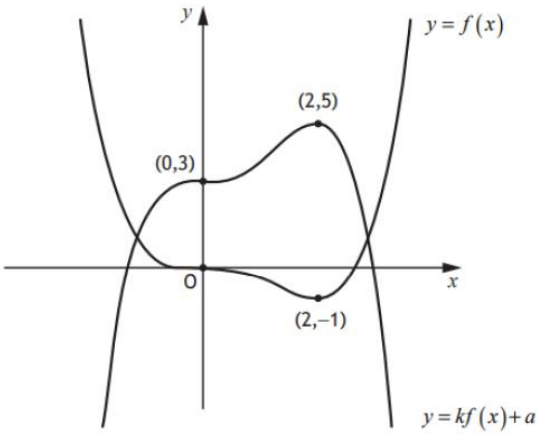
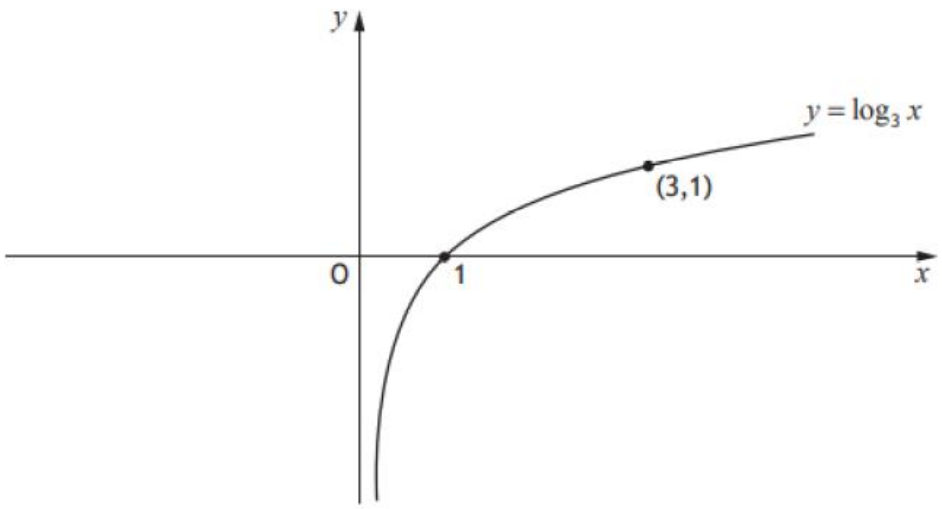
Graphs of Functions

2019 P1 Q10	The diagram shows the graphs with equations $y = f(x)$ and $y = kf(x) + a$.  (a) State the value of a. (b) Find the value of k.	1 1
2018 P1 Q11a only	The diagram shows the curve with equation $y = \log_3 x$.  (a) On the diagram in your answer booklet, sketch the curve with equation $y = 1 - \log_3 x$.	3

2017 P1 Q15a only

A quadratic function, f, is defined on $\mathbb{R}$, the set of real numbers.

Diagram 1 shows part of the graph with equation $y = f(x)$.
The turning point is (2, 3).

Diagram 2 shows part of the graph with equation $y = h(x)$.
The turning point is (7, 6).

