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National 5 Maths Quadratic Formula

SQA past paper and specimen paper questions and answers by topic

BE GREEN
KEEP IT ON
THE SCREEN

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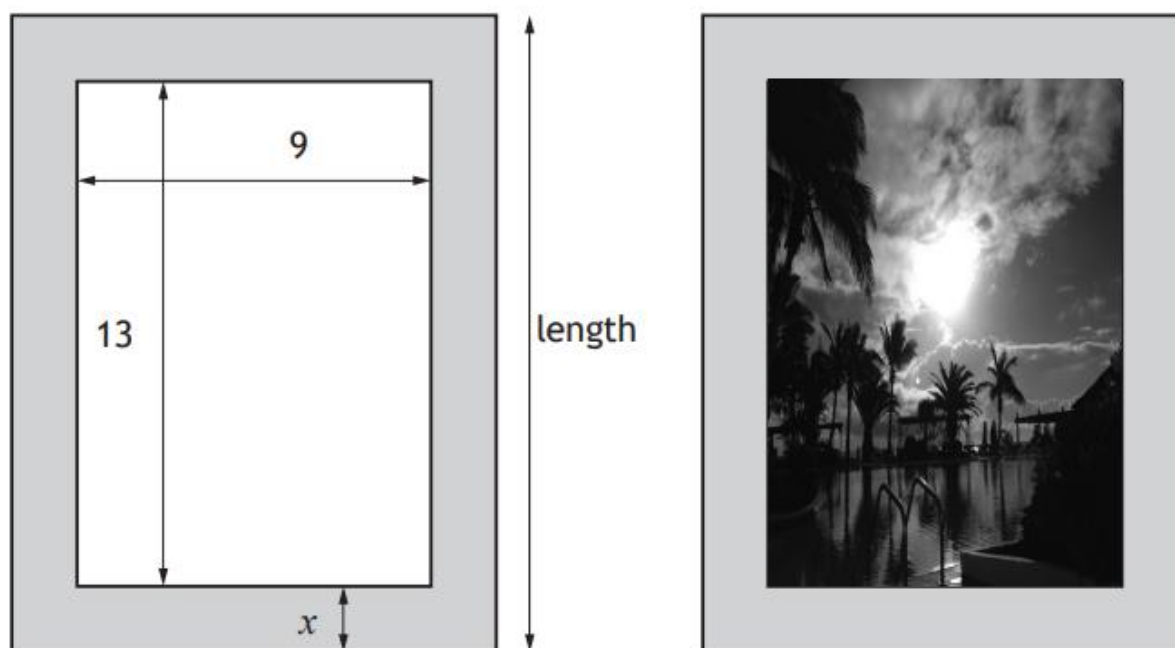
(a)　(i)　Write down an expression for the length of the card in terms of x.　**1**

　　　(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**

Answers:

　(a)　(i)　　$2x + 13$

　　　(ii)　　Use "area = length × width" to obtain the required equation.

　(b)　　　2.8 cm

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

Give your answers correct to one decimal place.   **3**

Answer:

$x = -3.1$ or $x = 0.6$

(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**

Answer:

(a) (i) $(x - 3)^2 - 90$

(ii) $x = 3$

(b) $d = 3, e = 10$

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Solve the equation $3x^2 + 9x - 2 = 0$.
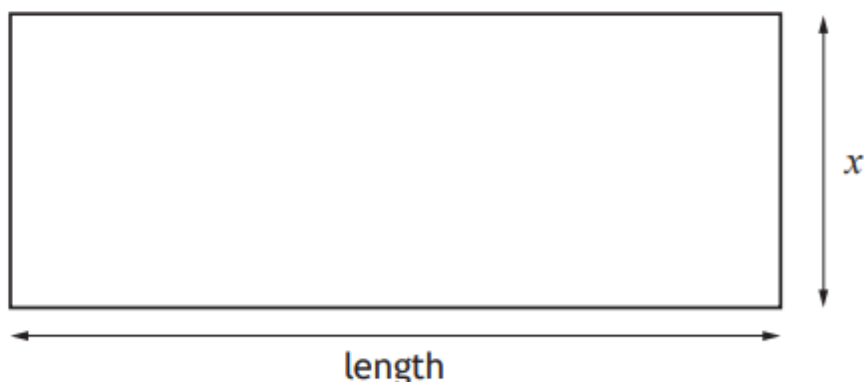
Give your answers correct to 1 decimal place.

3

Answer:

$x = -3.2$ or $x = 0.2$

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**

Answers:

(a) $x + 5$

(b)   Equate to area and rearrange into required form

(c)   2.6 cm

Solve the equation $4x^2 + 2x - 7 = 0$.
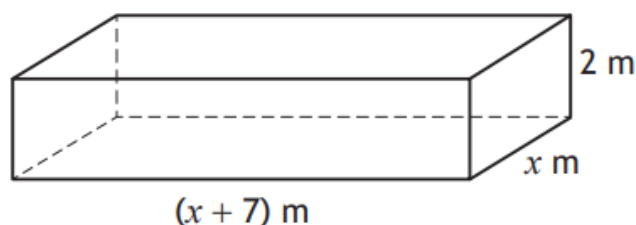
Give your answers correct to 2 significant figures. **4**

Answer:

$x = -1.6$ or $x = 1.1$

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**

Answers:

(a) Use the dimensions of the cuboid to find an expression for the volume. Then rearrange it into the required form.

(b) $x = 2.4$