**1.** **[4 marks]**

$A$

Diagram **NOT**
accurately drawn

$(3x + 32)°$   $(87 - 2x)°$

$B$   $C$

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

Work out the value of *x*.
Show clear algebraic working.

$x = $ ...........................

**2.** [4 marks]

Rectangle **A** has a width of $x$ metres and a height of $(x + 2)$ metres.
Rectangle **B** has a width of $2x$ metres and a height of $4x$ metres.
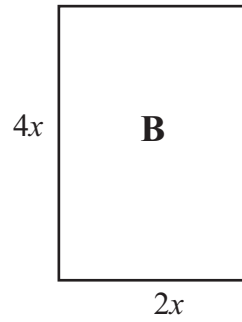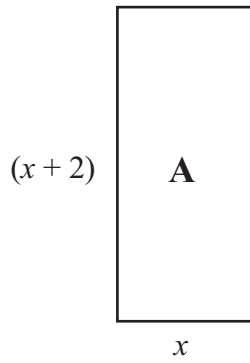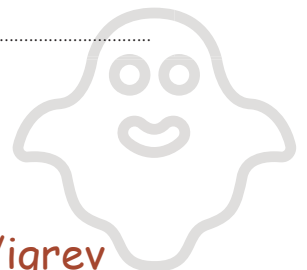
Diagram **NOT** accurately drawn

$(x + 2)$    **A**

$x$

$4x$    **B**

$2x$

The perimeter of rectangle **A** is equal to the perimeter of rectangle **B**.

(i) Use this information to write down an equation in $x$.

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

(ii) Find the value of $x$.

$x =$ ...............................................................................................................
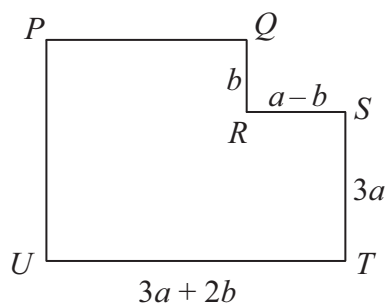
**3.** **[3 marks]**

The diagram shows a shape, *PQRSTU*.
All the corners are right angles.
The lengths of four of the sides are given in terms of *a* and *b*.



Find an expression, in terms of *a* and *b*, for

(i) *PU*,

.......................................................
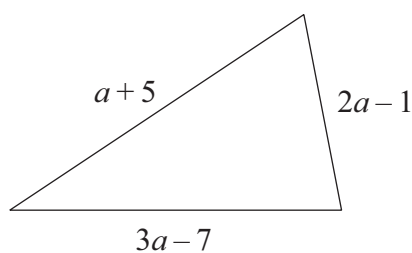
(ii) *PQ*.

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

**4.** **[3 marks]**



The lengths, in cm, of the sides of a triangle are $(a + 5)$, $(3a - 7)$ and $(2a - 1)$.
The perimeter of the triangle is 24 cm.
Work out the value of *a*.

$a = $ ........................

**5.** [5 marks]

Angelou has $x$ sweets.
He eats 5 of these sweets.
He puts all the sweets he has left into a bag.

(i) Nina has 3 times as many sweets as the number that Angelou put into the bag.
Nina has 39 sweets.

Use this information to write down an equation in $x$.

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

(ii) Solve your equation to find the value of $x$.

$x =$ ..............................

**6.** [5 marks]

Paper clips are sold in small boxes and in large boxes.

There is a total of 1115 paper clips in 4 small boxes and 5 large boxes.
There is a total of 530 paper clips in 3 small boxes and 2 large boxes.

Work out the number of paper clips in each small box and in each large box.

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

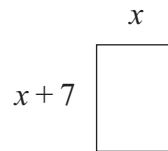Rectangular tiles have width $x$ cm and height $(x + 7)$ cm.

