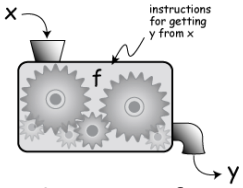

Manipulating Functions

When you first met algebra, you learnt how to collect like terms. Then you learnt how to expand a bracket and eventually learnt to multiply two brackets together. All these skills are applicable to manipulating functions.

Do these questions to refresh your skills:

1. Expand each of these expressions

(i) 3(4a+5) (ii) 2(5b-7) (iii) -10(2c+6) (iv) -3(4-d) (v) e(e+11)

(vi) 3f(5f-2) (vii) $g(g^2-h)$

2. Expand and simplify these expressions

(i) 3(4a+5) + 2(5a-7) (ii) 3(4-b) - 10(2b+6) (iii) $c(c+11) - 3(c^2-h)$

(iv) (d+4)(d+1) (v) (e-5)(e+3) (vi) (2f-3)(f+4)

Let f(x) = x+7 and g(x) = 2x

Now look at 3f(x)

Remember mathematicians are lazy and drop the multiply sign, which means:

$3f(x) = 3\times f(x) = 3\times(x+7) = 3x+21$

The same is true for f(x)g(x):

$f(x)g(x) = f(x)\times g(x) = (x+7)\times 2x = 2x^2+14x$

1. f(x) = 8x g(x) = 3x

(a) 3f(x) (b) -2g(x) (c) 3f(x) – 2g(x) (d) f(x)g(x) (e) $[g(x)]^2$

2. f(x) = 2x h(x) = x-4

(a) 6f(x) (b) 7h(x) (c) f(x)h(x) (d) 5f(x) + h(x) (e) 10 – h(x)

3. f(x) = x+6 g(x) = x-8

(a) -5g(x) (b) 3f(x) (c) g(x)g(x) (d) g(x) – f(x) (e) f(x) – g(x)

4. f(x) = 2x+1 g(x) = x+10

(a) 0.5g(x) (b) 7f(x) (c) f(x)g(x) (d) 2f(x) – 3g(x) (f) $[f(x)]^2$