Simplify. Write in standard form. Then classify by degree and number of terms. You can use your WB pg 49

1) $(6x^2 - 5x + 3) - (9x^2 - 7)$ $-3x^2 - 5x + 10$ quadratic trinomial

2) $3x(2x - 7) + 7x^4 - x$ $7x^4 + 6x^2 - 20x$ quartic trinomial

3) $-x^2 + 7x^5 + x^2$ $7x^5$ 5th degree Monomial

4) $(x + 2)^3$ *(hint! You must FOIL twice!)* $x^3 + 6x^2 + 12x + 8$ cubic polynomial

5) Write an example of a cubic binomial.

$5x^3 + 6$

6) Factor, in order to solve: $2x^2 + 7x = -6$

12
7
3,4

$2x^2 + 7x + 6 = 0$

$2x^2 + 3x + 4x + 6 = 0$

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

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

$x = -\frac{3}{2}$ | $x = -2$

Nov 16-12:15 PM

6.2 Polynomials

and

Linear Factors

Analyze polynomial functions using graphs, factors and equations

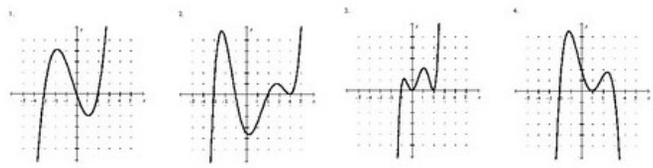
Nov 12-8:05 AM

6.2 POLYNOMIAL FUNCTIONS

We have discussed the degree of polynomials and classified them by number of terms.

But, what does a polynomial look like when graphed?

Examples:



Nov 2-1:46 PM

Write the polynomial in standard form.

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

$x = -1$ | $x = 2$ | $x = -3$

FOIL

$x^2 - 2x + x - 2$

$x^2 - x - 2$

	x^2	$-x$	-2
x	x^3	$-x^2$	$-2x$
3	$3x^2$	$-3x$	-6

$x^3 + 2x^2 - 5x - 6$

Use foil or box for first two binomials.

Next, use foil or box method again to get final answer.

Using your calculator, graph the original problem and your answer. What do you notice? Where does the graph hit the x-axis?

Nov 16-12:15 PM

Write the polynomial in factored form.

2) $-2x^4 + 10x^3 + 12x^2$

First, use the GCF to simplify. $-2x^2$

$-2x^2(x^2 - 5x - 6)$

-6
-5
$-6, 1$

Next, keep on factoring.

$-2x^2(x-6)(x+1)$

$-2x^2 = 0$
$\frac{-2x^2}{-2} = \frac{0}{-2}$
$\sqrt{x^2} = \sqrt{0}$
$x = 0$

$x = 6$

$x = -1$

Using your calculator, graph both of the problem and your answer. Are the graphs the same?

Where does the graph hit the x-axis?

$x^2 = 0$
$x \cdot x = 0$
$x = 0 \mid x = 0$

Nov 16-12:15 PM

You try!

Always look for the GCF 1st!

3) Factor $3x^3 - 3x^2 - 36x$

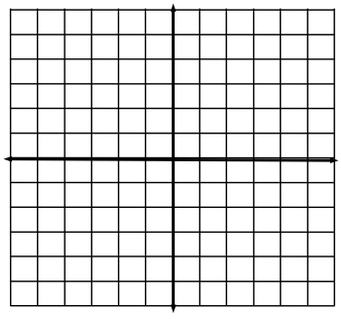
$3x(x^2 - x - 12)$

$3x(x-4)(x+3)$

$3x = 0$
$x = 0$

$x = 4$

$x = -3$



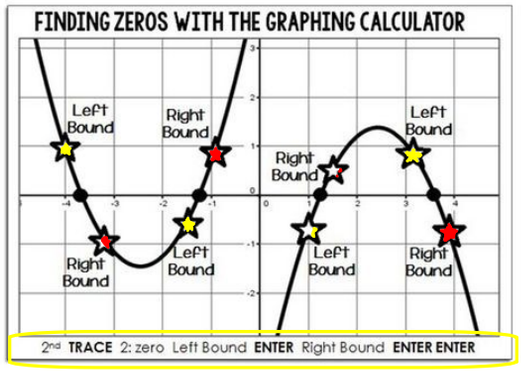
BEFORE checking on the graphing calculator, where do you think the graph will cross the x-axis?

Nov 16-12:15 PM

Finding zero's of a polynomial using your calculator.

Remember!

zero - where a graph crosses the x-axis



Nov 16-12:15 PM

Now let's graph this on the calculator to find the zero's

$$y = -2x^4 + 10x^3 + 12x^2$$

Compare the zeros on the calculator to the factored form you found before in #2.

