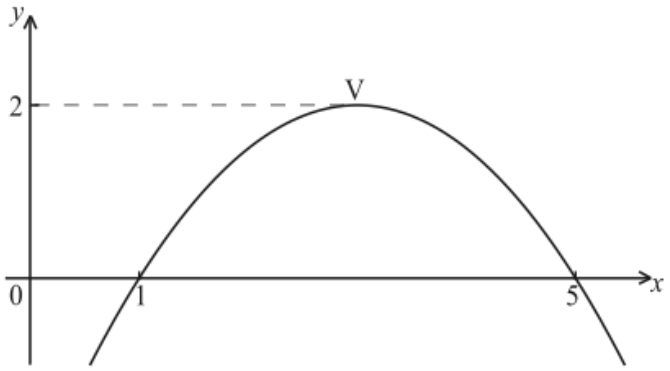
Quadratic functions 2

1) Part of the graph of the function $y = d(x-m)^2 + p$ is given in the diagram below. The x-intercepts are $(1, 0)$ and $(5, 0)$. The vertex is $V(m, 2)$.



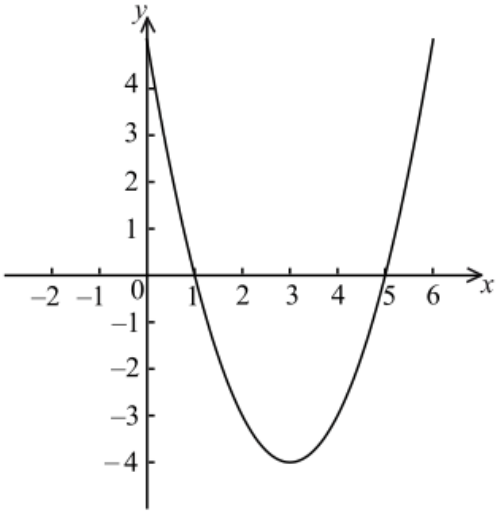
(a) Write down the value of

(i) m;

(ii) p.

(b) Find d.

2) The following diagram shows part of the graph of a quadratic function, with equation in the form $y = (x-p)(x-q)$, where $p, q \in \mathbb{Z}$.



(a) Write down

(i) the value of p and of q;

(ii) the equation of the axis of symmetry of the curve. *[3 marks]*

(b) Find the equation of the function in the form $y = (x-h)^2 + k$, where $h, k \in \mathbb{Z}$. *[3 marks]*

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3) Let $f(x)=3(x+1)^2-12$.

(a) Show that $f(x)=3x^2+6x-9$. *[2 marks]*

(b) For the graph of f

(i) write down the coordinates of the vertex;

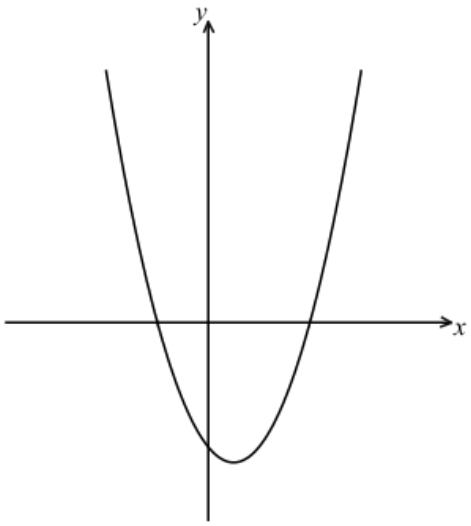
(ii) write down the **equation** of the axis of symmetry;

(iii) write down the y-intercept;

(iv) find both x-intercepts. *[8 marks]*

(c) **Hence** sketch the graph of f. *[2 marks]*

4) The following diagram shows part of the graph of f, where $f(x)=x^2-x-2$.



(a) Find both x-intercepts. *[4 marks]*

(b) Find the x-coordinate of the vertex. *[2 marks]*

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

(a) Express $f(x)$ in the form $f(x)=2(x-h)^2+k$. *[3 marks]*

(b) Write down the equation of the axis of symmetry of the graph of f. *[1 mark]*

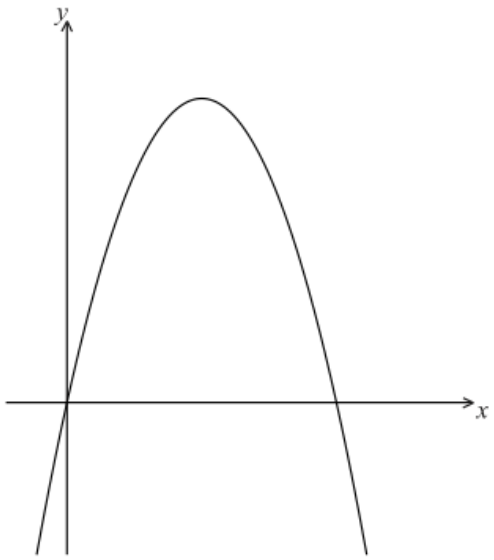
(c) Express $f(x)$ in the form $f(x)=2(x-p)(x-q)$. *[2 marks]*

6) The quadratic equation $kx^2+(k-3)x+1=0$ has two equal real roots.

(a) Find the possible values of k. *[5 marks]*

(b) **Write down** the values of k for which $x^2+(k-3)x+k=0$ has two equal real roots. *[2 marks]*

7) Let $f(x)=8x-2x^2$. Part of the graph of f is shown below.



(a) Find the x-intercepts of the graph. *[4 marks]*

(b) (i) Write down the equation of the axis of symmetry.

(ii) Find the y-coordinate of the vertex. *[3 marks]*

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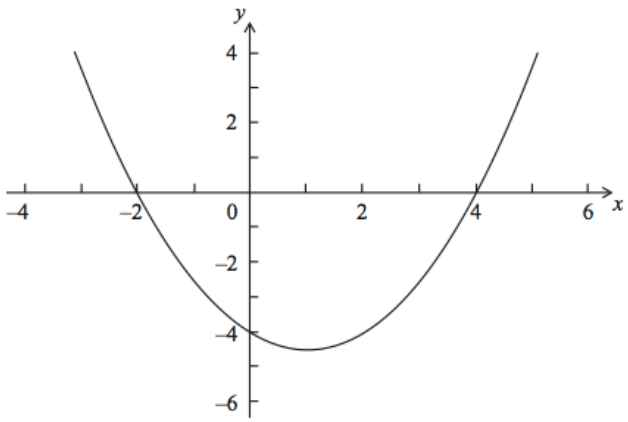
8) Let $f(x) = p(x-q)(x-r)$. Part of the graph of f is shown below.



The graph passes through the points $(-2, 0)$, $(0, -4)$ and $(4, 0)$.

(a) Write down the value of q and of r. *[2 marks]*

(b) Write down the **equation** of the axis of symmetry. *[1 mark]*

(c) Find the value of p. *[3 marks]*