Functions & Graphs

Questions

Functions

Straight Line Graphs

Quadratic Functions

Functions

Q1) For the following functions create a table of input / output values. These pairs of numbers are co-ordinates. Plot these on an $x - y$ axis and make a sketch of the graph.

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

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

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

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

Q2) Using your graphs from Q1) state the maximum or minimum value of the function, if either exists.

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

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

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

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

Q3) Find the average rate of change of the function on the stated interval.

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

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

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

Straight Line Graphs

Q1) Work out the gradient of the straight line passing through these points.

a) $A = (2, 5),\ B = (3, 7)$

b) $A = (-3, -5),\ B = (4, 7)$

Q2) Find the equation of the following straight lines.

a) Gradient $= 4$ and passing through the point $(1, 3)$.

b) Gradient $= -1$ and passing through the point $(-1, 4)$.

Q3) Work out the equation of the straight line passing through the following points.

a) $C = (2, -4),\ D = (3, 7)$

b) $R = (2, -3),\ S = (4, -2)$

Q4) State the points where the following straight lines intercept the co-ordinate axes.

a) $y = 3x - 5$

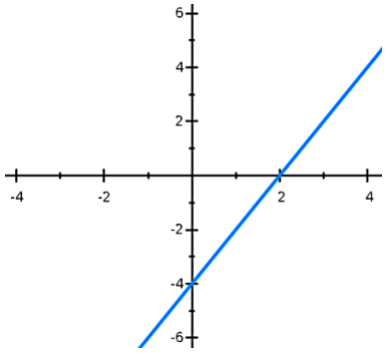
b) $y = -2x + 7$

c) $2y = 4x + 6$

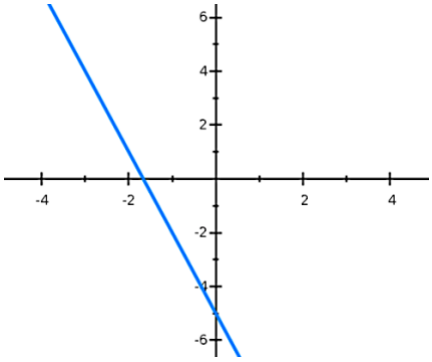
d) $\frac{1}{2}y = -3x - 5$

Q5) Write the equation of the following straight-line graphs.

a)



b)



Q6) For these questions, you don't have to draw a perfect graph – it is, after all, just a *sketch*. To help you judge the gradient remember that a 45° line has a gradient of 1. So, a gradient larger than 1 will be steeper than 45° and a gradient smaller than 1 will be less than 45°.

a) Sketch the line with equation $y = x + 3$

b) Sketch the line with equation $y = -x + 4$

Quadratic Functions

Q1) Solve the following quadratic equations.

a) $x^2 + 10x + 25 = 0$

b) $x^2 - 10x + 16 = 0$

c) $x^2 - 3x = 0$

d) $x^2 - 49 = 0$

e) $x^2 + 7x + 5 = 0$

f) $x^2 + 2x - 3 = 0$

Q2) Determine the nature of the roots of each quadratic equation.

a) $x^2 - 3x - 3 = 0$

b) $x^2 + 5x - 7 = 0$

c) $2x^2 + 5 = 0$

d) $x^2 + 5x = 0$

Q3) State the co-ordinates of the turning point of these quadratics.

a) $y = (x - 3)^2 + 1$

b) $y = (x - 4)^2 - 5$

c) $y = -(x - 2)^2 - 2$

d) $y = (x + 6)^2$

Q4) By writing these quadratics in the form $(x + p)^2 + q$ work out the co-ordinates of their turning point.

a) $y = x^2 - 8x + 3$

b) $y = x^2 + 6x + 17$

c) $y = x^2 + 10x$

d) $y = x^2 + 4x + 12$