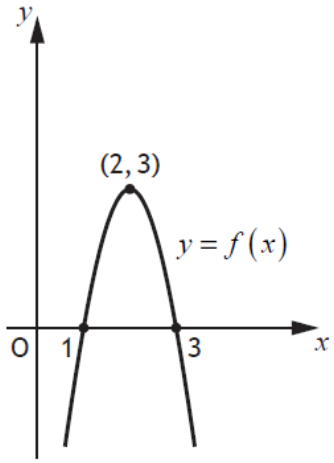


Diagram 1

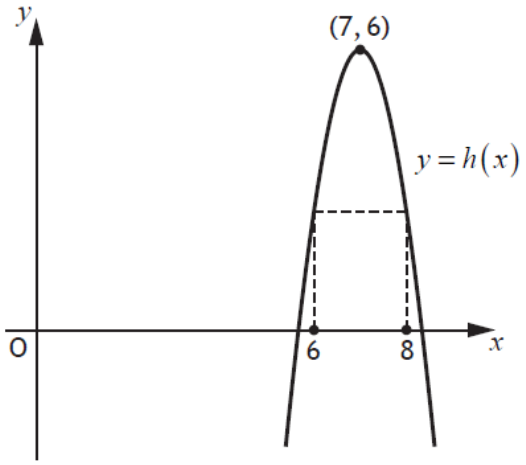


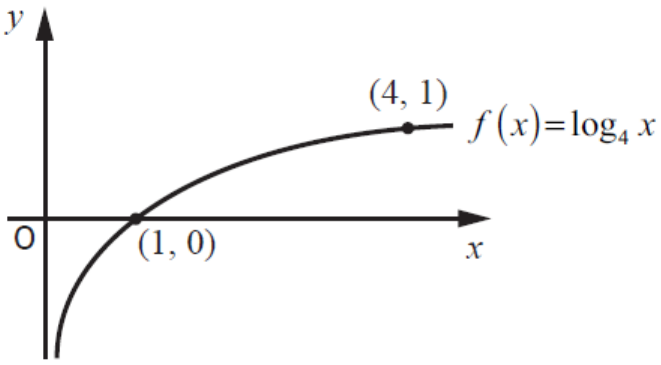
Diagram 2

(a) Given that $h(x) = f(x + a) + b$.

Write down the values of a and b. 2

2016 P1 Q10

The diagram below shows the graph of the function $f(x) = \log_4 x$, where $x > 0$.

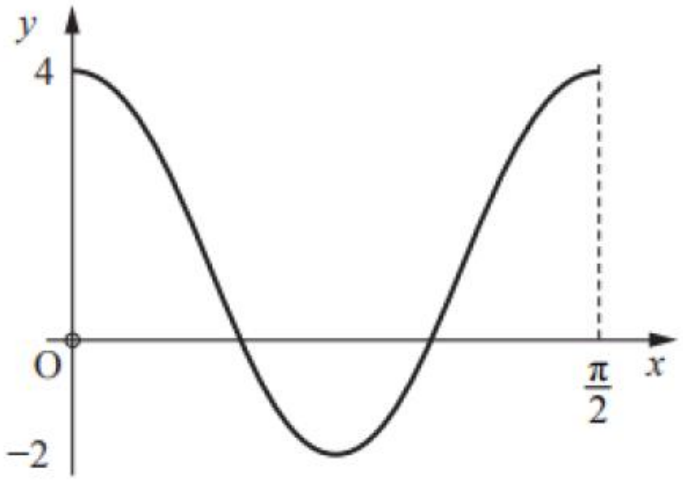


The inverse function, f^{-1}, exists.

On the diagram in your answer booklet, sketch the graph of the inverse function. 2

2015 P1 Q4

The diagram shows part of the graph of the function $y = p\cos qx + r$.

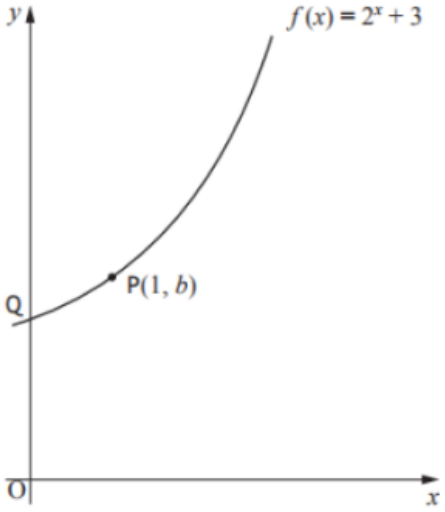


Write down the values of p, q and r. 3

2015 P1 Q13

The function $f(x) = 2^x + 3$ is defined on $\mathbb{R}$, the set of real numbers.

The graph with equation $y = f(x)$ passes through the point P$(1, b)$ and cuts the y-axis at Q as shown in the diagram.

