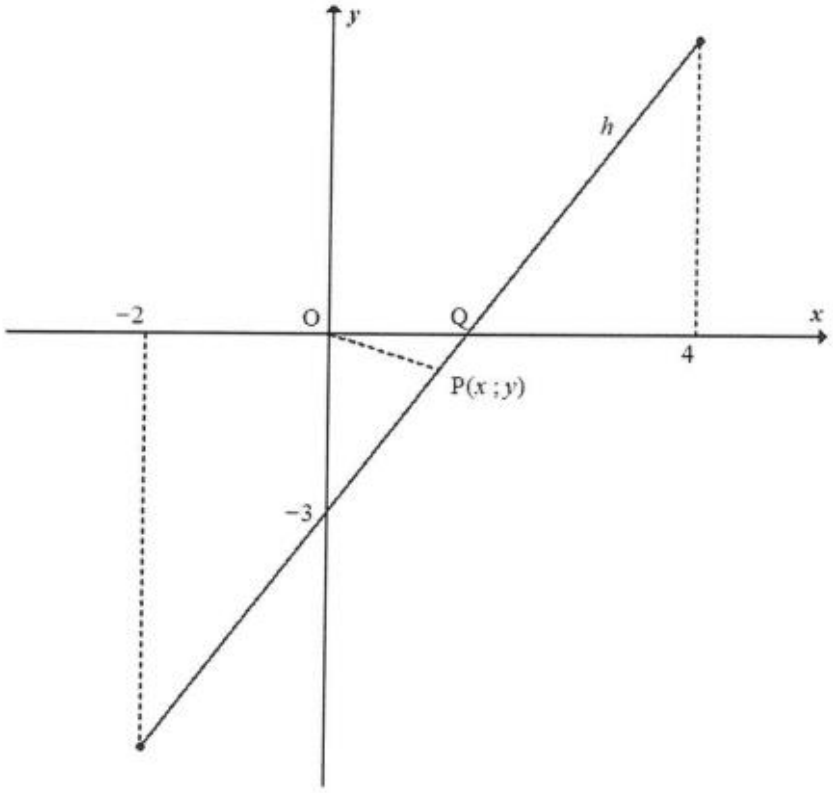
FUNCTIONS AND INVERSES

QUESTION 5

Given: $h(x) = 2x - 3$ for $-2 \le x \le 4$. The x-intercept of h is Q.



5.1 Determine the coordinates of Q. (2)

5.2 Write down the domain of h^{-1}. (3)

5.3 Sketch the graph of h^{-1} in your ANSWER BOOK, clearly indicating the y-intercept and the end points. (3)

5.4 For which value(s) of x will $h(x) = h^{-1}(x)$? (3)

5.5 P(x ; y) is the point on the graph of h that is closest to the origin. Calculate the distance OP. (5)

5.6 Given: $h(x) = f'(x)$ where f is a function defined for $-2 \le x \le 4$.

5.6.1 Explain why f has a local minimum. (2)

5.6.2 Write down the value of the maximum gradient of the tangent to the graph of f. (1)

[19]

WCED SEPTEMBER 2016

QUESTION 6

6.1 Given: $f(x) = 2.2^x - 1$

6.1.1 Write down the range of f. (2)

6.1.2 $g(x) = f(x-1) + 1$. Write down the equation of g^{-1}, the inverse of g in the form $y = ...$ (2)

6.2 Given: $h(x) = -\sqrt{\frac{x}{3}}\ ; x \geq 0$

6.2.1 If $k(x)$ is the inverse of h, give the equation of $k(x)$ (2)

6.2.2 Give the coordinates of the point of intersection of $h(x)$ and $k(x)$ (2)

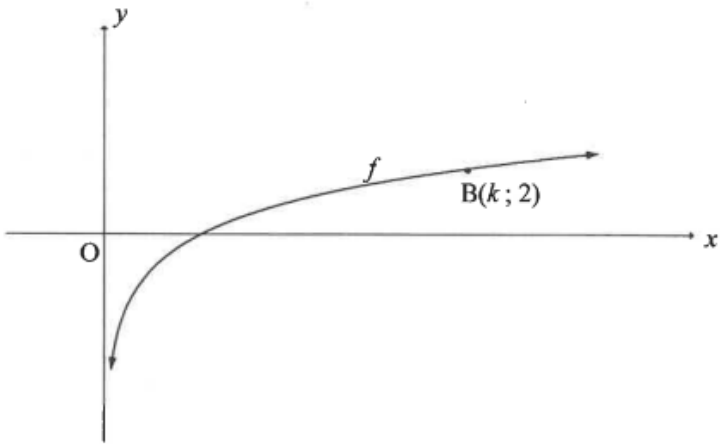
[8]

NOVEMBER 2021

QUESTION 6

The graph of $f(x) = \log_4 x$ is drawn below.

