

Integers

Positive and Negative Numbers

Positive numbers are those numbers *greater than zero*.
Negative numbers are those numbers *less than zero*.

Integers are defined as all *positive numbers, negative numbers* and *zero*.

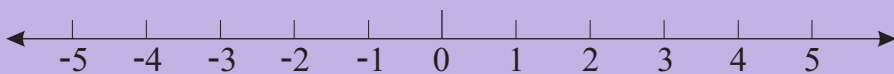
Negative numbers are written with a negative sign (-) in front of them.

Example negative 3 = **-3**

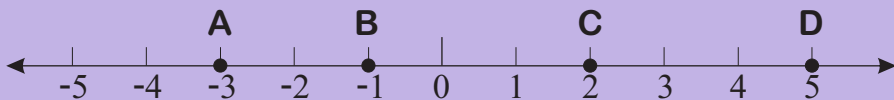
Positive numbers can be written with a positive sign (+) in front of them but this sign is not needed.

Example positive 6 = **+6 = 6**

Integers can be represented on a number line as shown below.



Examples



The points shown on this number line are:

A = -3

B = -1

C = 2 (or +2)

D = 5 (or +5)

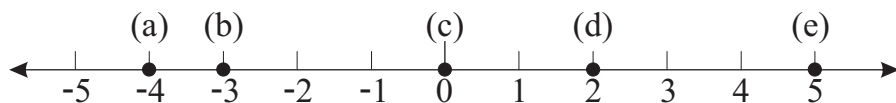
EXERCISE 3A

1. Which points on the number line below correspond to the following numbers.

- (a) -5 (b) 4 (c) 3 (d) -1



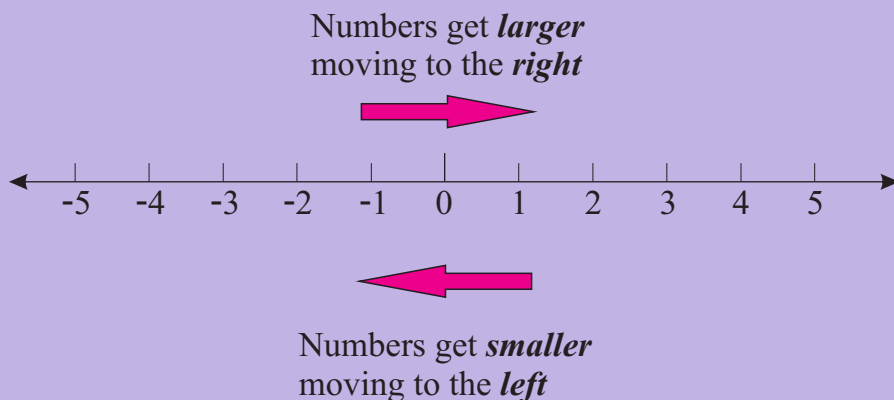
2. Write the number shown by each of the points on the number lines below.



3. Complete the following patterns.

- (a) -9, -8, -7, -6, -5, __, __, __, __, __.
 (b) -12, -10, -8, -6, -4, __, __, __, __, __.
 (c) -35, -30, -25, -20, -15, __, __, __, __, __.
 (d) 6, 5, 4, 3, 2, __, __, __, __, __.
 (e) 60, 50, 40, 30, 20, __, __, __, __, __.
 (f) -37, -32, -27, -22, -17, __, __, __, __, __.
 (g) 34, 28, 22, 16, 10, __, __, __, __, __.
 (h) 20, 19, 17, 14, 10, __, __, __, __, __.
 (i) 100, 95, 85, 70, 50, __, __, __, __, __.
 (j) -50, -48, -44, -38, -30, __, __, __, __, __.
 (k) -50, -47, -41, -32, -20, __, __, __, __, __.

Numbers get larger as you move to the right along a number line.
 Numbers get smaller as you move to the left along a number line.



Examples

1. Arrange these numbers from *smallest* to *largest*.

-6, 8, -10, 0, 3, -2

Answer: -10, -6, -2, 0, 3, 8

2. Which of the following numbers is the *largest*?

-12, 0, 8, 5, -4, -9, 2

Answer: 8

EXERCISE 3B

1. Arrange the following numbers from *smallest* to *largest*.

(a) 6, -5, 9, 3, -4, 4, -8

(b) -14, -23, 0, 21, -11, 17, 9, -5

(c) -12, -8, -3, 0, -4, -10

(d) 8, 7, -6, 5, -4, 3, -2, -1, 0, 1

2. Which of the following numbers is the *largest*?

(a) -21, -45, 33, 18, -64, 27

(b) -8, -17, -23, 0, -4, -7, -35

3. Which of the following numbers is the *smallest*?

(a) 8, -13, 14, 0, -11, 7, 2, -3

(b) 15, 9, 7, 1, 0, 8, 12, -3, -1

4. Choose the correct symbol ($<$ or $>$) to place between the pairs of numbers below.

Examples Remember the crocodile wants to eat the larger number.

