Setting up equations

Question 1

Pencils cost 2 dollars each. Rulers cost 3 dollars each.

Edith buys p pencils and r rulers. The total cost is T dollars.
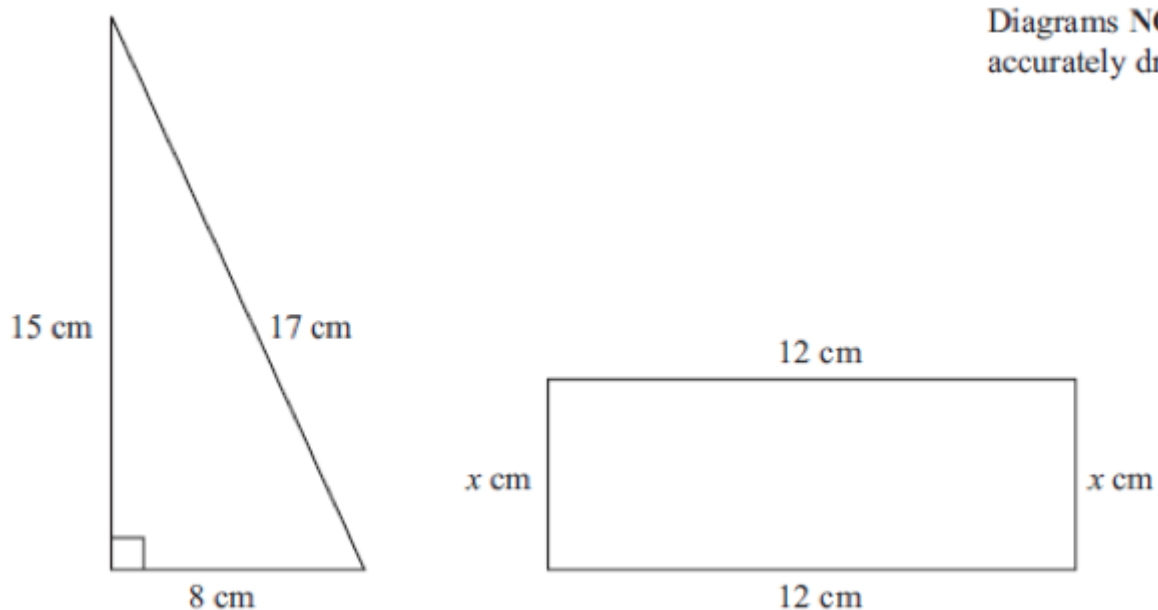
Write down a formula for T in terms of p and r.

$T = $ ....

(3 marks)

Question 2

The diagrams show a right-angled triangle and a rectangle.

Diagrams **NOT** accurately drawn

The area of the right-angled triangle is equal to the area of the rectangle.

Find the value of x.

$x = $ .... cm

(4 marks)

Question 3

There are 4 pens in a small box of pens. There are 10 pens in a large box of pens.

Ami buys x small boxes of pens and y large boxes of pens. She buys a total of T pens.

Write down a formula for T in terms of x and y.

$T = $ ....

(3 marks)

Question 4
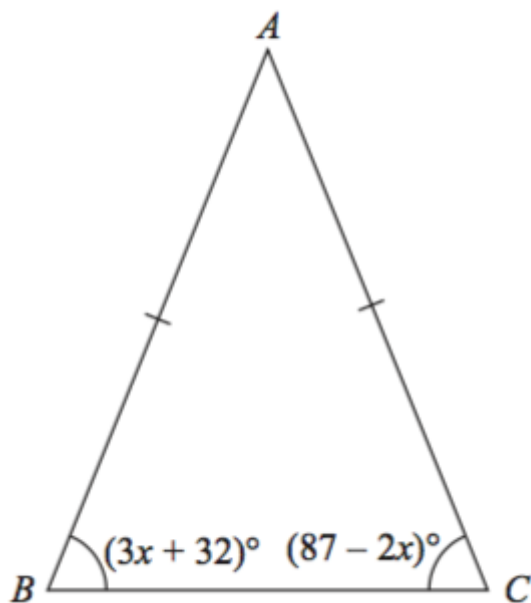

Diagram **NOT**
accurately drawn

In the isosceles triangle *ABC*,
AB = AC
angle *B* = $(3x + 32)°$
angle *C* = $(87 − 2x)°$

Work out the value of x.

