Finding x-intercepts by methods other than graphing.

- x-intercepts are Real Zeros of the factors of a polynomial.
- x-intercepts can sometimes be found by making y = 0 and and finding the Real Solutions like you normally do.

How many x-intercepts does each cubic have?

distinct real zeros!

Find them.

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

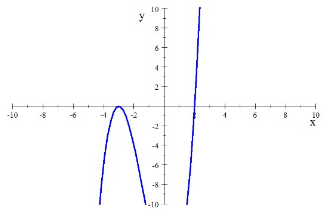
x-int: -3 & 2

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

NO real zeros (NO x-INT)

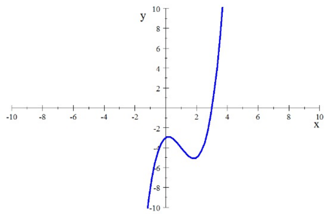
x-int: 3

Graph in a Standard Window



this graph shows that the function has only 2 distinct zeros.

Graph in a Standard Window



this graph shows that the function has only 1 distinct zero.

Solve by factoring:

Find the x-intercepts of this polynomial by making y = 0 and factoring. Then find the real zeros of each factor.

$y = 2x^3 - 8x$

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

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

$\boxed{x = 0, \pm 2}$

$y = 5x^3 + 45x$

$0 = 5x\underbrace{(x^2+9)}_{\text{NO real zeros}}$

$\boxed{x = 0}$

Find x-intercepts by making y = 0 and solving with algebra:

$y = x^3 - 125$

$0 = x^3 - 125$

$+125 \quad +125$

$\sqrt[3]{125} = \sqrt[3]{x^3}$

$x = 5$

$y = 7x^3 + 56$

$0 = 7x^3 + 56$

$-56 \quad -56$

$\frac{-56}{7} = \frac{7x^3}{7}$

$\sqrt[3]{-8} = \sqrt[3]{x^3}$

$x = -2$

Construct a cubic with the following characteristics.

There will be more than one possible answer.
Example answers are given.

1. 3 distinct real zeros

$x(x+3)(x-7)$

2. 2 distinct real zeros

$x(x+8)^2$

Construct a 5th degree polynomial with the following characteristics.

There will be more than one possible answer.
Example answers are given.

1. 2 distinct real zeros.

$(x+2)^3(x-7)^2$

2. 1 distinct real zeros.

$(x+1)(x^2+4)(x^2+3)$
or
$(x+1)^5$

3. 0 real zeros.

NOT POSSIBLE

all polynomials of odd degree must have at least one x-intercept.

Construct a 6th degree polynomial with the following characteristics.

There will be more than one possible answer.
Example answers are given.

1. 4 distinct real zeros.

$(x+3)^2(x-4)^2(x+1)(x-5)$.

2. 1 distinct real zero.

$(x-3)^2(x^2+1)(x^2+4)$
or
$(x+5)^6$
or
$(x-7)^4(x^2+5)$

3. 0 real zeros.

x^6+7
or
$(x^2+2)^3$

Hwk #26 Due tomorrow

Agilemind Workbook:

Topic 5 - Analyzing Polynomial Functions
Exploring: "Higher degree polynomials"

SAS4 - Questions 4 a-d, 5 a-e, 6

Done with Topic 5!!!

Test time

Thursday

Factoring Polynomials:

Binomials

- Start with GCF, if any.
- Look for Difference of Perfect Squares.

Factor completely.

1. $12x^2 - 52x$

$\boxed{4x(3x-13)}$

No more factoring to be done.

2. $6x^3 - 96x$

$6x(x^2-16)$

$\boxed{6x(x \pm 4)}$

This factor is the Difference of Perfect Squares and can always be factored further.

3. $8x^3 + 72x$

$\boxed{8x(x^2+9)}$

No more factoring is possible.

Trinomials

- Start with GCF, if any.
- Factor into its two binomial factors.
- Look to see if either binomial can be factored further using Difference of Perfect Squares.

Factor completely.

The following method of factoring is sometimes referred to as the X or Box method. There are other methods for factoring.

1. $x^2 + 3x - 28$

a·c

-28

$+7 \qquad -4$

b

$+3$

	x	$+7$
x	x^2	$+7x$
-4	$-4x$	-28

$= \boxed{(x+7)(x-4)}$

2. $2x^3 + 2x^2 - 60x$

$2x(x^2+x-30)$

-30

$+6 \qquad -5$

$+1$

	x	$+6$
x	x^2	$+6x$
-5	$-5x$	-30

$\boxed{2x(x-5)(x+6)}$