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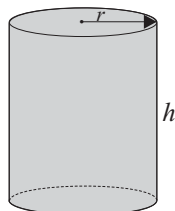
(a) Find the *total surface area* of the box.

(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.

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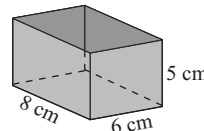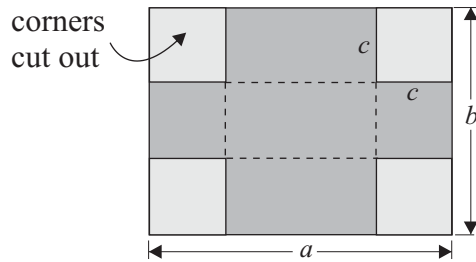
Dimensions of the box are 8 cm × 6 cm × 5 cm high.

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

$a =$

$b =$

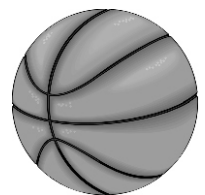(b) Find the *side length, c,* of the squares to be cut from the corners of the cardboard.

$c =$

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 cm².*

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