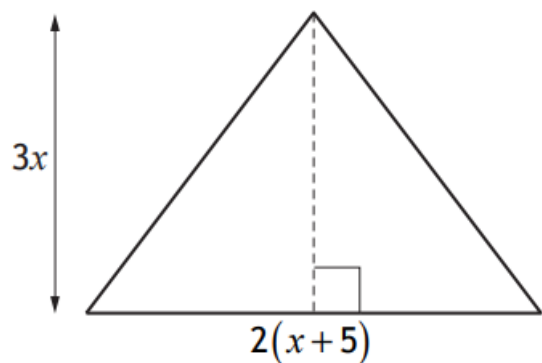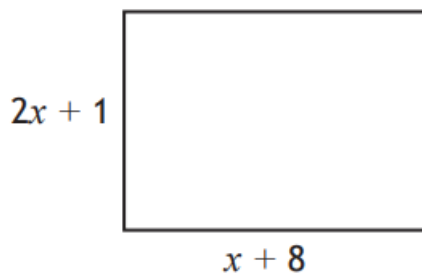# Quadratic Problems

N5 Maths Exam Questions

Source: 2016 P1 Q12 N5 Maths	

(1) The diagrams below show a rectangle and a triangle.

All measurements are in centimetres.

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

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

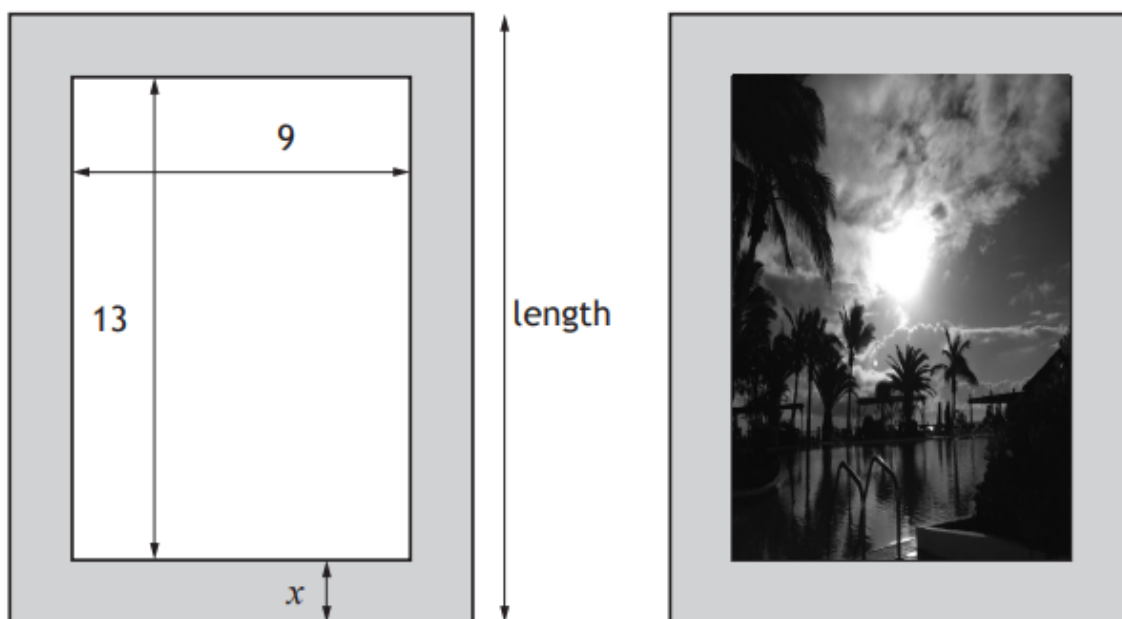(c) Hence find, **algebraically**, the length and breadth of the rectangle.

Answers: (a) $(2x + 1)(x + 8)$
(b) *Proof*
(c) $12\,cm$ & $8\,cm$

(2)

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.

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

(b) Calculate x, the width of the border.
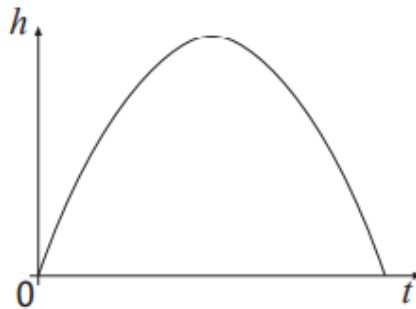Give your answer correct to one decimal place.

Answers: $(a)\ (i)2x + 13 \quad (ii)Proof$
$\qquad (b)\ x = 2.8\ cm$

(3)

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?

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

Answers: (a) $t = 6\ secs$
(b) $No, because\ maximumm\ height\ is\ 64\ m$

(4)

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

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

Answers: $(a)\ Proof$
    $(b)\ L = 35\ cm\ \ B = 15\ cm$