Higher

Mathematics

Functions and Graphs

Examples

Contents

1 Sets

List all the numbers in the set $P = \{x \in \mathbb{N} : 1 < x < 5\}$.

2 Functions

EF

Restrictions on the Domain

1. A function g is defined by $g(x) = x - \dfrac{6}{x+4}$.

   Define a suitable domain for g.

2 Functions

EF

Identifying the Range

2. A function f is defined by $f(x) = \sin x°$ for $x \in \mathbb{R}$. Identify its range.

3 Composite Functions

EF

1. Functions f and g are defined by $f(x) = 2x$ and $g(x) = x - 3$. Find:

   (a) $f(2)$ (b) $f\big(g(x)\big)$ (c) $g\big(f(x)\big)$

3 Composite Functions

EF

2. Functions f and g are defined on suitable domains by $f(x) = x^3 + 1$ and $g(x) = \frac{1}{x}$.

   Find formulae for $h(x) = f\big(g(x)\big)$ and $k(x) = g\big(f(x)\big)$.

4 Inverse Functions

EF

Formulae for Inverses

1. A function f is defined, for all real numbers, by $f(x) = x^3 + 1$.
   Find a formula for its inverse f^{-1}.

4 Inverse Functions

EF

Formulae for Inverses

2. A function g is defined, for all real numbers, by $g(x) = \frac{x-3}{2}$.

   Find a formula for its inverse g^{-1}.

5 Exponential Functions

EF

Sketch the curve with equation $y = 6^x$.

6 Introduction to Logarithms

EF

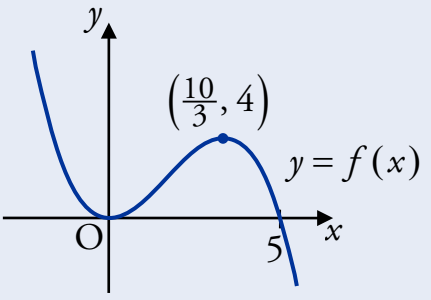
Logarithmic Functions

Sketch the curve with equation $y = \log_6 x$.

8 Graph Transformations

EF

1. The graph of $y = f(x)$ is shown below.



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

9 Graph Transformations

EF

2. Sketch the graph of $y = 5\cos(2x°)$ where $0 \leq x \leq 360$.