B$(k\,;2)$ is a point on f.



6.1 Calculate the value of k. (2)

6.2 Determine the values of x for which $-1 \leq f(x) \leq 2$. (2)

6.3 Write down the equation of f^{-1}, the inverse of f, in the form $y = \ldots$ (2)

6.4 For which values of x will $x.f^{-1}(x) < 0$? (2)

[8]

NSC JUNE 2021

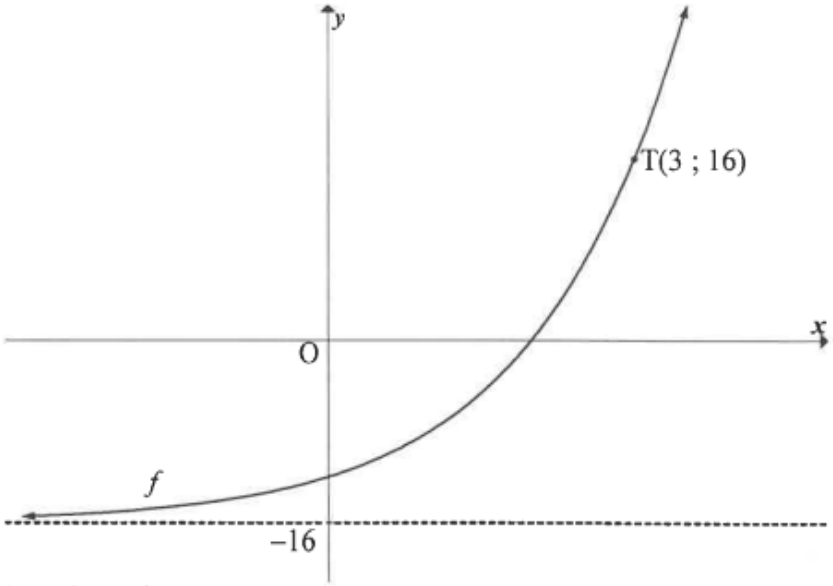
QUESTION 6

6.1 Given: $g(x) = 3^x$

6.1.1 Write down the equation of g^{-1} in the form $y = \ldots$ (2)

6.1.2 Point P(6 ; 11) lies on $h(x) = 3^{x-4} + 2$. The graph of h is translated to form g. Write down the coordinates of the image of P on g. (2)

6.2 Sketched is the graph of $f(x) = 2^{x+p} + q$. T(3 ; 16) is a point on f and the asymptote of f is $y = -16$.



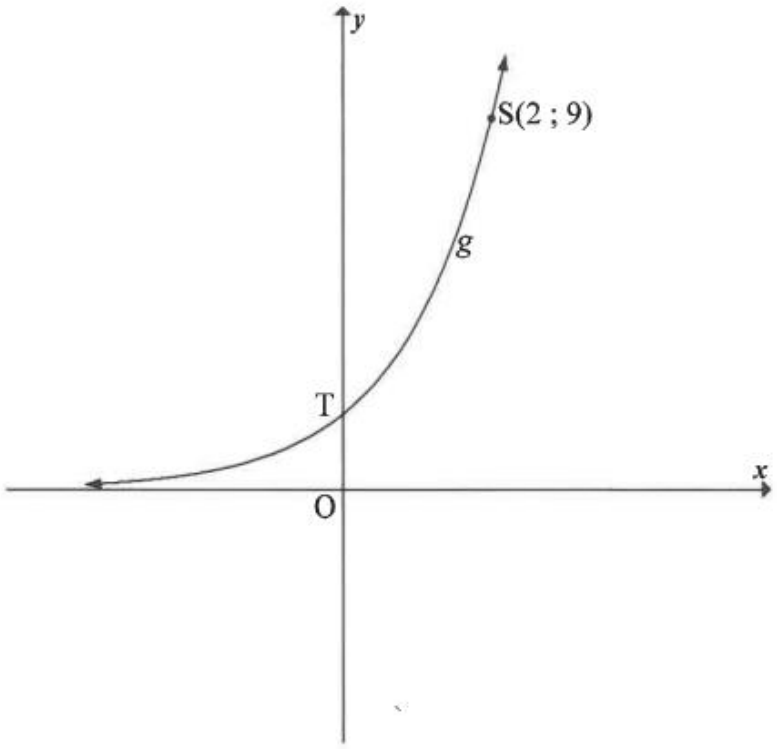
Determine the values of p and q. (4)

[8]

FEB/March 2018

QUESTION 5

The graph of $g(x) = a^x$ is drawn in the sketch below. The point S(2 ; 9) lies on g. T is the y-intercept of g.



