Functions & Polynomials

Questions

Types of Function

Q1) State what type of function each of the following is.

a) $y = 2x - 5$

b) $y = x^2 + 3$

c) $y = \sin x$

d) $y = 4 - x^2 + 3x^3$

e) $y = x^3$

f) $y = 5\, cos^2 x$

Domain of a Function

Q1) State any restrictions on the domain of the following functions.

a) $f(x) = \frac{2}{x-6}$

b) $f(x) = \frac{1}{9+x}$

c) $f(x) = \sqrt{12 - x}$

d) $g(x) = \frac{3}{\sqrt{8-x}}$

e) $g(x) = \frac{3}{(x+2)(x-6)}$

f) $f(x) = \frac{\sqrt{x}}{x^2 - 3x + 2}$

Q2) State the domain of the following functions.

a) $f(x) = \sqrt{x^2 - 2x - 15}$

b) $g(x) = \frac{x+2}{x^2 - 7x + 12}$

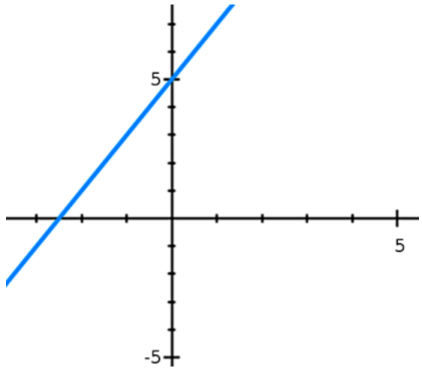
c) $f(x) = \frac{6x}{x^2 + 6x - 16}$

d) $h(x) = \frac{4}{3x - 2x^2}$

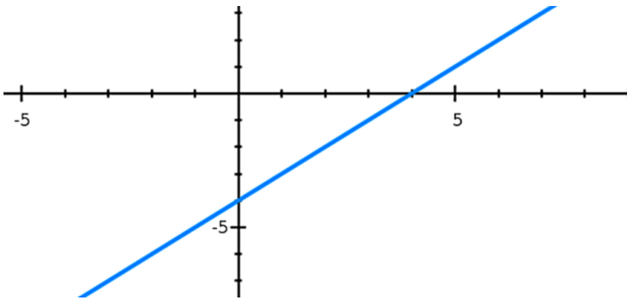
Maximum & Minimum Values

Q1) By considering the graph of the following functions state the maximum or minimum value, if either exists.

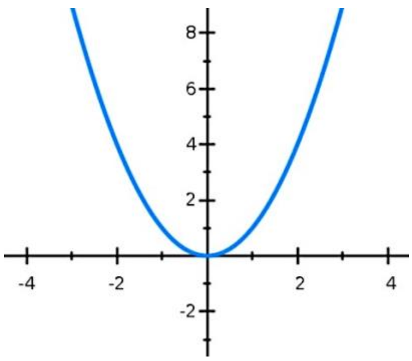
a) $f(x) = 2x + 5$



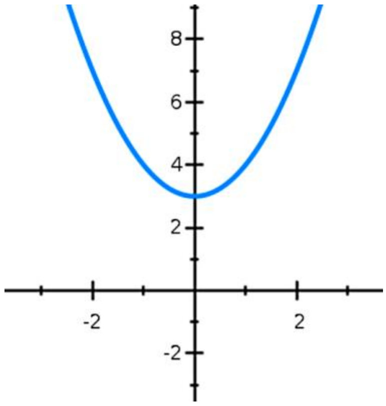
b) $f(x) = x - 4$



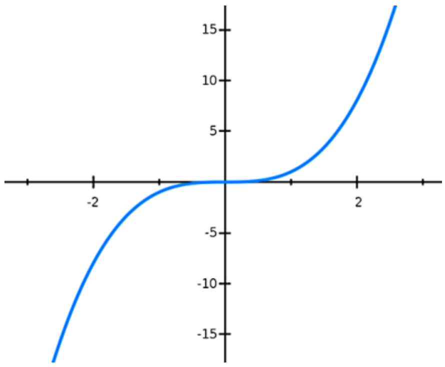
c) $f(x) = x^2$



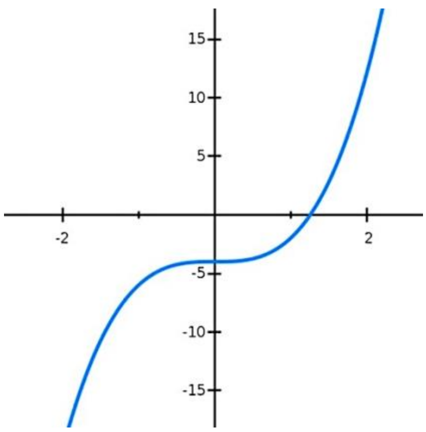
d) $f(x) = x^2 + 3$



e) $f(x) = x^3$



f) $f(x) = 2x^3 - 4$



Average Rate of Change

Q1) Find the average rate of change of the function on the stated interval.

a) $f(x) = 2x + 3, 1 \leq x \leq 5$

b) $f(x) = -2x + 5, -3 \leq x \leq 3$

c) $f(x) = x^2 - 2, -6 \leq x \leq -2$

d) $f(x) = x^3, 1 \leq x \leq 4$

Polynomials

Q1) a) Show that $(x - 3)$ is a factor of $f(x) = x^3 - 8x^2 + 19x - 12$.

b) Hence, fully factorise $f(x)$.

Q2) a) Show that $(x - 1)$ is a factor of $f(x) = 3x^3 + 4x^2 - 5x - 2$.

b) Hence, fully factorise $f(x)$.

Q3) Determine if the given value is a factor of the polynomial expression.

a) $(x - 3)$ and $f(x) = x^3 - 2x^2 - 9x + 18$

b) $(x + 2)$ and $f(x) = x^4 + 5x^3 + 2x^2 - 8x$

Q4) Solve the following equations.

a) $(x - 2)(x - 1)(x + 4) = 0$

b) $(x - 3)(x - 3)(x + 2) = 0$

c) $(2x - 4)(x + 2)(x - 3) = 0$

d) $(x - 2)(2x - 1)(2x - 4) = 0$

Q5) Determine the solutions of the equation using the given solution.

a) $x^3 - 8x^2 + 19x - 12 = 0, x = 3$

b) $3x^3 + 4x^2 - 5x - 2 = 0, x = 1$