SQA Past paper questions

FORMULAE LIST

The roots of $ax^2 + bx + c = 0$ are

$$x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$

2024 - Paper 2 - Question 8

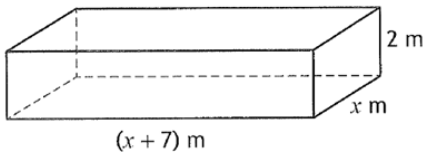
Solve the equation $3x^2 + 8x + 1 = 0$.

Give your answers correct to 2 decimal places. **3**

Click here for video solution.

2023 - Paper 2 - Question 14

A storage unit, built in the shape of a cuboid, is shown.



It has length $(x+7)$ metres, breadth x metres and height 2 metres.

The volume of this unit is 45 cubic metres.

(a) Show that $2x^2 + 14x - 45 = 0$. 2

(b) Calculate x, the breadth of the storage unit.
Give your answer correct to 1 decimal place. 4

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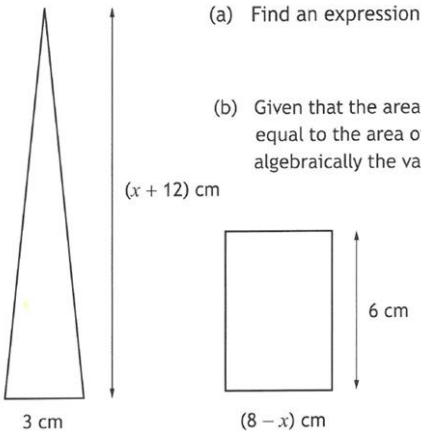
2022 - Paper 1 - Question 15

A triangle and rectangle are shown in the diagram.



(a) Find an expression for the area of the triangle. 1

(b) Given that the area of the triangle is equal to the area of the rectangle, find algebraically the value of x. 4

Click here for video solution.

2022 - Paper 2 - Question 7

Solve the equation $4x^2 + 2x - 7 = 0$.

Give your answers correct to 2 significant figures. 4

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2021 - Paper 1 - Question 19

Solve the equation **by factorising**

$$6x^2 + 13x - 5 = 0$$ 3

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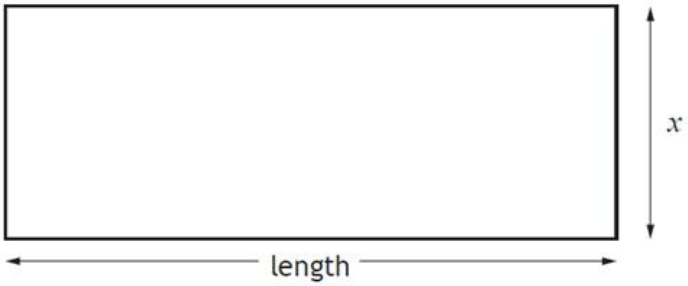
2021 - Paper 2 - Question 15

The diagram shows a rectangle with breadth x centimetres.



The length of the rectangle is 5 centimetres more than its breadth.

(a) Write down an expression for its length in terms of x. 1

The rectangle has an area of 20 square centimetres.

(b) Show that $x^2 + 5x - 20 = 0$. 2

(c) Calculate x, the breadth of the rectangle.
Give your answer correct to one decimal place. 4

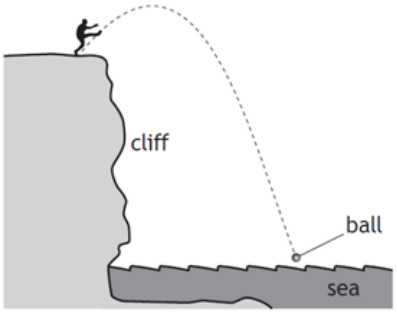
Click here for video solution.

2019 - Paper 1 - Question 15

A ball is kicked from a clifftop.

The height, h metres, of the ball relative to the clifftop after t seconds is given by $h = 12t - 5t^2$.

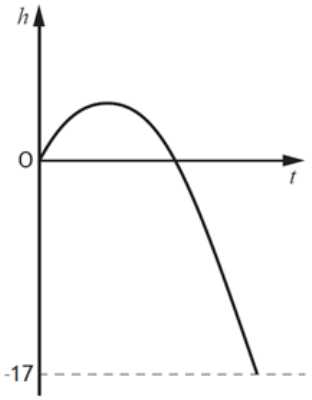
(a) Calculate the height of the ball above the clifftop after 2 seconds. 1



The graph below represents the height, h metres, of the ball relative to the clifftop after t seconds.

The sea is 17 metres below the clifftop.

(b) After how many seconds will the ball hit the sea? 4



Click here for video solution.

2019 - Paper 2 - Question 6

Solve the equation $3x^2 + 9x - 2 = 0$.

Give your answers correct to 1 decimal place. 3

Click here for video solution.

2018 - Paper 1 - Question 5

Solve $x^2 - 11x + 24 = 0$. 2

Click here for video solution.