....

(4 marks)

Question 5

The diagram shows a triangle.

Diagram **NOT** accurately drawn
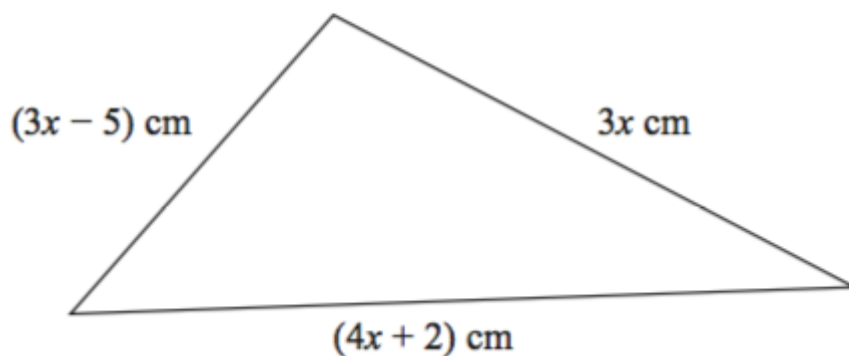
$(3x - 5)$ cm

$3x$ cm

$(4x + 2)$ cm

The lengths of the sides of the triangle are $3x$ cm, $(3x - 5)$ cm and $(4x + 2)$ cm.

The perimeter of the triangle is 62 cm.

Work out the value of x.

....

(4 marks)

Question 6

$$w = 4x - 5y$$

$x = 6t, y = 2t$

Find a formula for w in terms of t.
Give your answer in its simplest form.

$w =$ ....
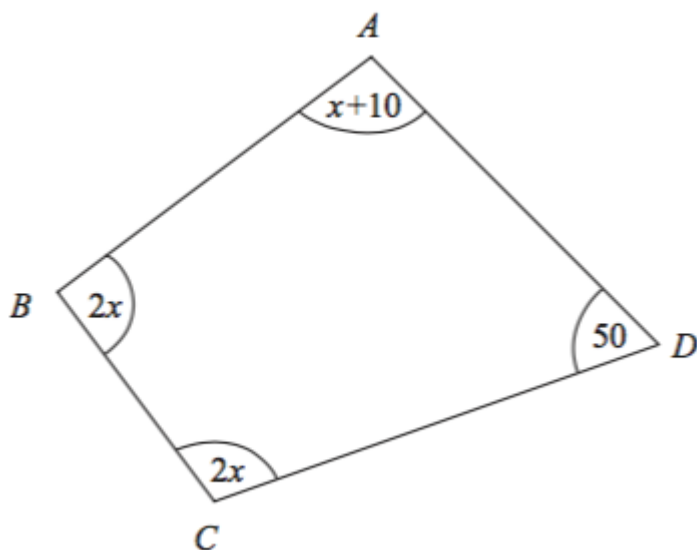
(2 marks)

