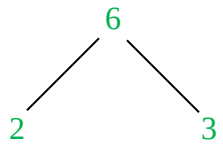
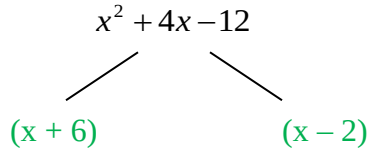
D – 9 *Fun with Factors*

Factored form of a polynomial





Once a polynomial has been factored completely to its LINEAR FACTORS, it is in factored form.

Write each expression as a polynomial in standard form

a) $(x+1)(x+2)(x+3)$

$$x^2 + 2x + x + 2(x+3)$$
$$(x+3)x^2 + 3x + 2$$
$$x^3 + 3x^2 + 2x + 3x^2 + 9x + 6$$
$$y = x^3 + 6x^2 + 11x + 6$$

Write each polynomial in factored form.

b) $y = 9x^3 + 6x^2 - 3x$

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

By setting each factor equal to zero, we can find the roots (or zeroes) of an equation. Let $y = 0$.

Ex: $y = (x-2)(x+1)(x+3)$
$0 = (x-2)(x+1)(x+3)$

Now, let's look at the graph! (graphing calculator)

The solutions/zeroes we found correspond with the x-intercepts of the graph.

- So x-intercepts, solutions, roots and zeroes all mean the same thing!

Find the zeroes of each function.

c) $y = x(x+5)(x-8)$

$x = 0$

$x + 5 = 0$
$x = -5$

$x - 8 = 0$
$x = 8$

d) $(x+2)(x-1)x = y$

$x = 0$

$x + 2 = 0$
$x = -2$

$x - 1 = 0$
$x = 1$

e) $y = (2x-3)(x+2)(x+1)$

$2x - 3 = 3/2$

$x + 2 = 0$
$x = -2$

$x + 1 = 0$
$x = -1$

Write a polynomial function in factored form using the given zeroes.

f) x = 5, 6, 7 $y = (x-5)(x-6)(x-7)$

g) x = -2, 0, 1 $y = x(x+2)(x-1)$

h) x = -½ , 0, 4 $f(x) = x\left(x + \frac{1}{2}\right)(x-4)$