1. -6 4



Answer: $-6 < 4$

2. -3 -8



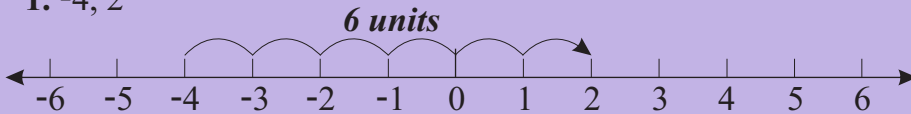
Answer: $-3 > -8$

- (a) -5 1 (b) -4 -7 (c) 9 4 (d) 4 -9 (e) 0 7
 (f) 7 12 (g) -8 -5 (h) 0 -7 (i) 6 -1 (j) -12 -1

5. Draw a number line between -6 and 6 in your books and use it to find the gap between the following pairs of numbers.

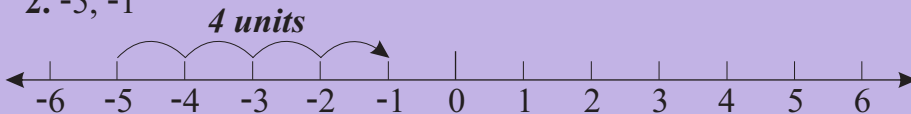
Examples

1. -4 , 2



The gap between -4 and 2 is **6**.

2. -5 , -1



The gap between -5 and -1 is **4**.

- (a) -2 , 3 (b) -5 , -2 (c) -4 , 3 (d) -3 , 0 (e) 2 , 6
 (f) -4 , 5 (g) -3 , 6 (h) -6 , -1 (i) -1 , 5 (j) -5 , -4
6. Find the gap between the following pairs of numbers.
- (a) -8 , 3 (b) -9 , 5 (c) -10 , 8 (d) -8 , 23 (e) -18 , -7
 (f) -15 , 25 (g) -13 , 29 (h) -34 , -8 (i) -19 , 37 (j) -23 , 45
 (k) -34 , -16 (l) -46 , -7 (m) -29 , 17 (n) -56 , -17 (o) -78 , -23

7. The highest temperature variation recorded on one day was in Browning, Montana, USA on 23rd January 1916. The temperature dropped 58°C . If the maximum temperature was 7°C , what was the lowest temperature on that day?

8. The temperature on the moon varies from 117°C to -163°C . What is the temperature variation on the moon?



9. This table shows the maximum temperature (max. temp.) and minimum temperature (min. temp.) for three cities on a particular day.

City	Min. Temp.	Max. Temp.
New York	-2°C	15°C
Paris	-5°C	9°C
Moscow	-12°C	-4°C

- (a) Find the difference between the maximum and minimum temperatures for: (i) New York (ii) Paris (iii) Moscow
- (b) Which city had the largest increase in temperature?
- (c) Which city had the highest maximum?
- (d) Which city had the lowest minimum?
- (e) What is the difference between the lowest minimum and highest maximum for the three cities?
- (f) The minimum temperature on the next day in New York was three degrees lower than on the day shown. What was the minimum temperature on the next day?
- (g) The maximum temperature on the next day in Moscow was seven degrees higher than on the day shown. What was the maximum temperature on the next day?



10. Use the information below to find the maximum and minimum temperatures for the three cities.

- * The three minimum temperatures were -3°C , -10°C and -5°C
- * Warsaw had the lowest minimum
- * Warsaw's maximum was nine degrees higher than its minimum
- * Stockholm's minimum was two degrees lower than Warsaw's maximum
- * Berlin's maximum was 18 degrees higher than Warsaw's minimum
- * The difference in Stockholm's temperatures was 15 degrees

Addition and Subtraction

EXERCISE 3C

1. Find the answers to the problems below by following these steps.

Step 1 Use the first number as the starting point on a number line.

Step 2 Move to the right or left by the amount shown.

