. On one property he planted 500 trees and found one year later that 400 had survived.

(a) Based on these figures, what is the probability (as a decimal) of a tree surviving?

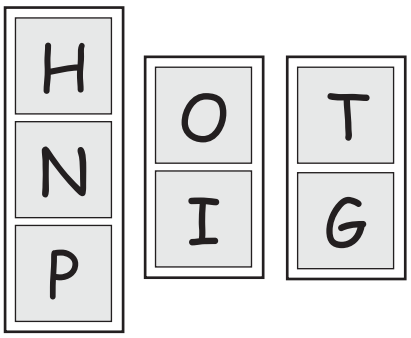
(b) On another property he plants 3400 trees. How many would be expected to survive?

Master Maths 9 Worksheet 89
Probability 2

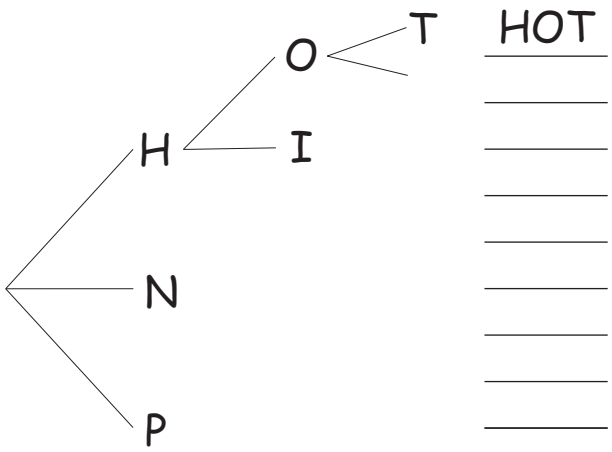
89

Name: _____

1. A primary school student is given three sets of letters to make three-letter words.
The first letter of the words can be H, N or P.
The second letter of the words can be O or I.
The third letter of the words can be T or G.



(a) Draw a tree diagram to show all the possible combinations that can be formed. This has been started.



(b) How many different combinations are there?

(c) Circle the combinations that are words that could be found in a dictionary.

(d) If a combination is formed randomly, what is the probability that it is a word? (Give answer as a fraction)

2. Phil goes for a bike ride each morning. He has three different coloured bikes (red, blue and green) and three helmets that are the same colours as the bikes (red, blue and green). One morning he gets a bike and helmet while it is still dark and can't see the colours.

(a) Draw a tree diagram to show all the different combinations of coloured bikes and helmets.

(b) What is the probability (as a fraction) that Phil will be wearing matching colours?

3. An explorer was trekking through a remote forest and discovered a locked treasure chest outside two caves.
There was a message above the treasure chest describing how to find the key to open the chest. The message read:

Each cave has two tunnels,
In each tunnel find two rocks,
On each rock are two boxes,
And two keys in each box.
By choosing wisely,
The treasure you'll see,
But the chest will explode,
If you try the wrong key.

What is the probability (as a fraction) of finding the correct key?