Question 7

A

x+10

B 2x

50 D

2x

C

Diagram **NOT** accurately drawn

In this quadrilateral, the sizes of the angles, in degrees, are

$$x + 10 \quad 2x \quad 2x \quad 50$$

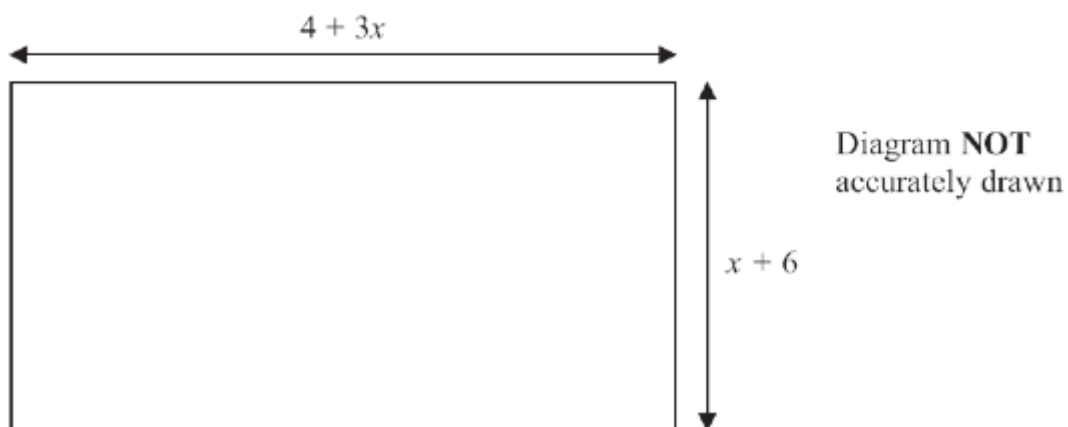(a) Use this information to write down an equation in terms of x.

....

(2 marks)

Question 8

The diagram shows a garden in the shape of a rectangle.

$4 + 3x$
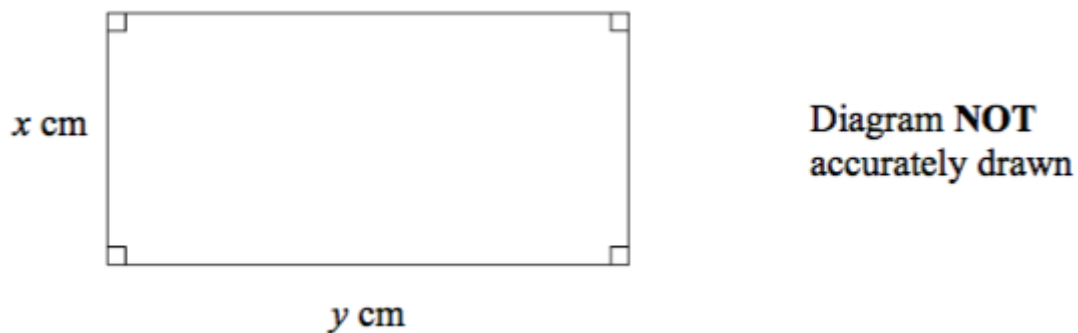
Diagram **NOT** accurately drawn

$x + 6$

All measurements are in metres. The perimeter of the garden is 32 metres.

Work out the value of x.

....

(4 marks)

Question 9

x cm

y cm

Diagram **NOT** accurately drawn

The diagram shows a rectangle.

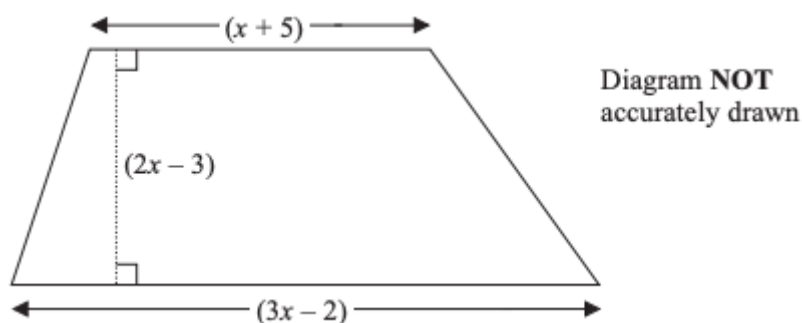The width of the rectangle is x cm and its length is y cm.
The perimeter of the rectangle is 10 cm.

Show that $x + y = a$ where a is an integer to be found.

$a = $ ....

Question 10

The diagram shows a trapezium.

Diagram **NOT** accurately drawn

All measurements shown on the diagram are in centimetres.

