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National 5 Mathematics

Exam Questions by Topic

Quadratic Problems

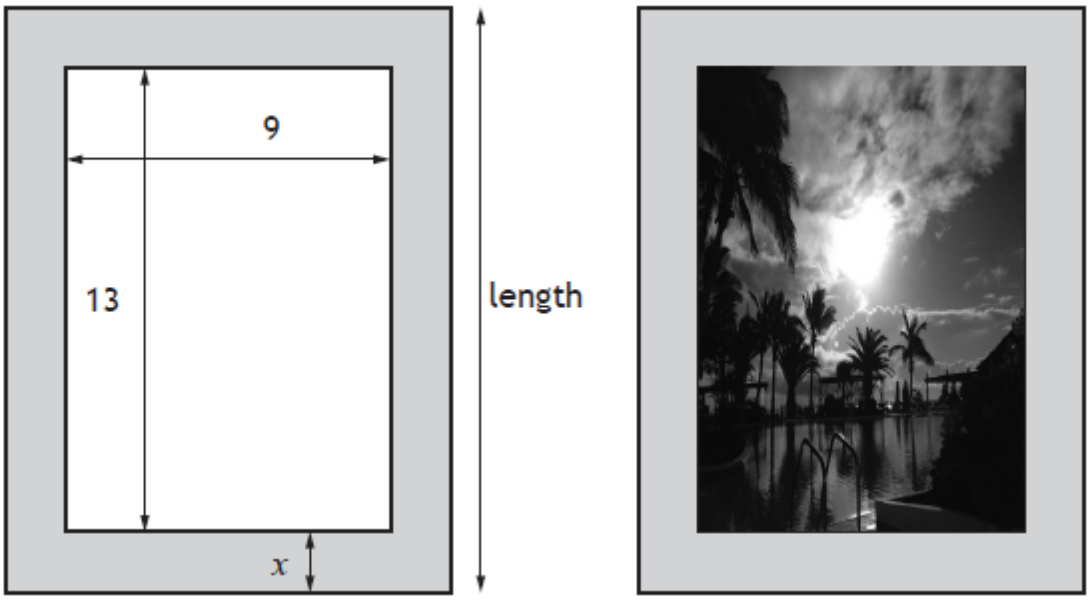
Step-by-step worked solutions to these questions in the N5 Maths Study Pack

2015 N5 Past Paper P2, Q14

1. 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 mark)

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

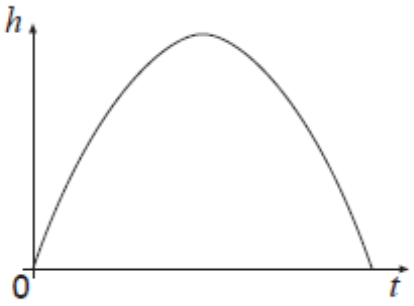
(b) Calculate x, the width of the border.

Give your answer correct to one decimal place. (4 marks)

2014 N5 Past Paper P1, Q13

2. The diagram below shows the height of a small rocket which is fired into the air. The height, h meters, 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 marks)

(b) Will the rocket reach a height of 70 metres?

Justify your answer. (3 marks)

N5 Practice Past A Paper P2, Q10

3. A rectangular wall vent is 30 centimetres long and 10 centimetres wide.

It is to be enlarged by increasing both the length and width by x centimetres.

(a) Show that the area, A square centimetres, of the new vent is given by

$$A = x^2 + 40x + 300$$

The area of the new vent must be at least 75% more than the original area.

(b) Find the minimum dimensions of the new vent. (5 marks)