Remember: + means move to the *right*
- means move to the *left*

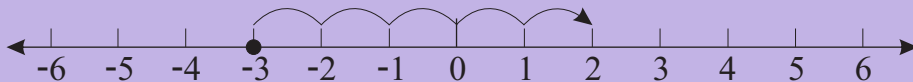
Examples

1. $-3 + 5$

-3 is the starting number

$-3 + 5$

$+ 5$ means move to the *right* by 5 units



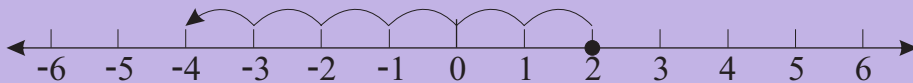
Answer = 2

2. $2 - 6$

2 is the starting number

$2 - 6$

$- 6$ means move to the *left* by 6 units



Answer = -4

(a) $-2 + 3$

(b) $3 - 4$

(c) $-3 + 1$

(d) $-1 - 3$

(e) $4 - 7$

(f) $5 - 6$

(g) $-6 + 8$

(h) $-3 + 9$

(i) $-5 + 3$

(j) $-4 + 4$

(k) $5 - 4$

(l) $4 - 8$

(m) $5 - 11$

(n) $-2 - 4$

(o) $4 - 5$

(p) $-4 + 7$

2. Find the answers to the following problems.

- (a) $-8 + 10$ (b) $1 - 10$ (c) $-12 + 7$ (d) $-9 - 3$
 (e) $-5 - 15$ (f) $7 - 20$ (g) $-8 + 14$ (h) $12 - 26$
 (i) $4 - 22$ (j) $-17 + 11$ (k) $-21 - 13$ (l) $-25 + 24$
 (m) $-9 + 16$ (n) $-8 - 7 - 5$ (o) $9 - 12 + 7$ (p) $-8 + 5 - 10$

3. Find the missing number in each of these equations.

- (a) $3 - \square = 1$ (b) $4 - \square = -2$ (c) $-2 + \square = 3$
 (d) $1 - \square = -4$ (e) $-8 + \square = -5$ (f) $-3 - \square = -10$
 (g) $-5 + \square = 7$ (h) $5 - \square = -4$ (i) $-4 - \square = -12$
 (j) $\square - 2 = -5$ (k) $\square + 4 = 1$ (l) $\square - 5 = -2$
 (m) $\square + 3 = -3$ (n) $\square - 4 = -10$ (o) $\square + 7 = 2$

4. Where two signs occur together, replace them with one sign before finding the answer. Use the guide and examples below.

Note: *Some positive (+) signs are shown on positive numbers in this question. This is not usually necessary.*

$+ + = +$	$+ - = -$
$- - = +$	$- + = -$

Examples

1. $2 + +3$

$$\begin{aligned} & 2 \overset{+}{+} 3 \\ & \quad \swarrow \text{Replace with +} \\ & = 2 + 3 \\ & = 5 \end{aligned}$$

2. $-2 + -4$

$$\begin{aligned} & -2 \overset{+}{+} -4 \\ & \quad \swarrow \text{Replace with -} \\ & = -2 - 4 \\ & = -6 \end{aligned}$$

3. $5 - +3$

$$\begin{aligned} & 5 \overset{+}{-} 3 \\ & \quad \swarrow \text{Replace with -} \\ & = 5 - 3 \\ & = 2 \end{aligned}$$

4. $-3 - -4$

$$\begin{aligned} & -3 \overset{-}{-} 4 \\ & \quad \swarrow \text{Replace with +} \\ & = -3 + 4 \\ & = 1 \end{aligned}$$

- (a) $3 - -4$ (b) $5 + -2$ (c) $7 - +5$ (d) $-2 + +6$
 (e) $-3 - -5$ (f) $4 - +7$ (g) $-4 + -5$ (h) $4 - -6$
 (i) $-1 + +5$ (j) $-5 + -6$ (k) $-6 - -6$ (l) $-8 + -4$
 (m) $7 + +5$ (n) $4 + -10$ (o) $-7 + +9$ (p) $-8 - -10$

5. Find the answers to the following problems.

- (a) $-12 - -20$ (b) $15 - +25$ (c) $16 - -18$ (d) $-30 + -20$
 (e) $-27 + -23$ (f) $35 + -45$ (g) $-20 + +25$ (h) $-37 - -23$
 (i) $38 + -23$ (j) $-24 - -27$ (k) $-58 - -42$ (l) $63 + -85$

6. Find the missing number in each of the following equations.

- (a) $5 + \square = 3$ (b) $-2 - \square = -6$ (c) $-3 - \square = -1$
 (d) $4 - \square = 7$ (e) $-2 + \square = -8$ (f) $-9 + \square = -3$
 (g) $\square + 2 = -2$ (h) $\square + 7 = 0$ (i) $\square - 5 = -11$
 (j) $\square + 1 = -5$ (k) $-6 - \square = 0$ (l) $-10 - \square = -5$

7. Find the missing operation + or - in the following equations.

<i>Examples</i>	1. $-5 \square -2 = -3$ $-5 - -2 = -3$ $-5 + 2 = -3$ <i>Answer: -</i>	2. $4 \square -5 = -1$ $4 + -5 = -1$ $4 - 5 = -1$ <i>Answer: +</i>
-----------------	--	---

