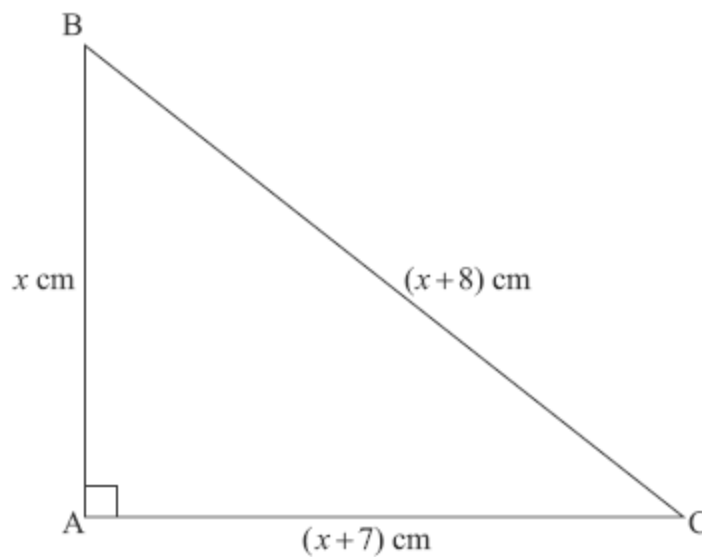# Solving Quadratics

50 min

70 marks

1. In the diagram, $B\hat{A}C = 90°$. The length of the three sides are x cm, $(x + 7)$ cm and $(x + 8)$ cm.
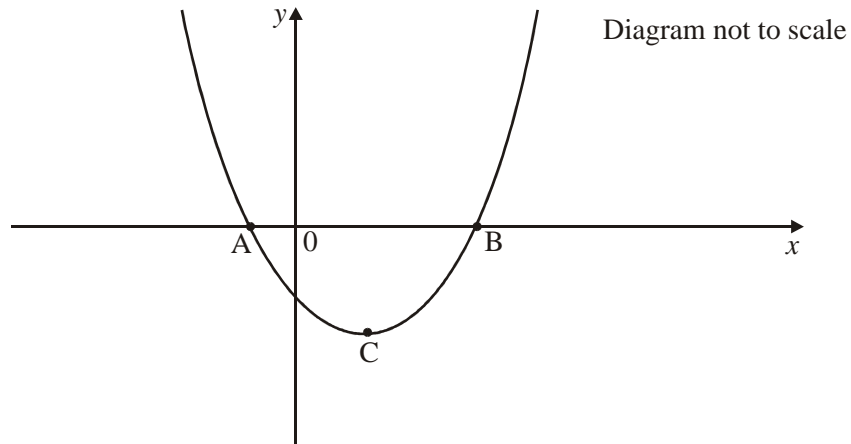

B

x cm

$(x+8)$ cm

A

$(x+7)$ cm

C

diagram not to scale

(a) Write down and **simplify** a quadratic equation in x that links the three sides of the triangle.

(3)

(b) Solve the quadratic equation found in part (a).

(2)

(c)   Write down the value of the perimeter of the triangle.

2.   The graph of the function $f(x) = x^2 - 2x - 3$ is shown in the diagram below.

Diagram not to scale

(a)   Factorize the expression $x^2 - 2x - 3$.

(b)   Write down the coordinates of the points A and B.

(c)   Write down the equation of the axis of symmetry.

(d)   Write down the coordinates of the point C, the vertex of the parabola.

3. (a) Factorize the expression $x^2 - 25$.

(b) Factorize the expression $x^2 - 3x - 4$.

(c) Using your answer to part (b), or otherwise, solve the equation $x^2 - 3x - 4 = 0$.

(Total 8 marks)

4. Let $f(x) = x^2 - 6x + 8$.

(a) Factorise $x^2 - 6x + 8$.

(2)

(b) Hence, or otherwise, solve the equation $x^2 - 6x + 8 = 0$.

(2)

Let $g(x) = x + 3$.

(c) Write down the solutions to the equation $f(x) = g(x)$.

(2)

(Total 6 marks)

5. (a) Factorize $3x^2 + 13x - 10$.

(2)

(b) Solve the equation $3x^2 + 13x - 10 = 0$.

(2)

Consider a function $f(x) = 3x^2 + 13x - 10$.

(c) Find the equation of the axis of symmetry on the graph of this function.

(2)

(d) Calculate the minimum value of this function.

