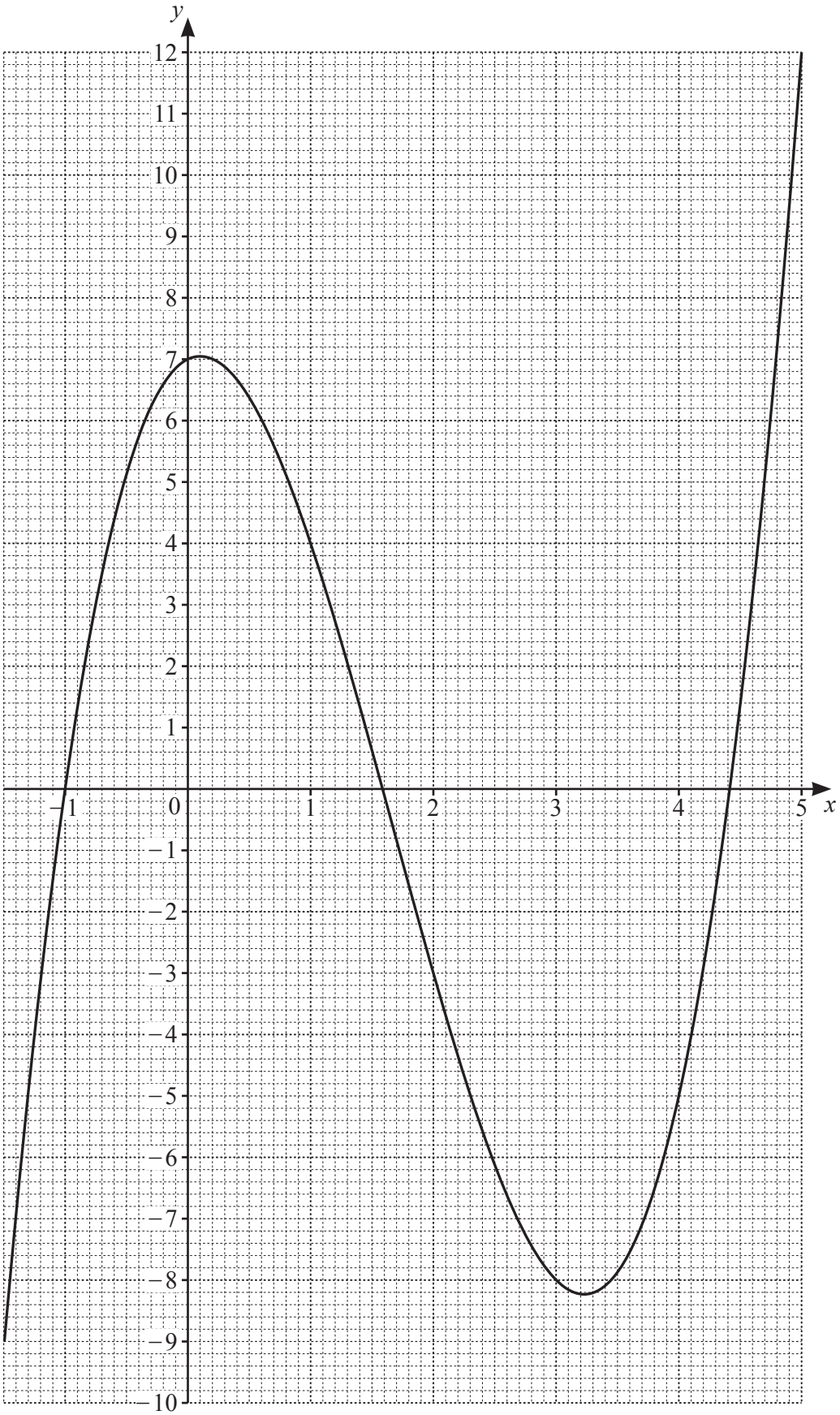
6 (a)



The diagram shows the graph of $y = f(x)$ for $-1.5 \leqslant x \leqslant 5$.

(i) Find $f(2)$.

..... [1]

(ii) Solve the equation $f(x) = 0$ for $-1.5 \leqslant x \leqslant 5$.

$x =$ ..... or $x =$ ..... or $x =$ ..... [3]

(iii) $f(x) = k$ has three solutions for $-1.5 \leqslant x \leqslant 5$ where k is an integer.

Find the smallest possible value of k.

$k =$ ..... [1]

(iv) On the grid, draw a line $y = mx$ so that $f(x) = mx$ has exactly one solution for $-1.5 \leqslant x \leqslant 5$. [2]

(b) $y = 3x^2 - 12x + 7$

(i) Find the value of $\frac{dy}{dx}$ when $x = 5$.

..... [3]

(ii) Find the coordinates of the point on the graph of $y = 3x^2 - 12x + 7$ where the gradient is 0.

(..... , ...) [2]

(c) When $y = 2x^p + qx^2$, $\frac{dy}{dx} = 14x^6 + 6x$.

Find the value of p and the value of q.

$p =$ .....

$q =$ ..... [2]