$x$

Diagram **NOT**
accurately drawn

$x + 7$

Some of these tiles are used to form a shape.
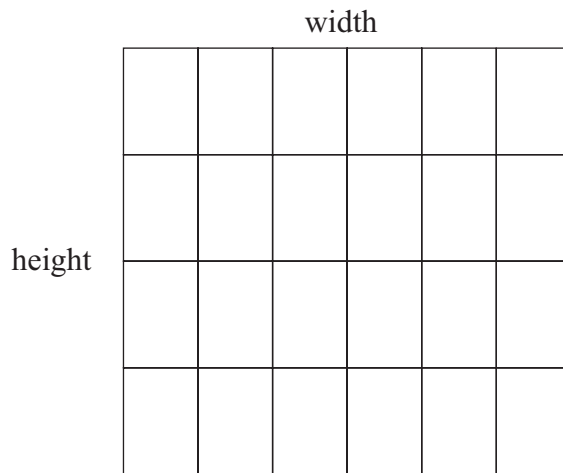The shape is 6 tiles wide and 4 tiles high.

width

height

Diagram **NOT**
accurately drawn

(a) Write down expressions, in terms of $x$, for the width and height of this shape.

width = ............................................................................ cm

height = ............................................................................ cm

**(2)**

(b) The width and the height of this shape are equal.

(i) Write down an equation in $x$.

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

(ii) Solve your equation to find the value of $x$.

$x =$ .........................
(4)

**8.** [5 marks]

Arul had $x$ sweets.
Nikos had four times as many sweets as Arul.

(a) Write down an expression, in terms of $x$, for the number of sweets Nikos had.

.........................
**(1)**

Nikos gave 6 of his sweets to Arul.
Now they both have the same number of sweets.

(b) Use this information to form an equation in $x$.

.............................................................................
**(2)**

(c) Solve your equation to find the number of sweets that Arul had at the start.

.........................
**(2)**

**9.** [4 marks]

Cups cost $x$ dollars each.
Mugs cost $(x + 2)$ dollars each.

(a) Write down an expression, in terms of $x$, for the total cost of 12 cups and 6 mugs.

.......................................................................... dollars
(2)

(b) The total cost of 12 cups and 6 mugs is 57 dollars.
Work out the cost of 1 cup.

.......................... dollars
(2)

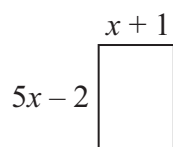Rectangular tiles have width $(x + 1)$ cm and height $(5x - 2)$ cm.

$x + 1$

$5x - 2$

Diagram **NOT**
accurately drawn

Some of these tiles are used to form a large rectangle.
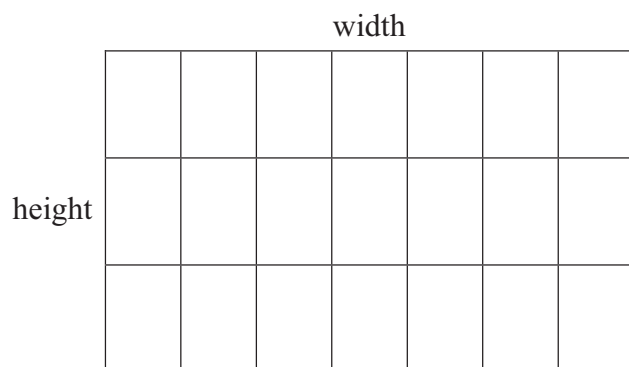The large rectangle is 7 tiles wide and 3 tiles high.

width

height

Diagram **NOT**
accurately drawn

The perimeter of the large rectangle is 68 cm.

(a) Write down an equation in $x$.

.......................................................................................................................
**(3)**

(b) Solve this equation to find the value of $x$.

$x =$ ..........................
(3)

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**11.** [4 marks]

The diagram shows a parallelogram *ABCD*.
In the diagram, all the angles are in degrees.
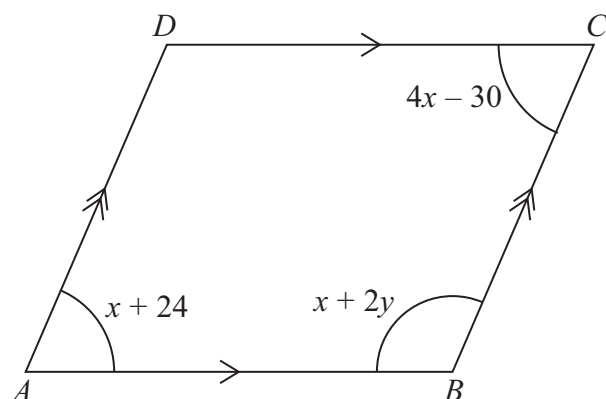


Diagram **NOT** accurately drawn

Work out the value of *x* and the value of *y*.

