11 The functions f and g are defined by

$$f(x) = \frac{2}{x+1},\ x > 0 \qquad g(x) = 1 - x^2,\ x \in \mathbb{R}.$$

a Find $fg(x)$, giving your answer in its simplest form.

b Find $f^{-1}(x)$.

c Solve the equation $f(x) = f^{-1}(x)$.

12 The function f is defined by $f(x) = x^2 - 4x - 5,\ x \in \mathbb{R},\ x \geqslant 2$.

a Find the range of f.

b Write down the domain and range of f^{-1}.

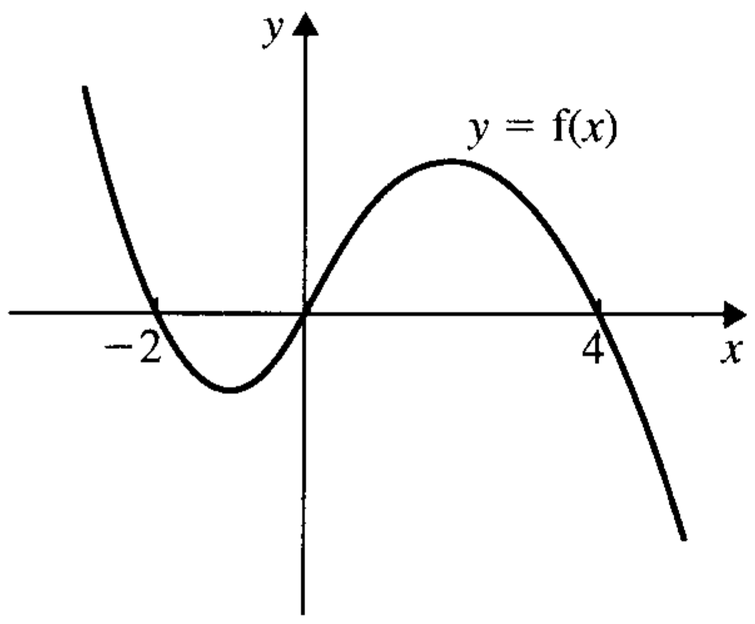
c Sketch the graph of f^{-1}, showing any points where the graph intersects the coordinate axes.

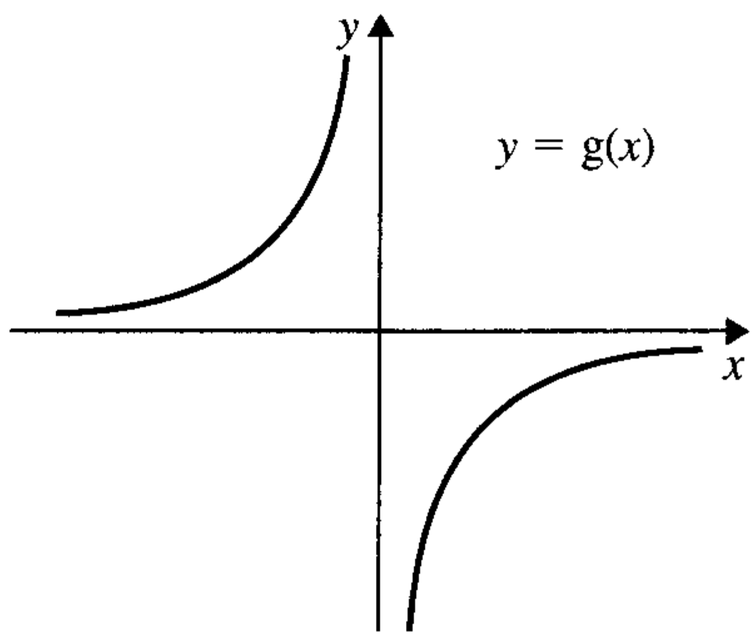
13 Sketch the graphs of the following, marking where the graphs cross the axes.

a $y = |x - 3|$ **b** $y = |3x + 1|$

c $y = |x^2 - 1|$ **d** $y = |\sin x|$ for $0 \leqslant x \leqslant 2\pi$.

14 The graphs of $y = f(x)$ and $y = g(x)$ are shown.





Sketch the graphs of

a $y = |f(x)|$ **b** $y = |g(x)|$ **c** $y = f(|x|)$ **d** $y = g(|x|)$.

15 Solve the inequalities.

a $|x - 1| < |x + 2|$

b) $|2x + 1| > |x - 1|$

16 Solve the inequalities.

a $|x - 1| < 5$

b) $|2x - 3| > 1|$

17 **a** Sketch the graph of $y = |x^2 - 4|$.

b Solve the inequality $|x^2 - 4| > 5$.

18 **a** On the same axes, sketch the graphs of $y = |2x + 1|$ and $y = \frac{2}{x}$.

b How many solutions are there to the equation $|2x + 1| = \frac{2}{x}$?