

Homework: Function operations and quadratics review

1a. Write down the value of

(i) $\log_3 27$; [1 mark]

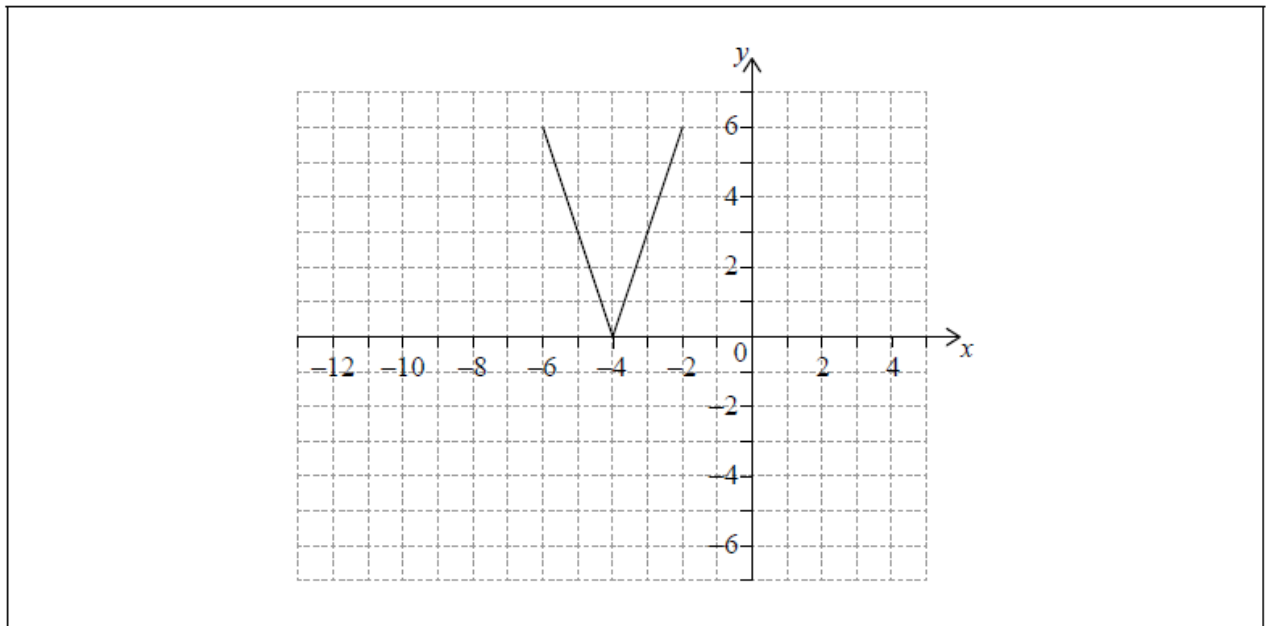
(ii) $\log_8 \frac{1}{8}$; [1 mark]

(iii) $\log_{16} 4$. [1 mark]

1d. Hence, solve $\log_3 27 + \log_8 \frac{1}{8} - \log_{16} 4 = \log_4 x$. [3 marks]

2a. The following diagram shows the graph of a function $y = f(x)$, for $-6 \leq x \leq -2$.

The points $(-6, 6)$ and $(-2, 6)$ lie on the graph of f . There is a minimum point at $(-4, 0)$.



Write down the range of f . [2 marks]

2b. Let $g(x) = f(x - 5)$.

On the grid above, sketch the graph of g . [2 marks]

2c. Write down the domain of g . [2 marks]

3a. Let $f(x) = 8x + 3$ and $g(x) = 4x$, for $x \in \mathbb{R}$.

Write down $g(2)$.

[1 mark]

3b. Find $(f \circ g)(x)$.

[2 marks]

3c. Find $f^{-1}(x)$.

[2 marks]

4a. Let $f(x) = x^2 + 2x + 1$ and $g(x) = x - 5$, for $x \in \mathbb{R}$.

Find $f(8)$.

[2 marks]

4b. Find $(g \circ f)(x)$.

[2 marks]

4c. Solve $(g \circ f)(x) = 0$.

[3 marks]

5a. Let $f(x) = (x - 5)^3$, for $x \in \mathbb{R}$.

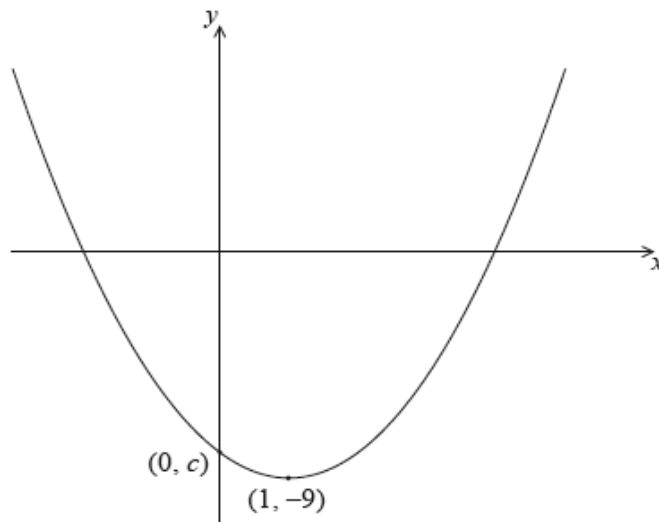
Find $f^{-1}(x)$.

[3 marks]

5b. Let g be a function so that $(f \circ g)(x) = 8x^6$. Find $g(x)$.

[3 marks]

6a. The following diagram shows part of the graph of a quadratic function f .



The vertex is at $(1, -9)$, and the graph crosses the y -axis at the point $(0, c)$.

The function can be written in the form $f(x) = (x - h)^2 + k$.

Write down the value of h and of k .

[2 marks]

6b. Let $g(x) = -(x - 3)^2 + 1$. The graph of g is obtained by a reflection of the graph of f in the x -axis,

followed by a translation of $\begin{pmatrix} p \\ q \end{pmatrix}$.

Find the value of p and of q .

[5 marks]