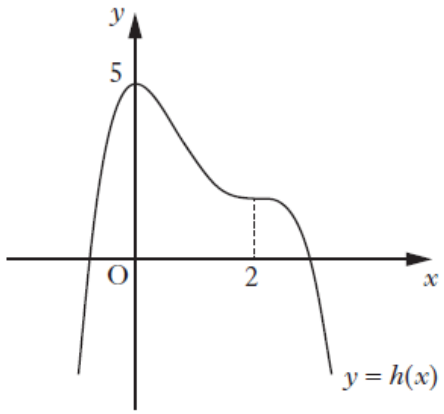
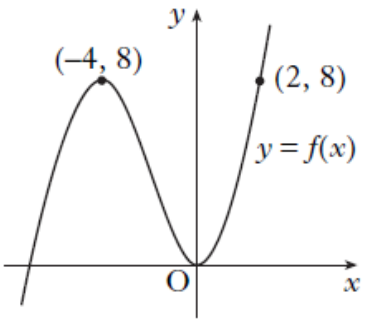
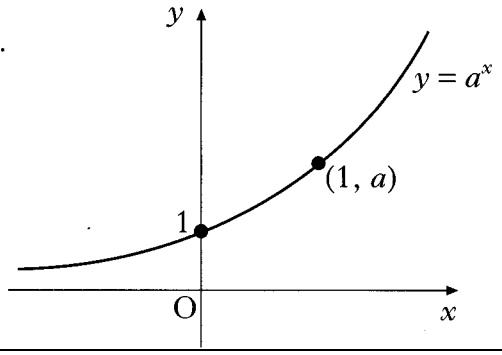


(a) What is the value of b? 1

(b) (i) Copy the above diagram.
On the same diagram, sketch the graph with equation $y = f^{-1}(x)$. 1

(ii) Write down the coordinates of the images of P and Q. 3

(c) R $(3,11)$ also lies on the graph with equation $y = f(x)$.
Find the coordinates of the image of R on the graph with equation $y = 4 - f(x + 1)$. 2

2012 P2 Q4	The diagram below shows the graph of a quartic $y = h(x)$, with stationary points at $x = 0$ and $x = 2$.  On separate diagrams sketch the graphs of: (*a*) $y = h'(x)$; (*b*) $y = 2 - h'(x)$.	3 3
2009 P1 Q23	The diagram shows a sketch of the function $y = f(x)$. (*a*) Copy the diagram and on it sketch the graph of $y = f(2x)$. (*b*) On a separate diagram sketch the graph of $y = 1 - f(2x)$.  	2 3
2007 P2 Q9	**9.** The diagram shows the graph of $y = a^x$, $a > 1$. On separate diagrams, sketch the graphs of: (*a*) $y = a^{-x}$; (*b*) $y = a^{1-x}$.  	2 2

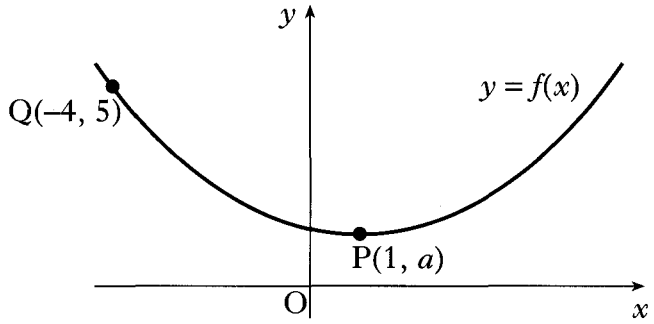
2006 P2 Q7

7. The diagram shows the graph of a function $y = f(x)$.

Copy the diagram and on it sketch the graphs of:

(*a*) $y = f(x - 4)$; 2

(*b*) $y = 2 + f(x - 4)$. 2

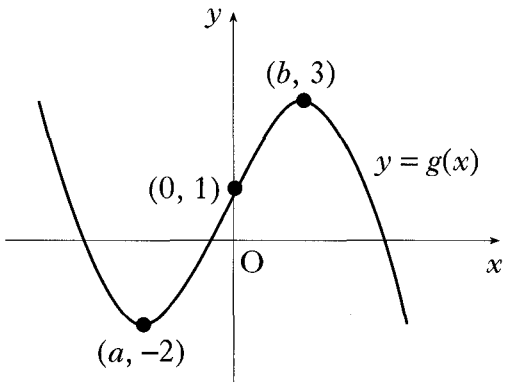


2004 P1 Q4

4. The diagram shows the graph of $y = g(x)$.

(*a*) Sketch the graph of $y = -g(x)$. 2

(*b*) On the same diagram, sketch the graph of $y = 3 - g(x)$. 2



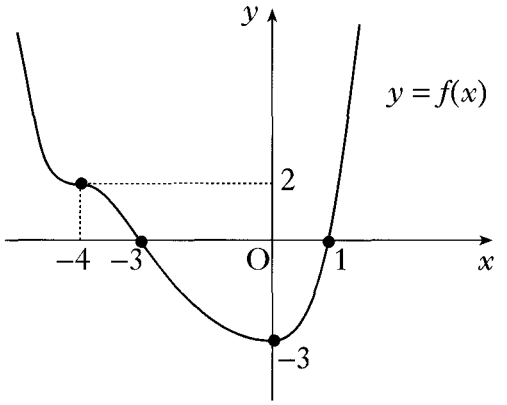
2003 P2 Q5

5. The diagram shows the graph of a function f.

f has a minimum turning point at (0, –3) and a point of inflexion at (–4, 2).

