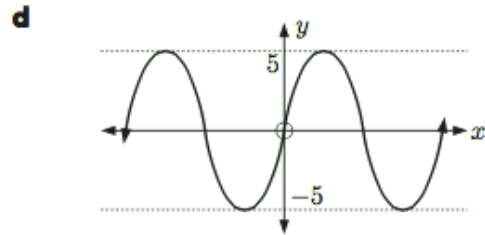
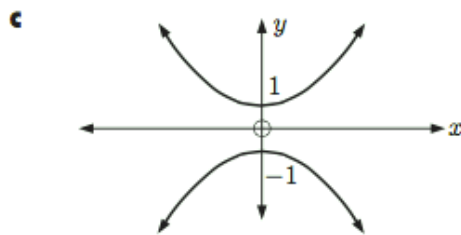
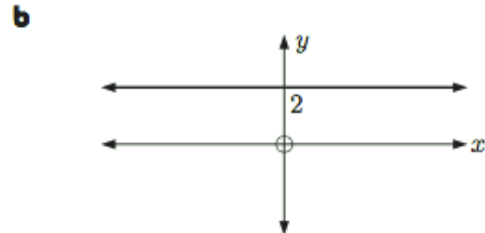
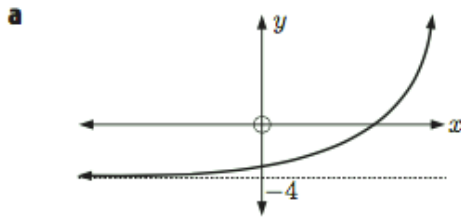


NON CALCULATOR

1 For each graph, state:

i the domain ii the range

iii whether the graph shows a function.



2 If $f(x) = 2x - x^2$, find: **a** $f(2)$ **b** $f(-3)$ **c** $f(-\frac{1}{2})$

3 Suppose $f(x) = ax + b$ where a and b are constants. If $f(1) = 7$ and $f(3) = -5$, find a and b .

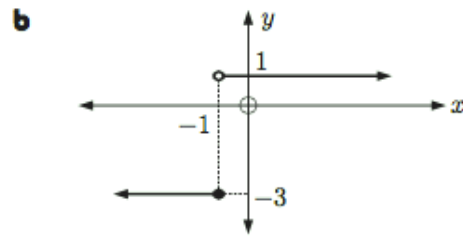
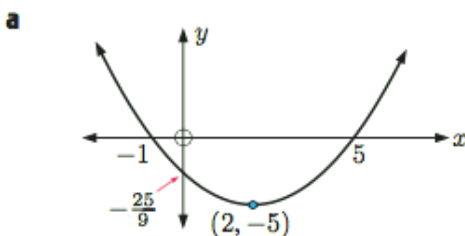
4 If $g(x) = x^2 - 3x$, find in simplest form: **a** $g(x + 1)$ **b** $g(x^2 - 2)$

5 For each of the following graphs determine:

i the domain and range

ii the x and y -intercepts

iii whether it is a function.



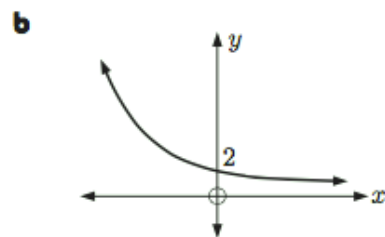
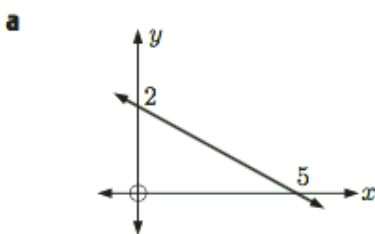
6 Draw a sign diagram for:

a $(3x + 2)(4 - x)$

b $\frac{x - 3}{x^2 + 4x + 4}$

7 If $f(x) = ax + b$, $f(2) = 1$, and $f^{-1}(3) = 4$, find a and b .

8 Copy the following graphs and draw the inverse function on the same set of axes:

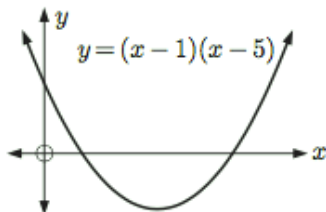


- 9** Find $f^{-1}(x)$ given that $f(x)$ is: **a** $4x + 2$ **b** $\frac{3 - 5x}{4}$
- 10** Consider $f(x) = x^2$ and $g(x) = 1 - 6x$.
- a** Show that $f(-3) = g(-\frac{4}{3})$. **b** Find $(f \circ g)(-2)$.
- c** Find x such that $g(x) = f(5)$.
- 11** Given $f : x \mapsto 3x + 6$ and $h : x \mapsto \frac{x}{3}$, show that $(f^{-1} \circ h^{-1})(x) = (h \circ f)^{-1}(x)$.

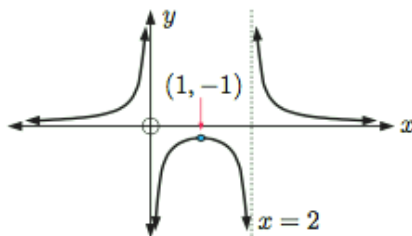
CALCULATOR

- 1 For each of the following graphs, find the domain and range:

a



b



- 2 If $f(x) = 2x - 3$ and $g(x) = x^2 + 2$, find in simplest form:

a $(f \circ g)(x)$

b $(g \circ f)(x)$

- 3 Draw a sign diagram for:

a $\frac{x^2 - 6x - 16}{x - 3}$

b $\frac{x + 9}{x + 5} + x$

- 4 Consider $f(x) = \frac{1}{x^2}$.

- a For what value of x is $f(x)$ undefined, or not a real number?
 b Sketch the graph of this function using technology.
 c State the domain and range of the function.

- 5 Consider the function $f(x) = \frac{ax + 3}{x - b}$.

- a Find a and b given that $y = f(x)$ has asymptotes with equations $x = -1$ and $y = 2$.
 b Write down the domain and range of $f^{-1}(x)$.

- 6 Consider the function $f : x \mapsto \frac{4x + 1}{2 - x}$.

- a Determine the equations of the asymptotes.
 b State the domain and range of the function.
 c Discuss the behaviour of the function as it approaches its asymptotes.
 d Determine the axes intercepts.
 e Sketch the function.

- 7 Consider the functions $f(x) = 3x + 1$ and $g(x) = \frac{2}{x}$.

- a Find $(g \circ f)(x)$.
 b Given $(g \circ f)(x) = -4$, solve for x .
 c Let $h(x) = (g \circ f)(x)$, $x \neq -\frac{1}{3}$.
 i Write down the equations of the asymptotes of $h(x)$.
 ii Sketch the graph of $h(x)$ for $-3 \leq x \leq 2$.
 iii State the range of $h(x)$ for the domain $-3 \leq x \leq 2$.

8 Consider $f : x \mapsto 2x - 7$.

- a On the same set of axes graph $y = x$, $y = f(x)$, and $y = f^{-1}(x)$.
- b Find $f^{-1}(x)$ using variable interchange.
- c Show that $(f \circ f^{-1})(x) = (f^{-1} \circ f)(x) = x$, the identity function.

9 The graph of the function $f(x) = -3x^2$, $0 \leq x \leq 2$ is shown alongside.

a Sketch the graph of $y = f^{-1}(x)$.

b State the range of f^{-1} .

c Solve:

i $f(x) = -10$

ii $f^{-1}(x) = 1$

