1. A function is defined by $g : x \to 3x^2 + 5$. Find the images of -1 and 4. Find also $g(3a)$ and $g(2p - 1)$.

2. A function $f : x \to \dfrac{72}{ax + b}, x \neq -\dfrac{b}{a}$, maps 7 to 9 and 6 to 12.

   (a) Explain why the definition of f specifies $x \neq -cfracba$.

   (b) Find the value of a and b.

   (c) Find the element that under this mapping has an image of 4.

3. For each of the functions below, state if there is any restriction on the domain, and write down the domain in algebraic and interval form.

   (a) $f(x) = 3x^2 - 5$

   (b) $g(x) = \sqrt{x - 2}$

   (c) $h(x) = \dfrac{x}{3x + 1}$

4. Find the range of each of the following functions. Find also the value(s) of x which is invariant under each of the functions.

   (a) $f : x \to 2x^2 + 1, x \in R$

   (b) $g : x \to 2x^2 + 1, -1 \leq x \leq 3$

   (c) $h : x \to 2x^2 + 1, x \in R^+$

   Determine algebraically if the functions below are even, odd or neither. Use your GC to graph the functions to check.

   (a) $f(x) = 3x^2 - 5$

   (b) $g(x) = 2x + x^3$

   (c) $h(x) = \dfrac{x}{3x + 1}$

   For each of the following functions, determine if it is odd, even, or neither. Specify the interval over which the function is increasing, decreasing or constant. State where an extreme value occurs. State the range of the function.

   (a) $f : x \to x$

   (b) $f : x \to 3 - 2x$

   (c) $f : x \to 2x^2 - 4$

   (d) $g : x \to x(3 - x)$

   (e) $f : x \to 2 - 3x^3$

   (f) $g : x \to (x - 1)(x + 2)(x + 3)$

   (g) $f(x) = \sqrt{x}$

(h) $g(x) = \dfrac{1}{x}$

(i) $h(x) = 2^x$

(j) $f(x) = \log x$

Given $f(x) = |2x+7|$, evaluate $f(-5)$ and $f(\frac{1}{4})$, and find the possible values of x given that $f(x) = 6$.

Sketch the given functions and state the range. $f : x \to |3x-5|, -3 \leq x < 4$ and $g : x \to |2-x|$.

Sketch the function $f(x)$ and state the domain, range and intervals over which the fnction is increasing, decreasing or constant, where $f(x) = x^2 - 2, -3 \leq x < 0, 3x-2, 0 \leq x < 2, 2^x, 2 \leq x < 4$. Also for $g(x) = |x|, -5 \leq x < 1, \ln x, x \geq 1$

A curve is defined parametrically by the equations $x = 2 - t^2, y = t(t+1)$. Find the points P and Q on the curve with parameters -2 and 3. Find the length of PQ.

For each of the parametric equations given below, find the Cartesian equations. Determine whether the equation of the curve is a function. If it is, giv the maximum domain and range of the function.

(a) $x = 4t, y = 3t^2$

(b) $x = t^2 - 1, y = t + 1$

(c) $x = 2 + t, y = \dfrac{3+t}{t+1}, t \neq -1$

Which of the following are 1-1 functions?

(a) $f : x \to \sqrt{x}, x \geq 0$

(b) $g : x \to \dfrac{1}{x}, x \neq 0$

(c) $h : x \to |x|$

For the functions which are not one-to-one, give a suitable domain for he function so that it becomes an injective function.

A function f is given by $f : x \to \dfrac{x-5}{2x-4}, x \neq 2$. Find the values of $f^{-1}(1)$ and $f^{-1}(3)$. Find the value of a for which $f^{-1}(a) = 2a + 1$.

Find $f^{-1}(x)$ for the function $f : x \to \dfrac{x-3}{x+1}, x \neq -1$.

Find the inverse function for

i. $f(x) = 2x^2 + 4, x > 0$

ii. $g(x) = \dfrac{2x+5}{x-7}, x \neq 7$

iii. $h(x) = x^2 + 2x, x \geq -1$

iv. $m(x) = x + \dfrac{1}{x}, x \geq 1$