

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  $g(x) = x + 1$ .

**E/P** 8 The function  $h$  is defined by

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

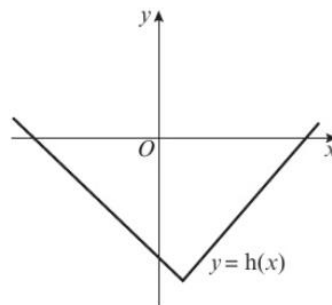
The diagram shows a sketch of the graph  $y = h(x)$ .

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)**



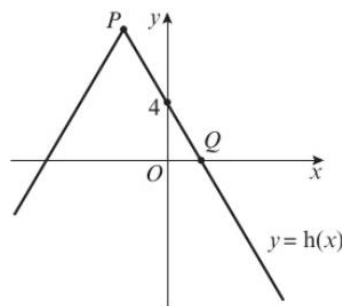
**E/P** 9 The diagram shows a sketch of part of the graph  $y = h(x)$ , where  $h(x) = a - 2|x + 3|, x \in \mathbb{R}$ .

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)**



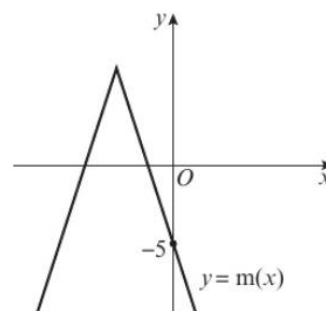
**E/P** 10 The diagram shows a sketch of part of the graph  $y = m(x)$ , where  $m(x) = -4|x + 3| + 7, x \in \mathbb{R}$ .

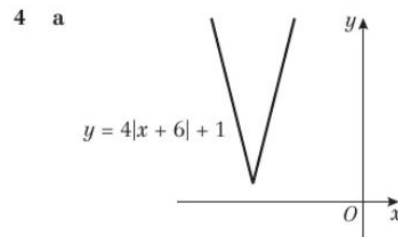
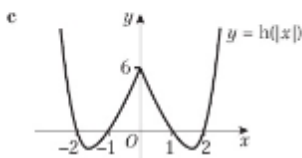
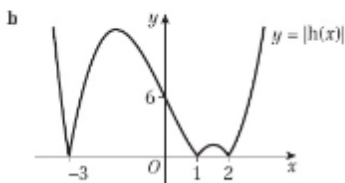
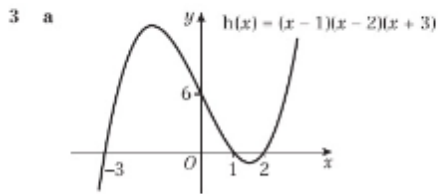
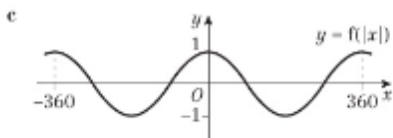
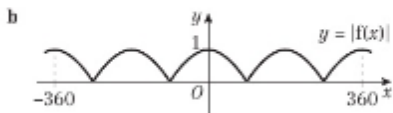
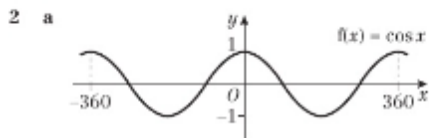
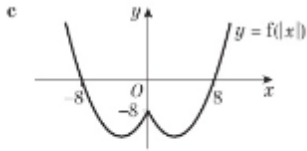
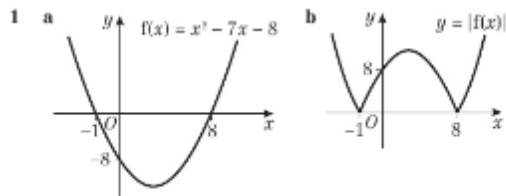
a State the range of  $m$ . **(1 mark)**

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

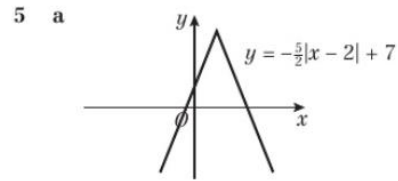
Given that  $m(x) = k$ , where  $k$  is a constant, has two distinct roots

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





b  $f(x) \geq 1$       c  $x = -\frac{16}{3}$  and  $x = -\frac{48}{7}$



b  $g(x) \leq 7$       c  $x = -\frac{2}{3}$  and  $x = \frac{22}{7}$

- 8 a  $h(x) \geq -7$   
 b Original function is many-to-one, therefore the inverse is one-to-many, which is not a function.  
 c  $-\frac{1}{2} < x < \frac{5}{2}$       d  $k < -\frac{23}{3}$
- 9 a  $a = 10$       b  $P(-3, 10)$  and  $Q(2, 0)$   
 c  $x = -\frac{6}{7}$  and  $x = -6$
- 10 a  $m(x) \leq 7$       b  $x = -\frac{35}{23}$  and  $x = -5$   
 c  $k < 7$

