

Day 2: 3.3 Relating Polynomial Functions and Equations

What are 2 other terms that are used to mean x - intercept??

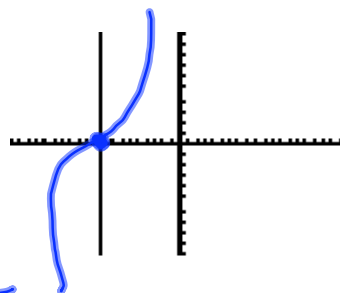
roots

zeros

Determining x - intercepts graphically using your calculator

$$y = x^3 + 7x^2 - 18x + 40$$

$x = -9.375$



Determining the x-intercepts by factoring

We can determine the x-intercepts of a polynomial function by factoring its equation. Then we can use these x-intercepts to graph the function. Determining the x-intercepts is referred to **assolving the equation.**

Example #5:

Solve for x. $x^3 + 7x^2 + 12x = 0$

$$x^3 + 7x^2 + 12x = 0$$

$$x(x^2 + 7x + 12) = 0$$

$$x(x+3)(x+4) = 0$$

3
4

 $+12$

$+7$

$x=0$
 $x+3=0$
 $x+4=0$

$x=-3$
 $x=-4$

$$2x^3 + 17x^2 + 21x = 0$$

$$x(2x^2 + 17x + 21) = 0$$

$$\frac{14}{2} \quad \frac{3}{2}$$
~~7~~

$$\frac{3}{2}$$

14
3
17

 $x+2$

$$x(x+7)(2x+3) = 0$$

$x=0$
 $x+7=0 \Rightarrow x=-7$
 $2x+3=0 \Rightarrow x=-\frac{3}{2}$

Example #6

Consider the equation $x^2 + kx + 8 = 0$. For what value(s) of k is one root double the other root?

$$(x-r)(x-2r) = 0$$

$$x^2 - 2rx - rx + 2r^2 = 0$$

$$x^2 - 3rx + 2r^2 = 0$$

$$x^2 + kx + 8 = 0$$

$$8 = 2r^2$$

$$4 = r^2$$

$$k = -3r$$

$$r = +2 \text{ or } -2$$

$$\text{If } r = 2$$

$$k = -3(2)$$

$$k = -6$$

$$\text{If } r = -2$$

$$k = -3(-2)$$

$$k = 6$$

$3x^2 + Kx + 12 = 0$ one root is double the other.

$$3(x-r)(x-2r) = 0$$

$$3(x^2 - 3rx + 2r^2) = 0$$

$$3x^2 - 9rx + 6r^2 = 0$$

$$3x^2 + Kx + 12 = 0$$

$$12 = 6r^2$$

$$2 = r^2$$

$$\pm\sqrt{2} = r$$

Exact
value

$$r = \sqrt{2}$$

$$K = -9r$$

$$K = -9(\sqrt{2})$$

$$K = -9\sqrt{2}$$

$$r = -\sqrt{2}$$

$$K = -9(-\sqrt{2})$$

$$K = 9\sqrt{2}$$

Pg. 174

13, 14, 16 odds

Pg. 180

1-4 odds

7