$x =$ ...........................

$y =$ ...........................

**12.** [3 marks]

Ben is *x* cm tall.

Kieran is 8 cm taller than Ben.

Bianca is 2 cm shorter than Ben.

Write an expression, in terms of *x*, for the mean of their heights in centimetres.

Give your answer in its simplest form.

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

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**13.** [7 marks]

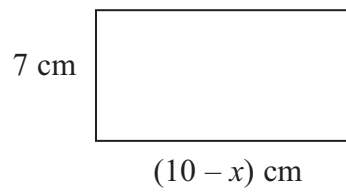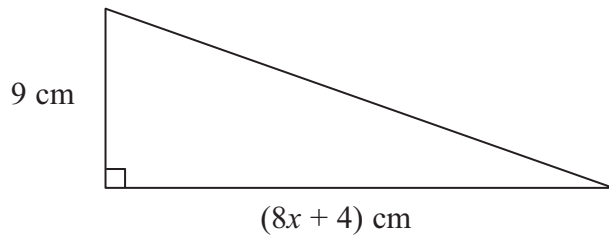The diagram shows a right-angled triangle and a rectangle.

9 cm

(8$x$ + 4) cm

7 cm

(10 – $x$) cm

Diagram **NOT** accurately drawn

The area of the triangle is twice the area of the rectangle.

(i) Write down an equation for $x$.

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

(ii) Find the area of the rectangle.
Show clear algebraic working.

.............................. cm$^2$

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$A$

Diagram **NOT** accurately drawn

$6x - 21$

$O$

$B$

$4x + 31$

$C$

In the diagram, all angles are in degrees.

Angle $AOB$ is a right angle.
Angle $AOC$ = Angle $BOC$.

Work out the value of $x$.
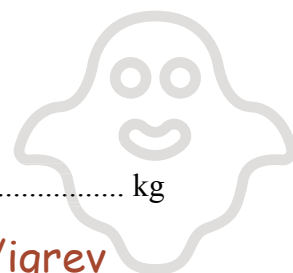
$x =$ .............................

Tara has 3 dogs and 4 cats.

The dogs have a mean weight of $x$ kg.

The cats have a mean weight of $y$ kg.

Write down an expression, in terms of $x$ and $y$, for the mean weight of all 7 of Tara's pets.

........................... kg
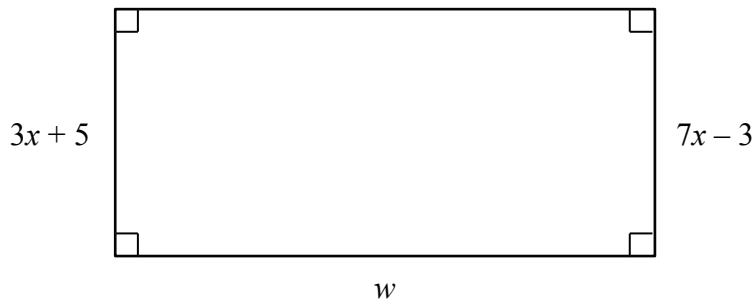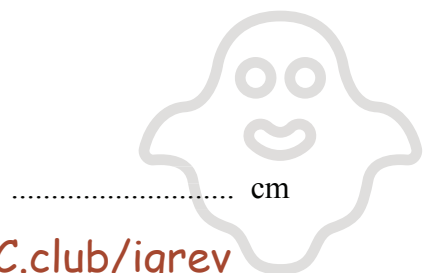
Here is a rectangle.

$3x + 5$ $\quad$ $7x - 3$ $\qquad$ Diagram **NOT** accurately drawn

$w$

All measurements are in centimetres.
The area of the rectangle is 242 cm$^2$.
Find the value of $w$.

..........................  cm

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Barney has the same number of sweets as Millie.

