Polynomials, Linear Factors and Zeros.

EB:	Even Degree	Odd
positive	Up up	Down Up
Negative	Down Down	Up Down
Coefficient		

$Y = -2x^3 + 3x^2 - 7x + 5$

Review for Yesterday x^3 x^5 x^7

$y = x^3 - 2x^2 - 15x$ Finding:

Y-int = 0

$X(X^2 - 2x - 15)$

$X(x-5)(X+3)$

-2 -15

-3 -5, 3

$x=0$ $x-5=0$ $x+3=0$

$+5\ +5$ $-3\ -3$

$x=5$ $x=-3$

X-INTERCEPTS

Zeros

X-intercepts = Zero

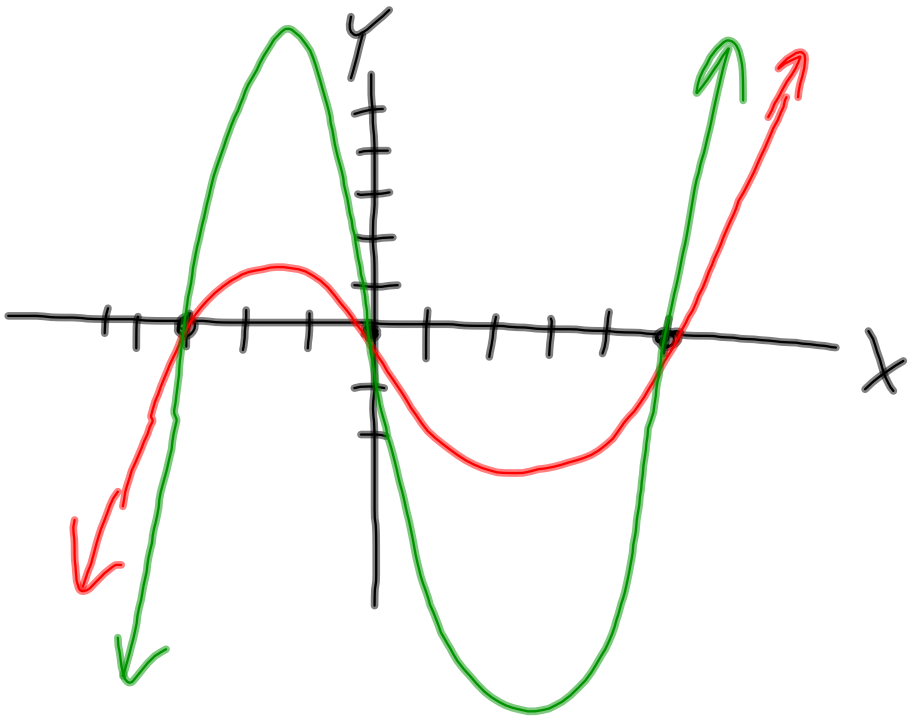
Y-intercept.

Constant

$y=mx+b$

Steps
(1) Factor
(2) Set factors equal to zero. and solve for X.

EB is Down Up


y
x

Going From Zeros to a Function:

$x = -2, 1, 4$

$(x+2)(x-1)(x-4)$

$(x^2 - x + 2x - 2)(x-4)$

$(x^2 + x - 2)(x-4)$

$$\begin{array}{r} x^3 - 4x^2 \\ x^2 - 4x \\ -2x + 8 \\ \hline x^3 - 3x^2 - 6x + 8 \end{array}$$

(6) $y = (x+2)(x+3)$

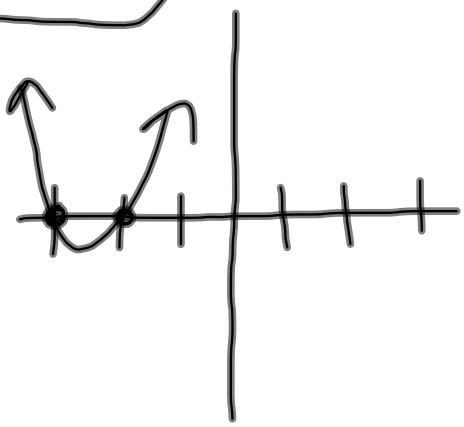
$x+2=0$ | $x+3=0$

$-2\ -2$ | $-3\ -3$

$x=-2$ | $x=-3$

$x=-2,-3$

$x \cdot x = x^2$



Finding the Multiplicity of zero

$y = x^4 + 2x^3 - 8x^2$

$x^2(x^2 - 2x - 8)$

-2	-8
	-1, 8
	-2, 4
-2	-4, 2

EB
Up Up $x^2(x-4)(x+2)$

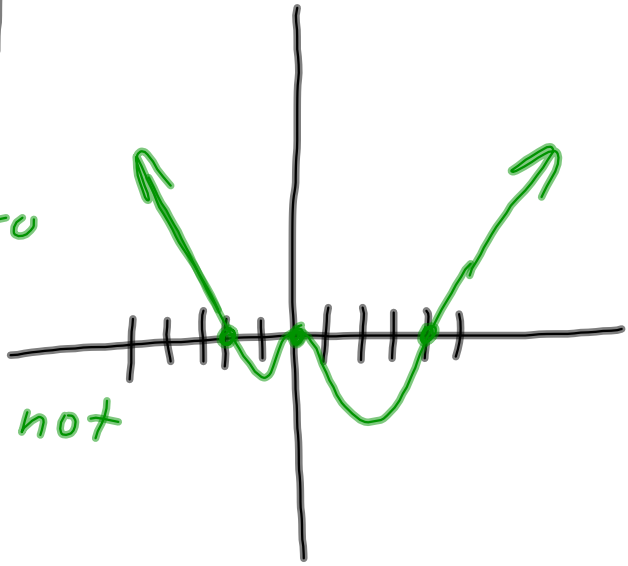
$x \cdot x \cdot (x-4)(x+2)$

$x = 0 \quad | \quad x = 0 \quad | \quad x - 4 = 0 \quad | \quad x + 2 = 0$

$+4 \quad +4 \qquad -2 \quad -2$

$x = 4 \qquad x = -2$

$x = 0, 0, 4, -2$



Multiplicity of zero
It touchrs the
X-avis but does not
(ross.

Digital Box Camera

Maximize the volume

Sum of dimensions to 6

Lenghth must be 1.5 height

Let $H = X$ $\quad H + L + W = 6$

$L = 1.5X$ $\quad W = 6 - H - L$

$W = 6 - X - 1.5X = 6 - 2.5X$

$(X)(1.5X)(6-2.5X) = V$

$V = -3.75X^3 + 9X^2$

14