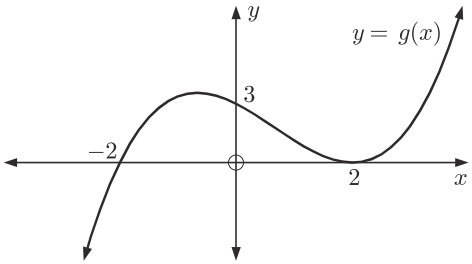
7



For the graph of $y = g(x)$ given, sketch the graph of:

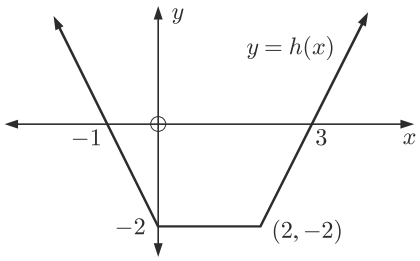
a $y = g(x) + 2$ **b** $y = -g(x)$

c $y = g(-x)$ **d** $y = g(x + 1)$

8 For the graph of $y = h(x)$ given, sketch the graph of:

a $y = h(x) + 1$ **b** $y = \frac{1}{2}h(x)$

c $y = h(-x)$ **d** $y = h\left(\frac{x}{2}\right)$



REVIEW SET 5A NON-CALCULATOR

1 If $f(x) = x^2 - 2x$, find in simplest form:

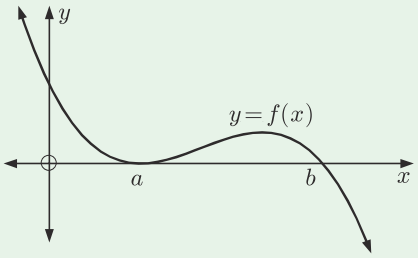
a $f(3)$ **b** $f(2x)$ **c** $f(-x)$ **d** $3f(x) - 2$

2 If $f(x) = 5 - x - x^2$, find in simplest form:

a $f(-1)$ **b** $f(x - 1)$ **c** $f\left(\frac{x}{2}\right)$ **d** $2f(x) - f(-x)$

3 The graph of $f(x) = 3x^3 - 2x^2 + x + 2$ is translated to its image $g(x)$ by the vector $\begin{pmatrix} 1 \\ -2 \end{pmatrix}$. Write the equation of $g(x)$ in the form $g(x) = ax^3 + bx^2 + cx + d$.

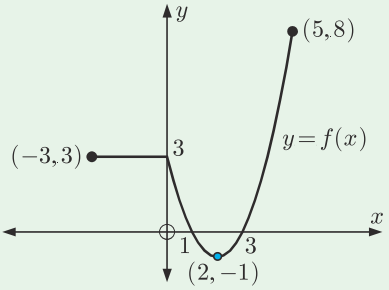
4 The graph of $y = f(x)$ is shown alongside.
The x-axis is a tangent to $f(x)$ at $x = a$ and $f(x)$ cuts the x-axis at $x = b$.
On the same diagram, sketch the graph of $y = f(x - c)$ where $0 < c < b - a$.
Indicate the x-intercepts of $y = f(x - c)$.



5 For the graph of $y = f(x)$, sketch graphs of:

a $y = f(-x)$ **b** $y = -f(x)$

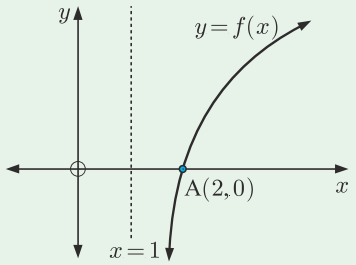
c $y = f(x + 2)$ **d** $y = f(x) + 2$



6 Consider the function $f : x \mapsto x^2$.
On the same set of axes graph:

a $y = f(x)$ **b** $y = f(x - 1)$ **c** $y = 3f(x - 1)$ **d** $y = 3f(x - 1) + 2$

7 The graph of $y = f(x)$ is shown alongside.



a Sketch the graph of $y = g(x)$ where $g(x) = f(x + 3) - 1$.

b State the equation of the vertical asymptote of $y = g(x)$.

c Identify the point A′ on the graph of $y = g(x)$ which corresponds to point A.

REVIEW SET 5B CALCULATOR

1 Use your calculator to help graph $f(x) = (x + 1)^2 - 4$. Include all axes intercepts, and the coordinates of the turning point of the function.

2 Consider the function $f : x \mapsto x^2$. On the same set of axes graph:

a $y = f(x)$ **b** $y = f(x + 2)$ **c** $y = 2f(x + 2)$ **d** $y = 2f(x + 2) - 3$

3 Consider $f : x \mapsto \dfrac{2^x}{x}$.

a Does the function have any axes intercepts?

b Find the equations of the asymptotes of the function.

c Find any turning points of the function.

d Sketch the function for $-4 \leqslant x \leqslant 4$.