2018 - Paper 1 - Question 19

(a) (i) Express $x^2-6x-81$ in the form $(x-p)^2+q$. 2

(ii) Hence state the equation of the axis of symmetry of the graph of $y=x^2-6x-81$. 1

(b) The roots of the equation $x^2-6x-81=0$ can be expressed in the form $x=d\pm d\sqrt{e}$.

Find, algebraically, the values of d and e. 4

Click here for video solution.

2017 - Paper 2 - Question 4

Solve the equation $2x^2+5x-4=0$.

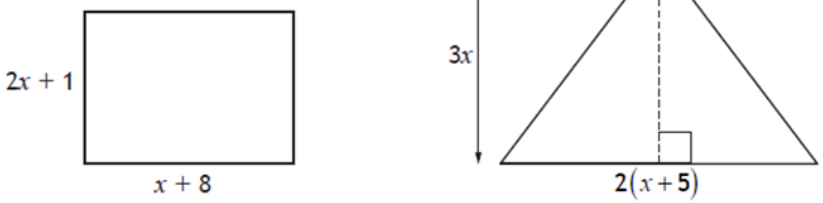
Give your answers correct to one decimal place. 3

Click here for video solution.

2016 - Paper 1 - Question 12

The diagrams below show a rectangle and a triangle.

All measurements are in centimetres.



(a) Find an expression for the area of the rectangle. 1

(b) Given that the area of the rectangle is equal to the area of the triangle, show that $x^2-2x-8=0$. 3

(c) Hence find, algebraically, the length and breadth of the rectangle. 3

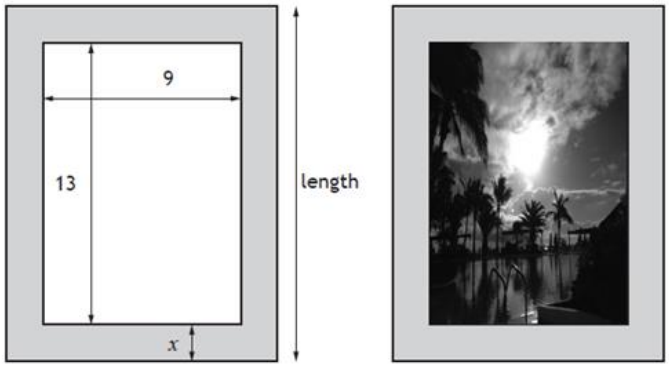
Click here for video solution.

2015 - Paper 2 - Question 14

A rectangular picture measuring 9 centimetres by 13 centimetres is placed on a rectangular piece of card.

The area of the card is 270 square centimetres.

There is a border x centimetres wide on all sides of the picture.



(a) (i) Write down an expression for the length of the card in terms of x. 1

(ii) Hence show that $4x^2 + 44x - 153 = 0$. 2

(b) Calculate x, the width of the border.

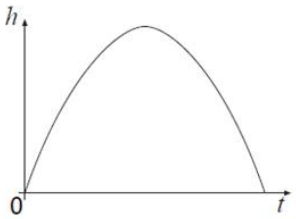
Give your answer correct to one decimal place. 4

Click here for video solution.

2014 - Paper 1 - Question 13

The diagram below shows the path of a small rocket which is fired into the air. The height, h metres, of the rocket after t seconds is given by

$$h(t) = 16t - t^2$$



(a) After how many seconds will the rocket first be at a height of 60 metres? 4

(b) Will the rocket reach a height of 70 metres?
Justify your answer. 3

Click here for video solution.

Specimen - Paper 1 - Question 4

Solve the equation

$$2x^2 + 7x - 15 = 0.$$ **3**

Click here for video solution.

2010 - Paper 2 - Question 10

The diagram below represents a rectangular garden with length $(x + 7)$ metres and breadth $(x + 3)$ metres.

(*a*) Show that the area, A square metres, of the garden is given by

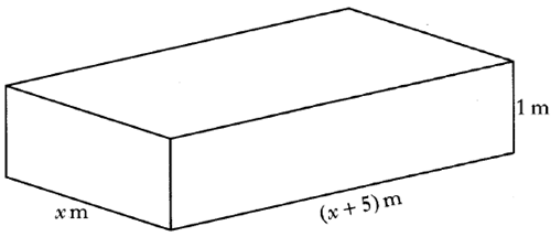
$$A = x^2 + 10x + 21.$$ **2**

(*b*) The area of the garden is 45 square metres. Find x.
Show clearly all your working. **4**

Click here for video solution.

2006 - Paper 2 - Question 11

A cuboid is shown below.



It has length $(x + 5)$ metres, breadth x metres, height 1 metre and volume 24 cubic metres.

(*a*) Show that

$$x^2 + 5x - 24 = 0.$$ **2**

(*b*) Using the equation in part (*a*), find the breadth of the cuboid. **3**

Click here for video solution.