N5 UNIT 3

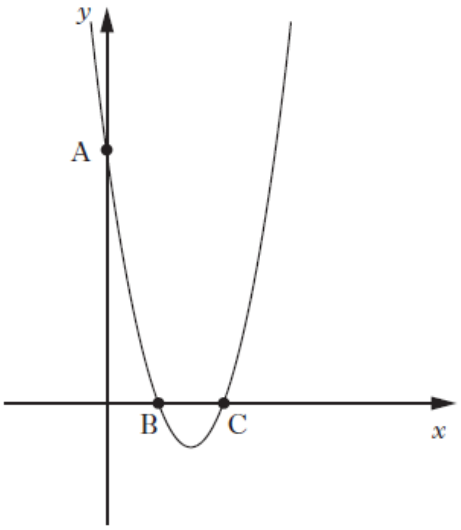
Past Paper Assessment Revision
National 5 Mathematics
Unit 3

GRAPHS OF QUADRATICS

The equation $x^2 - 6x + 8 = 0$ can also be written as $(x - 2)(x - 4) = 0$.

(*a*) Write down the roots of the equation $x^2 - 6x + 8 = 0$. **1**

Part of the graph of $y = x^2 - 6x + 8$ is shown below.



(*b*) State the coordinates of the points A, B and C. **3**

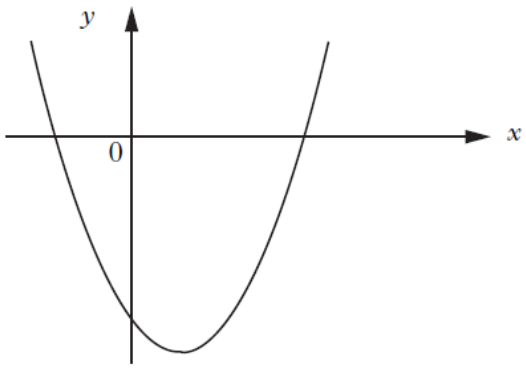
(*c*) What is the equation of the axis of symmetry of this graph? **1**

(*a*) Factorise $x^2 - 4x - 21$. **2**

(*b*) Hence write down the roots of the equation

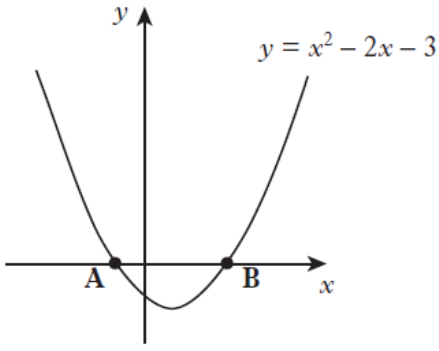
$$x^2 - 4x - 21 = 0.$$ **1**

(*c*) The graph of $y = x^2 - 4x - 21$ is shown in the diagram.



Find the coordinates of the turning point. **3**

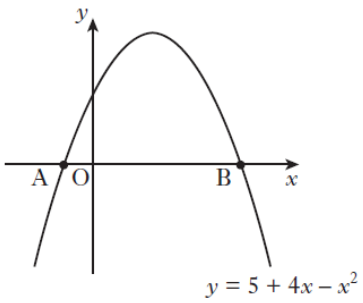
The parabola with equation $y = x^2 - 2x - 3$ cuts the x-axis at the points A and B as shown in the diagram.



(*a*) Find the coordinates of A and B. **4**

(*b*) Write down the equation of the axis of symmetry of $y = x^2 - 2x - 3$. **1**

The diagram shows part of the graph of $y = 5 + 4x - x^2$.



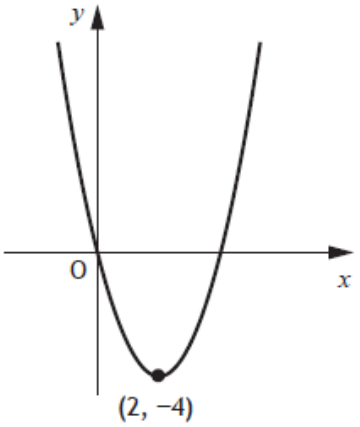
A is the point (–1, 0).
B is the point (5, 0).

