

Modulus Graphs

1 $f(x) = x^2 - 7x - 8$

a Sketch the graph of $y = f(x)$.

c Sketch the graph of $y = f(|x|)$.

b Sketch the graph of $y = |f(x)|$.

2 $g: x \mapsto \cos x, -360^\circ \leq x \leq 360^\circ$

a Sketch the graph of $y = g(x)$.

c Sketch the graph of $y = g(|x|)$.

b Sketch the graph of $y = |g(x)|$.

3 $h: x \mapsto (x - 1)(x - 2)(x + 3)$

a Sketch the graph of $y = h(x)$.

c Sketch the graph of $y = h(|x|)$.

b Sketch the graph of $y = |h(x)|$.

4 The function f is defined as

$$f: x \mapsto 4|x + 6| + 1, x \in \mathbb{R}.$$

a Sketch the graph of $y = f(x)$.

b State the range of the function.

c Solve the equation $f(x) = -\frac{1}{2}x + 1$.

5 Given that $g(x) = -\frac{5}{2}|x - 2| + 7, x \in \mathbb{R}$,

a sketch the graph of $y = g(x)$

b state the range of the function

c solve the equation $g(x) = x + 1$.

6 The function h is defined by

$$h(x) = \frac{2}{3}|x - 1| - 7, x \in \mathbb{R}$$

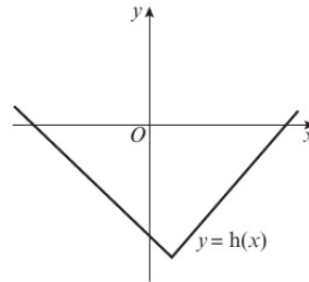
The diagram shows a sketch of the graph $y = h(x)$.

a State the range of h . (1 mark)

b Give a reason why h^{-1} does not exist. (1 mark)

c Solve the inequality $h(x) < -6$. (4 marks)

d State the range of values of k for which the equation $h(x) = \frac{2}{3}x + k$ has no solutions. (4 marks)



7 The diagram shows a sketch of part of the graph

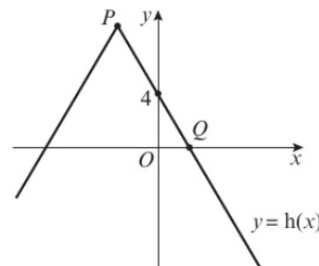
$$y = h(x), \text{ where } h(x) = a - 2|x + 3|, x \in \mathbb{R}.$$

The graph intercepts the y -axis at $(0, 4)$.

a Find the value of a . (2 marks)

b Find the coordinates of P and Q . (3 marks)

c Solve $h(x) = \frac{1}{3}x + 6$. (5 marks)



8 The diagram shows a sketch of part of the graph $y = m(x)$,

$$\text{where } m(x) = -4|x + 3| + 7, x \in \mathbb{R}.$$

a State the range of m . (1 mark)

b Solve the equation $m(x) = \frac{3}{5}x + 2$. (4 marks)

Given that $m(x) = k$, where k is a constant, has two distinct roots

c state the set of possible values for k . (4 marks)