4 Consider $f : x \mapsto 2^{-x}$.

a Use your calculator to help graph the function.

b True or false?

i As $x \to \infty$, $2^{-x} \to 0$. **ii** As $x \to -\infty$, $2^{-x} \to 0$.

iii The y-intercept is $\frac{1}{2}$. **iv** $2^{-x} > 0$ for all x.

5 The graph of the function $f(x) = (x + 1)^2 + 4$ is translated 2 units to the right and 4 units up.

a Find the function $g(x)$ corresponding to the translated graph.

b State the range of $f(x)$.

c State the range of $g(x)$.

6 For each of the following functions:

i Find $y = f(x)$, the result when the function is translated by $\begin{pmatrix} 1 \\ -2 \end{pmatrix}$.

ii Sketch the original function and its translated function on the same set of axes. Clearly state any asymptotes of each function.

iii State the domain and range of each function.

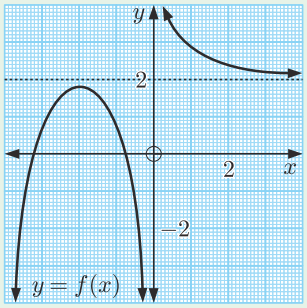
a $y = \dfrac{1}{x}$ **b** $y = 2^x$ **c** $y = \log_4 x$

7 Sketch the graph of $f(x) = x^2 + 1$, and on the same set of axes sketch the graphs of:

a $-f(x)$ **b** $f(2x)$ **c** $f(x) + 3$

REVIEW SET 5C

1 Consider the graph of $y = f(x)$ shown.



PRINTABLE GRAPH

a Use the graph to determine:

- **i** the coordinates of the turning point
- **ii** the equation of the vertical asymptote
- **iii** the equation of the horizontal asymptote
- **iv** the x-intercepts.

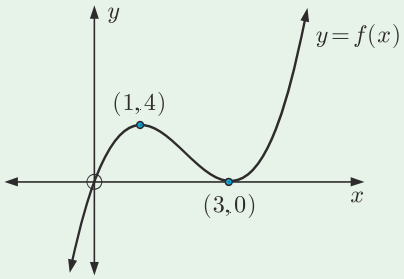
b Graph the function $g : x \mapsto x+1$ on the same set of axes.

c Hence estimate the coordinates of the points of intersection of $y = f(x)$ and $y = g(x)$.

2 Sketch the graph of $f(x) = -x^2$, and on the same set of axes sketch the graph of:

a $y = f(-x)$ **b** $y = -f(x)$ **c** $y = f(2x)$ **d** $y = f(x-2)$

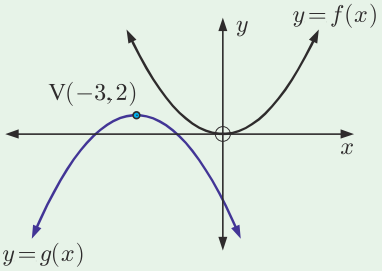
3 The graph of a cubic function $y = f(x)$ is shown alongside.



a Sketch the graph of $g(x) = -f(x-1)$.

b State the coordinates of the turning points of $y = g(x)$.

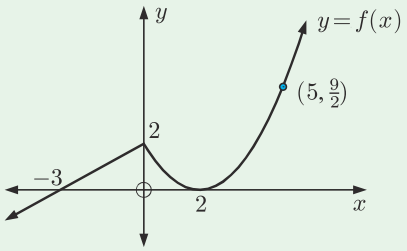
4 The graph of $f(x) = x^2$ is transformed to the graph of $g(x)$ by a reflection and a translation as illustrated. Find the formula for $g(x)$ in the form $g(x) = ax^2 + bx + c$.



5 Given the graph of $y = f(x)$, sketch graphs of:

a $f(-x)$ **b** $f(x+1)$

c $f(x) - 3$.



6 The graph of $f(x) = x^3 + 3x^2 - x + 4$ is translated to its image $y = g(x)$ by the vector $\begin{pmatrix} -1 \\ 3 \end{pmatrix}$. Write the equation of $g(x)$ in the form $g(x) = ax^3 + bx^2 + cx + d$.

7 **a** Find the equation of the line that results when the line $f(x) = 3x + 2$ is translated:

- **i** 2 units to the left
- **ii** 6 units upwards.

b Show that when the linear function $f(x) = ax + b$, $a > 0$ is translated k units to the left, the resulting line is the same as when $f(x)$ is translated ka units upwards.