(*a*) State the equation of the axis of symmetry of the graph. **2**

(*b*) Hence, find the maximum value of $y = 5 + 4x - x^2$. **2**

The graph below shows part of the parabola with equation of the form

$$y = (x + a)^2 + b.$$



The minimum turning point (2, –4) is shown in the diagram.

State the values of

(i) a

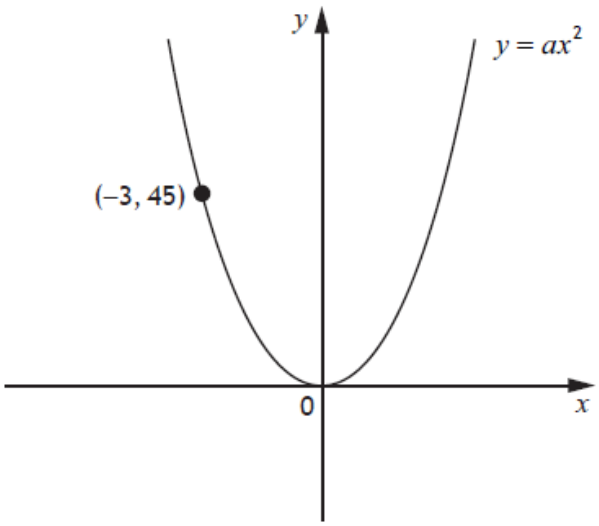
(ii) b

A parabola has equation $y = x^2 - 8x + 19$.

(a) Write the equation in the form $y = (x - p)^2 + q$. 2

(b) Sketch the graph of $y = x^2 - 8x + 19$, showing the coordinates of the turning point and the point of intersection with the y-axis. 3

The diagram below shows part of the graph of $y = ax^2$



Find the value of *a*. 2

SOLVING QUADRATIC EQUATIONS

Solve algebraically the following equations:

(a) $6y - y^2 = 0$ **(b)** $8x^2 - 12x = 0$

(c) $4x^2 - 9 = 0$ **(d)** $x^2 - 6x + 8 = 0$

(e) $x^2 - 2x - 8 = 0$ **(f)** $x^2 = 7x$

Use the quadratic formula to solve the equation,

$$3x^2 + 5x - 7 = 0.$$

Give your answers correct to **1 decimal place**.

Solve the equation

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

Give your answers **correct to 2 significant figures**.

Find the discriminant for each of these and use it to determine the nature of the roots.

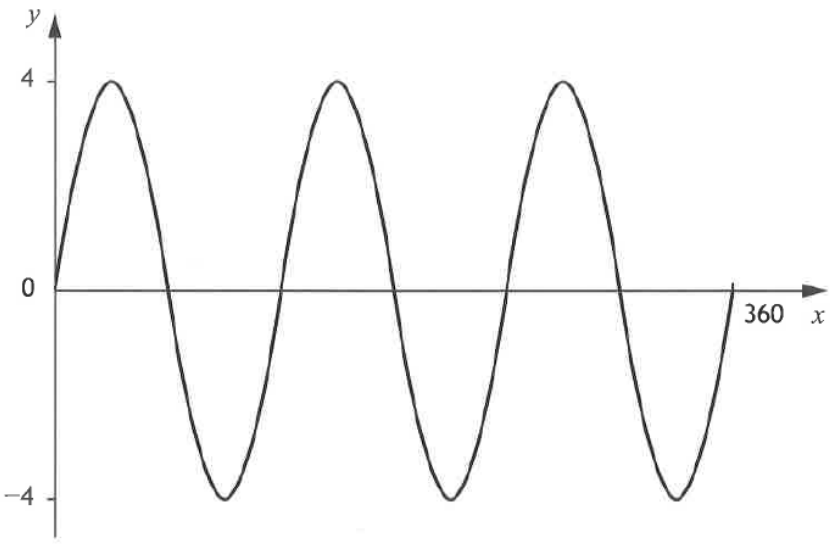
(a) $x^2 + 4x + 1$ **(b)** $x^2 + x + 4 = 0$