The area of the trapezium is 133 cm ^{2}

Show that $8x^2 + ax + b = 0$ where a and b are constants to be found.
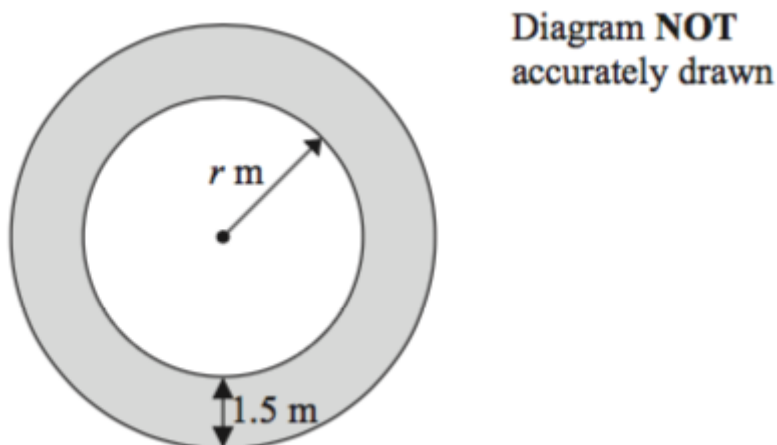
....

(3 marks)

Question 11

The diagram shows a circular pond, of radius r metres, surrounded by a circular path.

The circular path has a constant width of 1.5 metres.

Diagram **NOT** accurately drawn

The area of the path is $\frac{1}{10}$ the area of the pond.

Show that $ar^2 + br + c = 0$ where a, b and c are integers to be found.

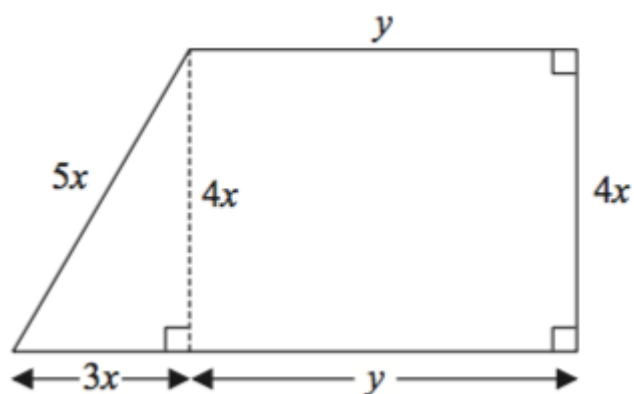.........................

(3 marks)

Question 12

Diagram **NOT**
accurately drawn

The shape in the diagram is made from a rectangle and a right-angled triangle.
The diagram shows, in terms of x and y, the lengths, in centimetres, of the sides of the rectangle and of the triangle.

Find, in terms of x and y, a formula for the area, A cm², of the shape.
Give your answer as simply as possible.

$A = $ ....

(2 marks)

Question 13

The diagram shows a parallelogram *ABCD*.
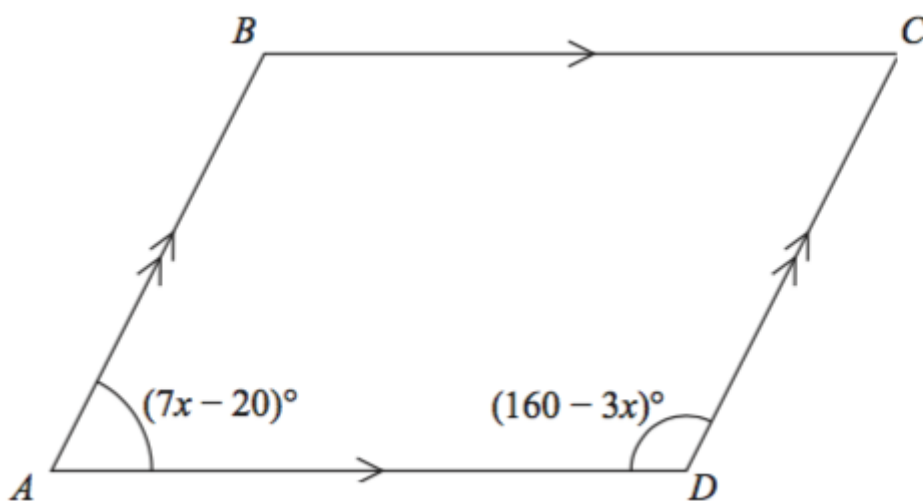
Diagram **NOT**
accurately drawn