5.1 Write down the coordinates of T. (2)

5.2 Calculate the value of a. (2)

5.3 The graph h is obtained by reflecting g in the y-axis. Write down the equation of h. (2)

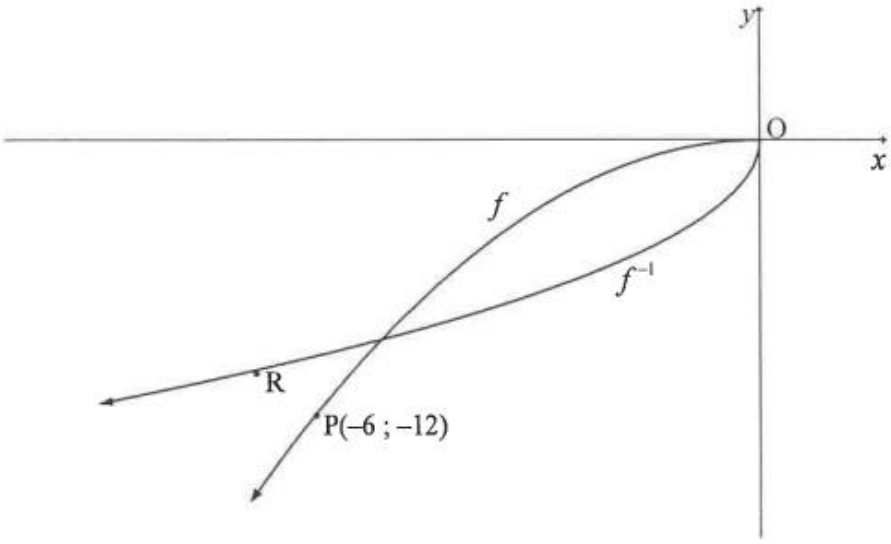
5.4 Write down the values of x for which $0 < \log_3 x < 1$. (2)

[8]

NOV 2018

QUESTION 4

In the diagram below, the graph of $f(x) = ax^2$ is drawn in the interval $x \leq 0$.
The graph of f^{-1} is also drawn. P(–6 ; –12) is a point on f and R is a point on f^{-1}.



4.1 Is f^{-1} a function? Motivate your answer. (2)

4.2 If R is the reflection of P in the line $y = x$, write down the coordinates of R. (1)

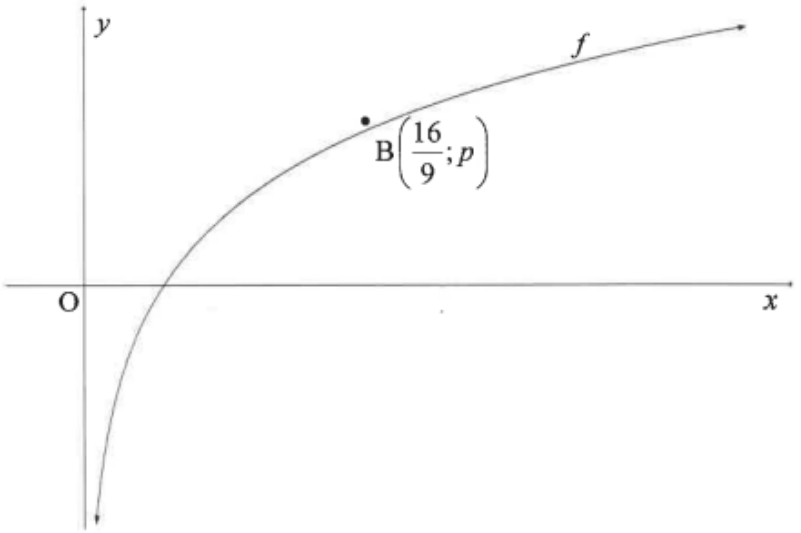
4.3 Calculate the value of a. (2)

4.4 Write down the equation of f^{-1} in the form $y = ...$ (3)
[8]

JUNE 2018

QUESTION 4

The graph of $f(x) = \log_{\frac{4}{3}} x$ is drawn below. $B\left(\frac{16}{9}; p\right)$ is a point on f.



4.1 For which value(s) of x is $\log_{\frac{4}{3}} x \leq 0$? (2)

4.2 Determine the value of p, without the use of a calculator. (3)

4.3 Write down the equation of the inverse of f in the form $y = \ldots$ (2)

4.4 Write down the range of $y = f^{-1}(x)$. (2)

4.5 The function $h(x) = \left(\frac{3}{4}\right)^x$ is obtained after applying two reflections on f.

Write down the coordinates of B'', the image of B on h. (2)

[11]