(c) $x^2 + 3x - 2 = 0$ **(d)** $3x^2 + 7x + 4 = 0$

(e) $2x^2 + 3x - 2 = 0$ **(f)** $4x^2 + 9x + 6 = 0$

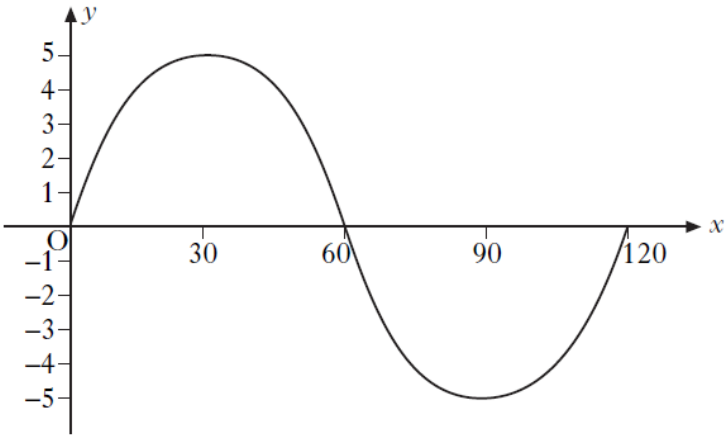
TRIGONOMETRIC GRAPHS

Part of the graph of $y = a \sin bx°$ is shown in the diagram.



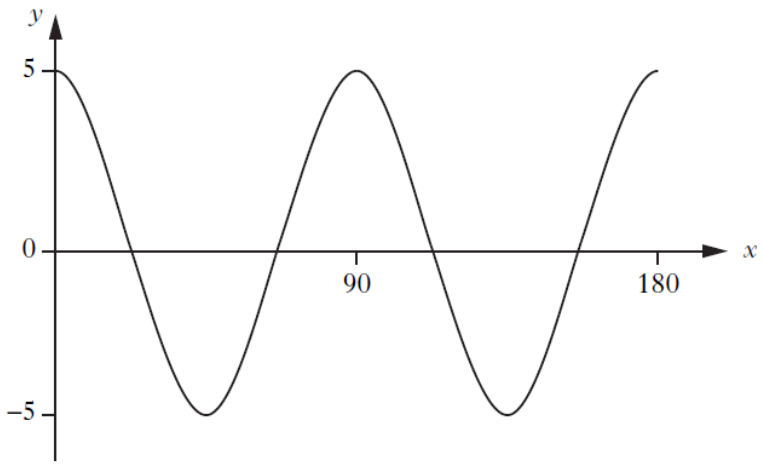
Write down the values of *a* and *b*.

Part of the graph of $y = a \sin bx°$ is shown in the diagram.



State the values of a and b. **2**

Part of the graph of $y = a\cos bx°$ is shown in the diagram.



State the values of a and b. **2**

Sketch the graph of $y = 4\cos 2x°$, $0 \leq x \leq 360$. **3**

State the period of $y = \sin 2x°$. **1**

SOLVING TRIGONOMETRIC EQUATIONS

Solve the equation

$$4\sin x° - 1 = 0, \qquad 0 \le x < 360.$$

Solve the equation

$$2\tan x° - 3 = 5, \qquad 0 \le x \le 360.$$

Solve the following equation for $0 \le x \le 360$.

$$7\sin x° - 3 = 0$$

Solve the equation

$$4\tan x° + 5 = 0, \qquad 0 \le x \le 360.$$

Solve the equation

$$2\tan x° + 7 = 0, \qquad 0 \le x < 360.$$