

5.3 Solving Polynomial Equations

- a. I can find complex solutions of polynomial equations by factoring (factoring GCF, trinomials, difference of squares, grouping, sum or difference of cubes).
- b. I can find real solutions of polynomial equations by analyzing a graph (by hand or calculator).

p. 80-81 Solving Polynomial Equations 5.3

Warm Up:

p.80

Find the zeros. Identify whether the zeros are real or imaginary.

$f(x) = (2x)(x^2 - 4)$

$0 = (2x)(x^2 - 4)$

$2x = 0$ or $x^2 - 4 = 0$
 $x = 0$ $\sqrt{x^2} = \sqrt{4}$
 $x = \pm 2$

$f(x) = (2x)(x^2 + 4)$

$0 = (2x)(x^2 + 4)$

$2x = 0$ $-2 + 4 = 0$
 $x = 0$ $\sqrt{x^2} = \sqrt{4}$
 $x^2 = \pm 2i^2$

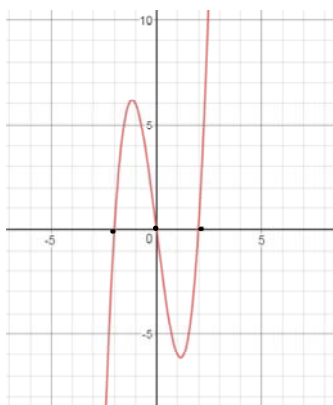
Let's compare the GRAPHS of the functions from the Warm-up

Desmos

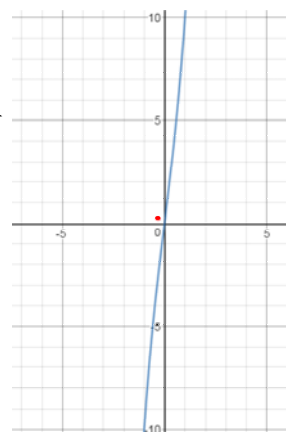
Function $f(x) = (2x)(x^2 - 4)$ $f(x) = (2x)(x^2 + 4)$

Zeros $\underline{\underline{-2, 2, -2}}$ $\underline{\underline{2i, -2i}}$

How does the type of zero (real or imaginary) effect the graph?



graphs



p.81

Find the zeros of the polynomial function by factoring. Identify whether the zero's are real or imaginary

1.) $f(x) = x^3 - 36x$

$$0 = x^3 - 36x$$

$$0 = x(x^2 - 36)$$

$$0 = x(x+6)(x-6)$$

$$x=0$$

$$x+6=0$$

$$x-6=0$$

$$\text{zeros: } 0, -6, 6$$

2.) $f(x) = x^3 + 100x$

$$0 = x^3 + 100x$$

$$0 = x(x^2 + 100)$$

$$x=0$$

$$x^2 + 100 = 0$$

$$\sqrt{x^2} = \sqrt{-100}$$

-1	100
10	10

$$x = \pm 10i$$

p.81

Find the zeros of the polynomial function by factoring. Identify whether the zero's are real or imaginary

3.) $f(x) = 2x^3 - 4x^2 - 6x$

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

~~$$-3x^2 + 1x - 3$$~~

x	$+1$
x^2	$+1x$
$-3x$	-3

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

$$\text{zeros: } 0, 3, -1$$

p.81

Find the zeros of the polynomial function by factoring. Identify whether the zero's are real or imaginary

$$4.) f(x) = 3x^3 - 15x^2 + 12x$$

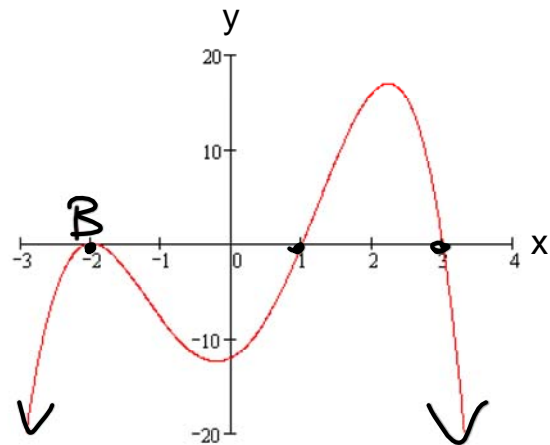
$$0 = 3x(x^2 - 5x + 4)$$

$$\begin{array}{r} -5 \\ -4 \quad -1 \\ \hline 4 \end{array}$$

$$0 = 3x(x-4)(x-1)$$

$$\text{Zeros: } 0, 4, 1$$

List the real zeros of the function graphed at the right. Then list the related factors.



Real Zero(s): $\overset{B}{-2}, 1, 3$

Factor(s): $(x+2)(x-1)(x-3)$

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Homework:

5.3 Solving Polynomials by Factoring