WARMUP 1-26-15

Find the value.

1. sin $\frac{7\pi}{6}$ $= -\frac{1}{2}$
2. cos $\frac{2\pi}{3}$ $= -\frac{1}{2}$
3. tan $\frac{\pi}{4}$ $= 1$

Jan 26-9:02 AM

55, 61, 59, 57

$C(x) = 800 - 10x + 0.25x^2$

2.2 Polynomial Functions

$x = 20$ fixtures

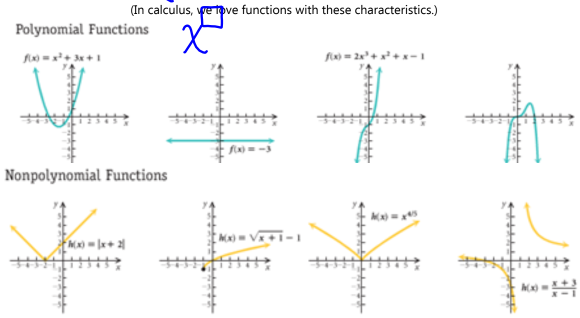
$y = \$700$

Jan 23-8:13 PM

The graphs of polynomial functions are Smooth & continuous, whose domains are $(-\infty, \infty)$.

(In calculus, we love functions with these characteristics.)

$x^{\square}$



Jan 13-4:46 PM

3 Important Aspects of Polynomial Functions:

1) End behavior
2) Zeros x-int
3) Relative extrema (min's and max's)

The coolest part ::

Jan 13-5:06 PM

Identifying Degree and Leading Coefficient

- Degree of a polynomial: the highest power.
- Leading coefficient: the number in front of the term with the highest power $-4x^5+5x^3+8x^2+3x-17$

$5x^3 + 8x^2 + 3x - 17 - 4x^5$

Degree: 5

Leading Coefficient: -4

Note: If your degree is k, then your polynomial has at most k zeros

Nov 12-11:03 AM

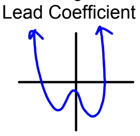
Common Polynomial Functions

Degree	Type	Example
0	constant	f(x)= c
1	linear	f(x)= x
2	quadratic	f(x)= x^2
3	cubic	f(x)= x^3
4	quartic	f(x)= x^4

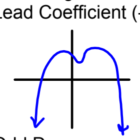
Nov 12-11:07 AM

End Behavior :: What happens as...

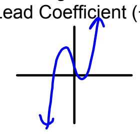
Even Degree
Lead Coefficient (+)



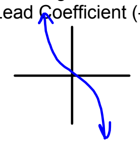
Even Degree
Lead Coefficient (-)



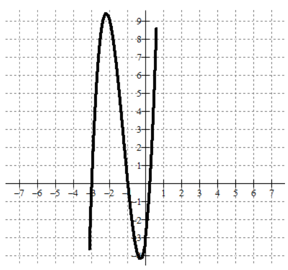
Odd Degree
Lead Coefficient (+)



Odd Degree
Lead Coefficient (-)



Jan 13-9:16 AM



Degree= (even/odd)

LC= (positive/negative)

p. 112, #1 & 2 (HW)

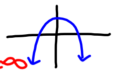
Jan 14-8:24 PM

Describe the end behavior for each function. Sketch the graph.

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

As $x \to \infty$, $f(x) \to -\infty$

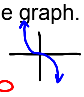
As $x \to -\infty$, $f(x) \to -\infty$



$h(x)=-x^3+5x^2+1$

As $x \to \infty$, $f(x) \to -\infty$

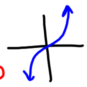
As $x \to -\infty$, $f(x) \to \infty$



$g(x)=2x^5+x^4-x^2+1$

As $x \to \infty$, $f(x) \to \infty$

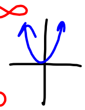
As $x \to -\infty$, $f(x) \to -\infty$



$k(x)=x^2+6x-7$

As $x \to \infty$, $f(x) \to \infty$

As $x \to -\infty$, $f(x) \to \infty$



Jan 24-11:26 PM

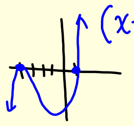
Finding Real Zeros

Real zero :: Zeros, Solutions, factored, x-int.

Multiplicity :: $(x+4)^2$

Repeated zero {Bounce}

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



FACTOR!FACTOR!FACTOR!FACTOR!FACTOR!FACTOR!

Nov 12-11:03 AM

Some Factoring Review...

Greatest Common Factor $4x^3+16x^2-24x$ $\quad 4x(x^2+4x-6)$

Difference of Squares x^2-64 $\quad (x-8)(x+8)$

Trinomial Factorization $x^2+8x+12$ $\quad (x+6)(x+2)$

Quadratic in Form x^4+8x^2+12 $\quad (x^2+6)(x^2+2)$

Factor by Grouping $(5x^3-15x^2)+(-2x+6)$

$5x^2\cancel{(x-3)}-2\cancel{(x-3)}$

$(x-3)(5x^2-2)$

p. 113, #29 (HW)

Jan 14-8:28 PM

Example

Find all the real zeros of the polynomial function. Determine the multiplicity of each zero.

$f(x)=x^2-16$

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

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

$x=4$ $\quad x=-4$

Mult of 1

$f(x)=x^2+10x+25$

$(x+5)(x+5)$

$x=-5$

Mult of 2

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

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

$x(x+1)(x+1)$

$x=0$ $\quad x=-1$

mult 1 $\quad$ mult 2

p. 113, #23 (HW)

Jan 14-8:21 PM

A **zero** is a number you put in for x that makes $f(x)$ zero.

If the polynomial function $f(x)=x^2+9x+20$
can be factored into $f(x)=(x+4)(x+5)$

what are the function's zeros?

$x=-4 \quad x=-5$

REVERSE//If a polynomial has zeros 2 & -1, what are its linear factors?

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

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

$\boxed{f(x)=x^2-x-2}$

Jan 13-10:19 AM

Example
Find the polynomial in standard form given zeros: 4, -3, 0.

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

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

p. 113, #51 (HW)

Jan 14-8:42 PM

HOMEWORK

...you can breathe! We're back to algebra!

p. 112 :: 1-8, 15, 17, 23, 29, 37, 39, 41, 51, 67, 69, 91

Jan 14-8:43 PM