Barney gives 15 of his sweets to Millie.

Millie now has 4 times as many sweets as Barney.

Work out the total number of sweets that Barney and Millie have.

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

Vicky makes 8 purses and 9 key rings to sell for charity.

The price of a purse will be twice as much as the price of a key ring.

Vicky wants to get a total of exactly £40 when she sells all the purses and all the key rings.

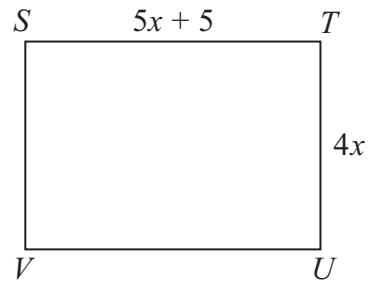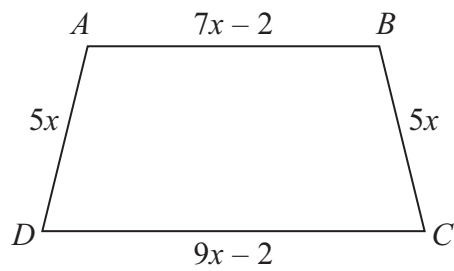Work out the price Vicky needs to charge for each purse and for each key ring.

purse ......................... key ring ...........................
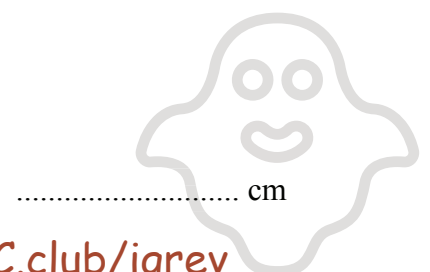
*ABCD* is a trapezium.
*STUV* is a rectangle.

Diagram **NOT**
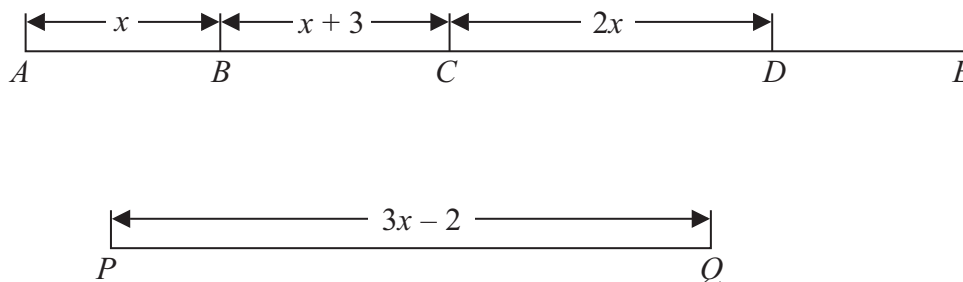accurately drawn



All measurements are in centimetres.

The two shapes have the same perimeter.

Work out the length of *ST*.

.......................... cm

**20.**                                                                                                                    **[4 marks]**

Here are two straight lines, *ABCDE* and *PQ*

Diagram **NOT**
accurately drawn



In the diagrams all the lengths are in cm.
$AE = 2PQ$.
Find an expression, in terms of $x$, for the length of *DE*.
Give your answer in its simplest form.

.............................. cm

**21.**                                                                                                                    **[2 marks]**

There are 30 sweets in a box.
$x$ of the sweets are blue.
The rest of the sweets are green.
Aaron takes at random a sweet from the box.
Write down an expression, in terms of $x$, for the probability that Aaron takes a green sweet.

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

## 22. [3 marks]

Amita, Monica and Rita are three sisters.

Monica is $x$ years old.
Amita is 3 years older than Monica.
Rita is twice the age of Amita.

If the mean age of the three sisters is 15, how old is Amita?

............................ years

## 23. [4 marks]

Asha and Lucy are selling pencils in a school shop.

They sell boxes of pencils and single pencils.

Asha sells 7 boxes of pencils and 22 single pencils.
Lucy sells 5 boxes of pencils and 2 single pencils.
Asha sells twice as many pencils as Lucy.

Work out how many pencils there are in a box.

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