(2)

(Total 8 marks)

6. (a) Solve the following equation for x

$$3(2x + 1) - 2(3 - x) = 13.$$

(2)

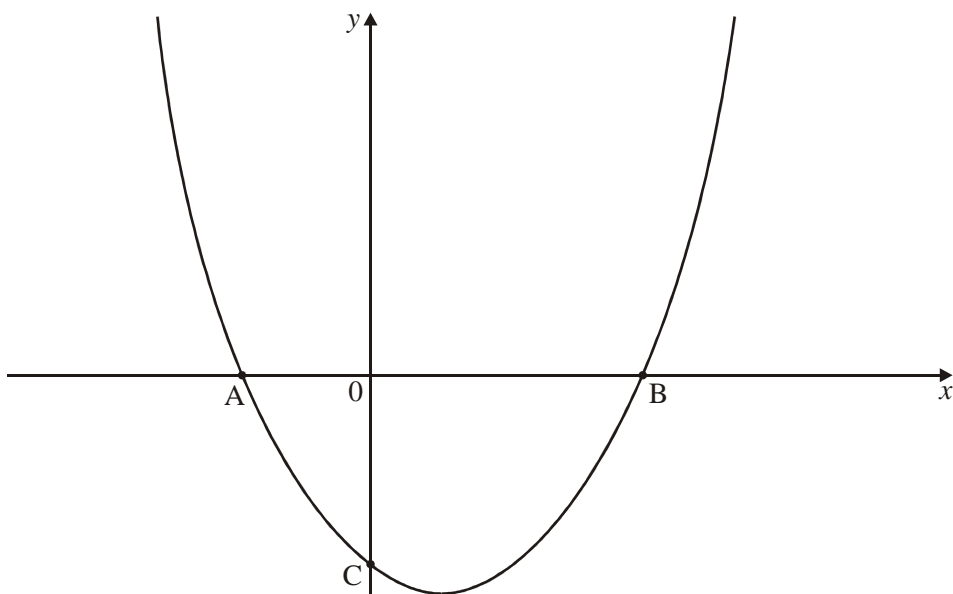(b) Factorize the expression $x^2 + 2x - 3$.

(2)

(c) Find the **positive** solution of the equation

$$x^2 + 2x - 6 = 0.$$

(2)

(Total 6 marks)

7. The graph of the function $y = x^2 - x - 2$ is drawn below.
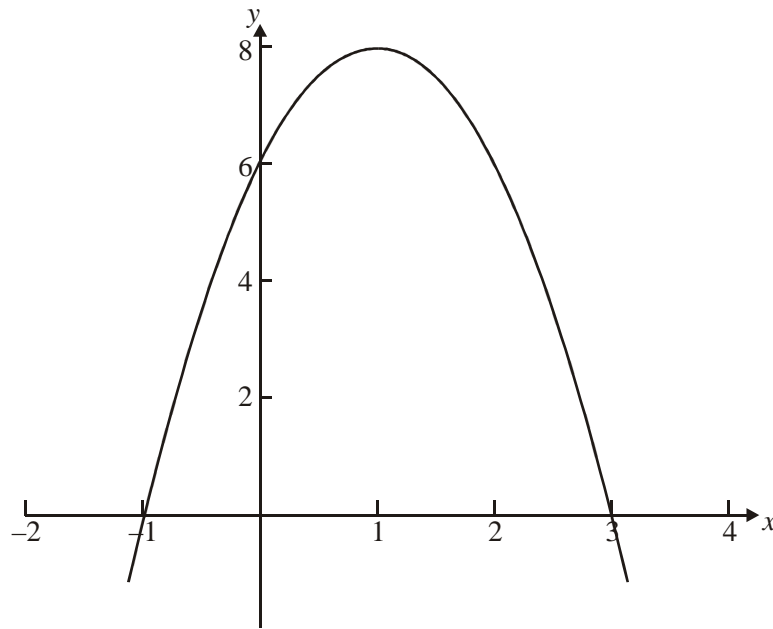

(a) Write down the coordinates of the point C.

(b) Calculate the coordinates of the points A and B.

(Total 8 marks)

8. (a) Find the solution of the equation $x^2 - 5x - 24 = 0$.

(b) The equation $ax^2 - 9x - 30 = 0$ has solution $x = 5$ and $x = -2$. Find the value of a.
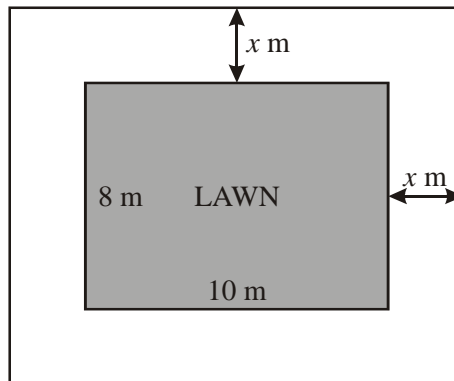
(Total 8 marks)

9. The figure below shows part of the graph of a quadratic function $y = ax^2 + 4x + c$.

(a) Write down the value of c.

(b) Find the value of a.

(c) Write the quadratic function in its factorized form.

(Total 8 marks)

10. The diagram below shows a path x m wide around a rectangular lawn which measures 10 m by 8 m.

(a)   Write down an expression in terms of x for the area of the path.

(b)   What is the width of the path when its area is 208 m²?

(Total 4 marks)