Algebra 2

3.4 part 1 Solve Polynomial Equations

Polynomial

$x^3 - 3x^2 - 16x + 48$

$x^3 - 7x^2 + 10x$

Polynomial Equation	Polynomial Function
$x^3 - 3x^2 - 16x + 48 = 0$	$f(x) = x^3 - 3x^2 - 16x + 48$
$x^3 - 7x^2 + 10x = 0$	$f(x) = x^3 - 7x^2 + 10x$

Zero Product Property

a·b = 0 means a = 0 or b = 0 or both

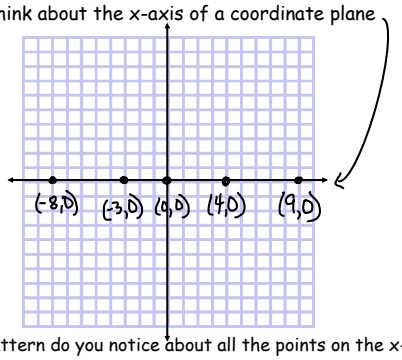
ex) $4 \cdot 0 = 0$ & $0 \cdot 4 = 0$ & $0 \cdot 0 = 0$

ex) $(x+2)(3x-1) = 0$ means

$x+2=0$ or $3x-1=0$

Why do we want to set it equal to 0 in the first place?

Think about the x-axis of a coordinate plane



What pattern do you notice about all the points on the x-axis?

all have 0 for y

Do these two equations mean the same thing?

$f(x) = x^3 - 7x^2 + 10x$ $\quad y = x^3 - 7x^2 + 10x$

yes bc $f(x) = y$

So if y=0 on the x-axis let's set y=0 in our polynomial equation.

$0 = x^3 - 7x^2 + 10x \longrightarrow x^3 - 7x^2 + 10x = 0$

Now think back to the pattern you found on the x-axis. If y is always equal to 0 and we are setting equations equal to 0 before we solve them, what are we finding?

x-intercept

Solve the polynomial equation.

1) $4x^3 + 18x^2 - 10x = 0$

$2x(2x^2 + 9x - 5) = 0$

$2x(2x-1)(x+5) = 0$

$\frac{2x}{2} = \frac{0}{2}$ $\quad 2x-1=0$ $\quad x+5=0$

$x = 0$ $\quad \frac{2x}{2} = \frac{1}{2}$ $\quad x = -5$

$x = \frac{1}{2}$

Solve the polynomial equation.

2) $8y^2 + 38y = 10$

$8y^2 + 38y - 10 = 0$

$2(4y^2 + 19y - 5) = 0$

$2(4y-1)(y+5) = 0$

$4 = 1 \cdot 4 = 2 \cdot 2$

$4y-1=0$ $\quad y+5=0$

$\frac{4y}{4} = \frac{1}{4}$

$y = \frac{1}{4}$ $\quad y = -5$

Try this:

Solve the polynomial equation.

3) $-16n^2 = -12n$

$-16n^2 + 12n = 0$

$-4n(4n - 3) = 0$

$-4n = 0$ $\quad$ $4n - 3 = 0$

$n = 0$ $\quad$ $n = \frac{3}{4}$