- (a) $5 \square -2 = 3$ (b) $-2 \square 7 = 5$ (c) $-4 \square 3 = -7$
 (d) $1 \square -5 = 6$ (e) $-2 \square -2 = 0$ (f) $-9 \square 6 = -3$
 (g) $-8 \square -5 = -3$ (h) $5 \square -6 = 11$ (i) $6 \square 11 = -5$

8. Place +, - and = in the following equations to make them correct.

<i>Examples</i>	1. $3 \square -2 \square -1 \square 6$ <i>Answer: $3 - -2 = -1 + 6$</i> Both sides = 5	2. $2 \square -3 \square 4 \square -5$ <i>Answer: $2 + -3 - 4 = -5$</i> Both sides = -5
	3. $-1 \square 4 \square -2 \square 3$ <i>Answer: $-1 = 4 + -2 - 3$</i> Both sides = -1	4. $-3 \square -4 \square -1 \square 6$ <i>Answer: $-3 + -4 = -1 - 6$</i> Both sides = -7

- (a) $2 \square -4 \square 5 \square -7$ (b) $-3 \square 5 \square -2 \square -4$
 (c) $6 \square 5 \square -1 \square -2$ (d) $1 \square 7 \square -9 \square 3$
 (e) $-3 \square 4 \square -8 \square 9$ (f) $-5 \square 6 \square -3 \square 8$

PROBLEM SOLVING

Maynard and Wade are camping on the Murray River. They decide to go fishing in a small boat. After a while they notice they have drifted 900 metres downstream because of the current.

They start paddling back to their campsite. They estimate they can paddle 100 metres in 10 minutes but then need to rest for 2 minutes.

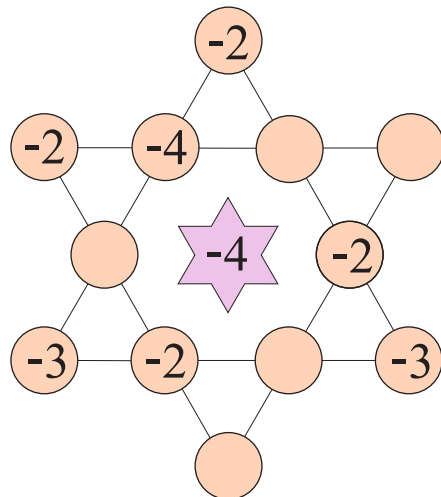
They drift back downstream 20 metres while they are resting.

How long will it take them to paddle back to their campsite?



PUZZLE

Find the missing numbers from this diagram. The sum of the numbers in each line is equal to the number in the centre.



CHAPTER REVIEW

1. What numbers are shown by the points on this number line?



2. Complete the following patterns.

(a) $-34, -28, -22, -16, _, _, _.$ (b) $15, 14, 12, 9, _, _, _.$

3. List the following numbers from the smallest to the largest.

$9 \quad -26 \quad 5 \quad -15 \quad 13 \quad -19 \quad -6 \quad -21$

4. Place the correct symbol ($<$ or $>$) between these numbers.

(a) $-1 \quad 7$ (b) $-9 \quad -15$ (c) $0 \quad -5$ (d) $-6 \quad -1$

5. Find the gap between the following pairs of numbers.

(a) $-3, 7$ (b) $-10, -2$ (c) $-13, 21$ (d) $-36, -9$

6. The temperature at Hobart dropped from 17°C to -6°C .

By how many degrees did the temperature drop?

7. Find the answers to the following problems.

(a) $3 - 9$ (b) $-6 + 10$ (c) $-12 - 3$ (d) $8 - -5$
 (e) $-10 + -6$ (f) $-5 - -13$ (g) $-18 + 7$ (h) $12 - -10$
 (i) $-6 - -4$ (j) $8 + -3$ (k) $-6 - -6$ (l) $-3 - -10$

8. Find the missing number in each of the following equations.

(a) $8 - \square = 10$ (b) $-4 + \square = -7$ (c) $7 - \square = -3$
 (d) $\square - 2 = -6$ (e) $\square + -1 = -5$ (f) $\square - 4 = -3$

9. Find the missing operation $+$ or $-$ in each of the following equations.

(a) $3 \square -1 = 4$ (b) $-2 \square 5 = 3$ (c) $6 \square -8 = -2$
 (d) $7 \square -1 = 8$ (e) $-4 \square -1 = -3$ (f) $-4 \square -9 = 5$

10. Place $+$, $-$ and $=$ in the following equations to make them correct.

(a) $-6 \square 2 \square 1 \square -9$ (b) $5 \square 2 \square -3 \square -6$