(*a*) Sketch the graph of $y = f(-x)$. 2

(*b*) On the same diagram, sketch the graph of $y = 2f(-x)$. 2

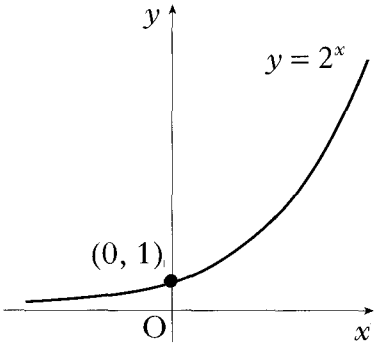


2002W P1B Q8

8. The diagram shows part of the graph of $y = 2^x$.

(*a*) Sketch the graph of $y = 2^{-x} - 8$. 2

(*b*) Find the coordinates of the points where it crosses the x and y axes. 2



2002 P1 Q7

7. (*a*) Express $f(x) = x^2 - 4x + 5$ in the form $f(x) = (x - a)^2 + b$. 2

(*b*) On the same diagram sketch:

(i) the graph of $y = f(x)$;

(ii) the graph of $y = 10 - f(x)$. 4

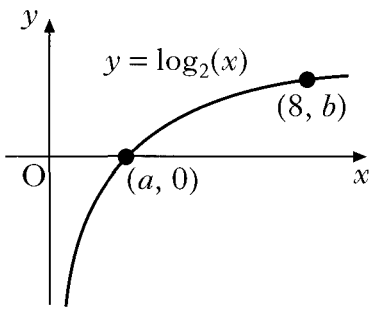
(*c*) Find the range of values of x for which $10 - f(x)$ is positive. 1

2001 P1 Q10

10. The diagram shows a sketch of part of the graph of $y = \log_2(x)$.

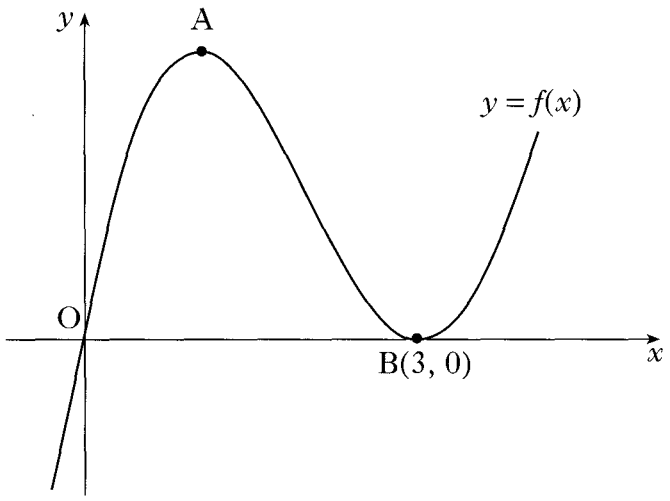
(*a*) State the values of a and b. 1

(*b*) Sketch the graph of $y = \log_2(x + 1) - 3$. 3



2000 P1 Q2

2. A sketch of the graph of $y = f(x)$ where $f(x) = x^3 - 6x^2 + 9x$ is shown below. The graph has a maximum at A and a minimum at B(3, 0).



(*a*) Find the coordinates of the turning point at A. 4

(*b*) Hence sketch the graph of $y = g(x)$ where $g(x) = f(x + 2) + 4$.
Indicate the coordinates of the turning points. There is no need to calculate the coordinates of the points of intersection with the axes. 2

(*c*) Write down the range of values of k for which $g(x) = k$ has 3 real roots. 1

Specimen 2 P2 Q5

5. Part of the graph of $y = f(x)$ is shown in the diagram. On separate diagrams, sketch the graphs of

(i) $y = f(x + 1)$

(ii) $y = -2f(x)$.

Indicate on each graph the images of O, A, B, C and D.

5