Angle $BAD = (7x - 20)°$

Angle $ADC = (160 - 3x)°$

Work out the value of x.

$x =$ .... °
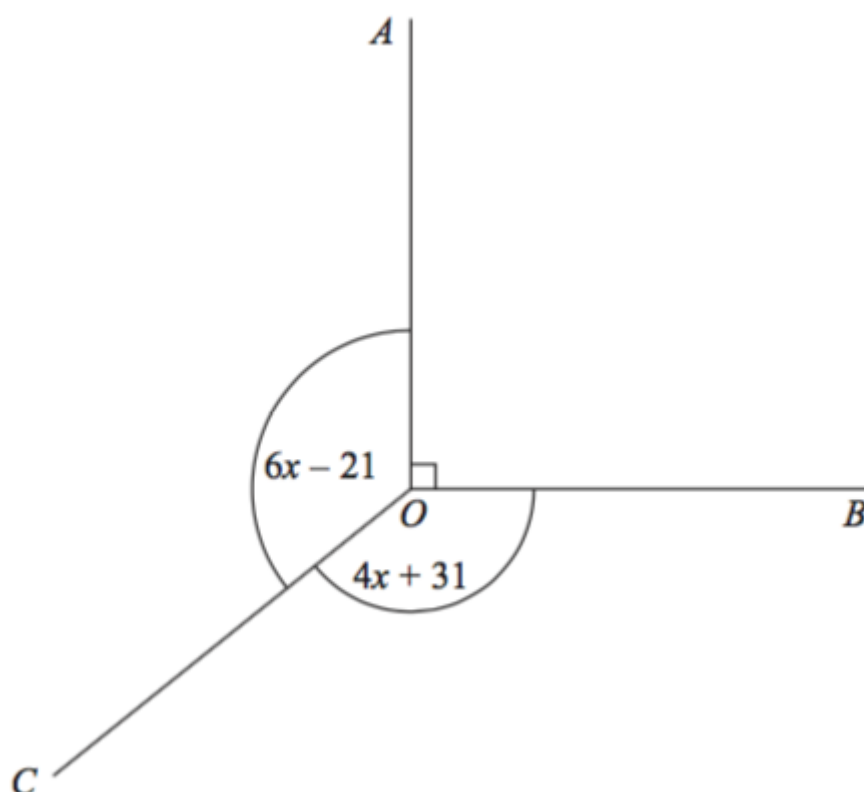
(3 marks)

Question 14

Diagram **NOT** accurately drawn

In the diagram, all angles are in degrees.
Angle AOB is a right angle.

Angle AOC = Angle BOC. Work out the value of x.

$x =$ .... °

(3 marks)

Question 15

The diagram shows a cube and a cuboid.
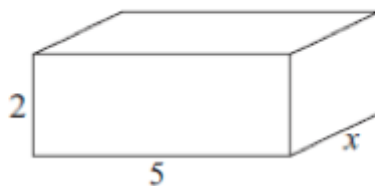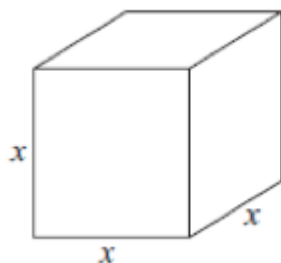
Diagram **NOT** accurately drawn

All the measurements are in cm.

The volume of the cube is 100 cm³ more than the volume of the cuboid.

Show that $x^3 + ax = b$ where a and b are integers to be found.

....

(2 marks)