Nov 3-6:27 AM

Multiplicity

The number of times a zero occurs for a polynomial

Find the zeros and state the multiplicity.

5) $y = (x - 4)^2 (2x + 5)$

$0 = (x-4)^2(2x+5) = \underbrace{(x-4)(x-4)(2x+5)}_{x^3 \text{ cubic}}$

$x = 4$ | $x = 4$ | $x = -5/2$

$m = 2$ | $m = 1$

6) $y = \underbrace{x(x - 2)^3}_{x^4}$ degree: 4

$x = 0$ | $x = 2$

$m = 1$ | $m = 3$

7) $y = 2x^3 - 50x$ *Hint! You must factor first!*

Nov 16-12:15 PM

Remember the degree of a polynomial is determined differently depending on its **form**:

Largest exponent when written in standard form.

Example:

$$y = 6x^4 + 5x^2 - 1$$

The total number of powers of x when written in factored form.

Example:

$$y = \underbrace{(2x+3)(x-5)(4x+1)}_{x^3}$$

Nov 4-9:03 AM

Writing a polynomial equation.

Write a polynomial function in standard form with the given zeros.

8) x = 0, 5, 5, and -3

What's the multiplicity of this zero? 1

What's the multiplicity of this zero?

What's the multiplicity of this zero? 1

click below each arrow

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

2

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

$x(x^2-5x-5x+25)$

$x^2-10x+25$

x	x^3	$-10x^2$	$25x$
3	$3x^2$	$-30x$	75

$x(x^3-7x^2-5x+75)$

$x^4-7x^3-5x^2+75x$

Nov 16-12:15 PM

HW 6.2 Part 1

p. 317 #3-11 odd, #13 - find only the zero's, 17, 19, 22, 25, 27, 31-35 odd

problems on the next slide

Nov 16-12:24 PM

Write each expression as a polynomial in standard form.

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

4. $x(x + 2)^2$ **5.** $x(x + 5)^2$ **6.** $x(x - 1)(x + 1)$

Write each polynomial in factored form. Check by multiplication.

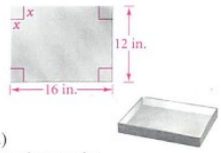
7. $x^3 - 36x$ **8.** $9x^3 + 6x^2 - 3x$ **9.** $10x^3 - 10x^2 + 15x$

10. $x^3 + 7x^2 + 10x$ **11.** $x^3 + 8x^2 + 16x$ **12.** $x^3 - 7x^2 - 18x$

Find the relative maximum, relative minimum, and zeros of each function.

13. $f(x) = x^3 + 4x^2 - 5x$ **14.** $f(x) = -x^3 + 16x^2 - 76x + 96$

15. **Metalwork** A metalworker wants to make an open box from a sheet of metal, by cutting equal squares from each corner as shown.



a. Write an expression for the length, width, and height of the open box.

b. Use your answer from part (a) to write a function for volume. (*Hint*: Use factored form.)

c. Graph the function. Find the maximum volume that can be contained by the box and the size of the square cut that produces this volume.

Find the zeros of each function. Then graph the function.

16. $y = (x - 1)(x + 2)$ **17.** $y = (x - 2)(x + 9)$ **18.** $y = x(x + 5)(x - 8)$

19. $y = (x + 1)(x - 2)(x - 3)$ **20.** $y = (x + 1)(x - 1)(x - 2)$

Write a polynomial function in standard form with the given zeros.

21. $x = 5, 6, 7$ **22.** $x = -2, 0, 1$ **23.** $x = -5, -5, 1$ **24.** $x = 3, 3, 3$

25. $x = 1, -1, -2$ **26.** $x = -1, -2, -3$ **27.** $x = 0, 0, 2$ **28.** $x = -\frac{1}{2}, 0, 4$

Find the zeros of each function. State the multiplicity of multiple zeros.

29. $y = (x + 3)^3$ **30.** $y = x(x - 1)^3$ **31.** $y = 2x^3 + x^2 - x$

32. $y = 3x^3 - 3x$ **33.** $y = (x - 4)^2$ **34.** $y = (x - 2)^2(x - 1)$

35. $y = (2x + 3)(x - 1)^2$ **36.** $y = (x + 1)^2(x - 1)(x - 2)$

Extra practice

Oct 25-5:38 PM

4) Use your graphing calculator to find the zero's of the function, rounded to nearest hundredth if necessary.

$$f(x) = 2x^3 - 23x^2 + 78x - 72$$

Nov 4-10:06 AM

Find the degree of each polynomial:

degree

1. $9x^4 - 12x^2 + 5$
2. $-3x(x+2)(x-4)^3$
3. $-(x+1)^3(x-2)^2(x+2)$
4. $-5x^3 + 2x^5 + 4x - 7$

Nov 4-9:16 AM

Nov 1-12:20 PM