

**Section 1 – Evaluating Functions (Substituting in)**

Steps! Just swap the  $x$  in the function for the number in the bracket.

(1) 3 different functions are given below:

$$f(x) = 2x - 1$$

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

$$h(x) = \frac{1}{x-3}$$

Evaluate the following:

(a)  $f(3)$       (b)  $f(-4)$       (c)  $g(1)$       (d)  $g(-3)$       (e)  $g(0.5)$       (f)  $h(4)$       (g)  $h(-5)$

(h)  $h(0.5)$       (i)  $g(0)$       (j)  $f(-1)$       (k)  $h(0)$       (l)  $h(3)$  (Be careful!)

(2)  $f(x) = 2 + 3x$ . Given that  $f(p) = 8$ , find the value of  $p$ .

(3)  $f(x) = 2x^2 - 1$ . Given that  $f(k) = 71$ , find the positive value of  $k$ .

(4)  $f(x) = 2(x^3 - 8)$ . Find the value of  $x$  such that  $f(x) = 0$

**Extension:**

$$f(x) = \frac{6}{x-1}$$

(a) Find the values of  $x$  which map onto themselves under the function  $f(x)$ .

(b) State the value for which  $f(x)$  is undefined.

**Section 2 – Composite Functions (Combining Functions)**

Tip! Always work inwards out.  $fg(1)$  means you do  $g(1)$  first followed by  $f(\text{answer to } g(1))$ .

(1) 3 different functions are given below:

$$f(x) = 2x - 1$$

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

$$h(x) = \frac{1}{x-3}$$

Find the following:

(a)  $fg(1)$       (b)  $gf(1)$       (c)  $gh(4)$       (d)  $hg(4)$       (e)  $gh(6)$       (f)  $gg(-6)$       (g)  $hfg(-2)$

(2)  $f(x) = 3x + 2$ . Given that  $ff(m) = 6$ , find the value of  $m$ .

(3)  $f(x) = x^2 - 1$  and  $g(x) = x + 2$ . Given that  $gf(k) = 10$ , find the positive value of  $k$ .

**Section 3 – Inverse Functions**

Steps! (i) Write  $y = f(x)$  (ii) Swap the  $x$ 's and  $y$ 's (iii) Rearrange to make  $y$  the subject. (iv) Write  $f^{-1}(x) =$

(1) Find the inverse function of each of the following functions using the correct notation in your answer.

(a).  $f(x) = 2x + 1$       (b)  $f(x) = \frac{3}{x+1}$       (c)  $f(x) = x^3 - 7$       (d)  $g(x) = (x+4)^{\frac{1}{5}}$       (e)  $f(x) = \frac{x+1}{x-1}$