U1D2 Pre-Calc Unit 1 Day 2 More Algebra 2 RETRO Date: Key

Warm Up:

1. Solve the system:
$$4\left(\frac{1}{4}x=1-.5y\right)$$
$$3\left(-\frac{5}{3}x-3=\frac{21}{3}y\right)$$

$x=4-2y$

$-5x-9=21y$

$-5(4-2y)-9=21y$

$-20+10y-9=21y$

$-29=11y$

$\boxed{y=\frac{-29}{11}}$

Strategy:

$x=4-2\left(\frac{-29}{11}\right)$ $\left(\frac{102}{11},\frac{-29}{11}\right)$

$x=\frac{44+58}{11}=\boxed{\frac{102}{11}}$

2. Solve by factoring $72x^2+50x^4=120x^3$

Strategy:

$50x^4-120x^3+72x^2=0$

$25x^4-60x^3+36x^2=0$

$x^2(25x^2-60x+36)=0$

$x^2(5x-6)^2=0$

$\boxed{x=0,\ 5/6}$

Objective 1: I can write a system of equations to represent, and go on to solve mixture problems:

EXAMPLE: You are opening a coffee shop. Your signature coffee is a mixture of Sumatran and Cacao. Sumatran costs \$20 a pound, while Cacao cost \$14 a pound. You want to charge \$15.75 per pound for the blend, and you want to produce it in 20 pound batches. How many pounds of each should you mix?

let S = # lbs Sumatran

C # lbs Cacao

common error! Q·V=REV.

$s+c=20$

$20s+14c=15.75(20)$

$-20s-20c=-400$

$-6c=-85$

C = 14.17 lbs cacao

S = 20−14.17 = 5.83 lb. Sum.

s = speed still water

OBJECTIVE 2: I can write a system of equations to represent and go on to solve D = rt problems.

let c = rate of current

Example: A boat traveled 24 miles downstream in 2 hours. The return trip took twice as long. What is the speed of the boat in still water?

	r	t	= d
up	s - c	4	= 24
down	s + c	2	= 24

$4s - 4c = 24 \rightarrow 4s - 4c = 24$

$2(2s + 2c) = (24)2 \rightarrow 4s + 4c = 48$

$8s = 72$

s = 9 mph
c = 3 mph

Objective 3: I can determine end behaviors, x-intercepts (zeros), y intercepts of and graph polynomials.

Zeros and multiplicities – FACTOR Odd multiplicity – SHOOT THROUGH EVEN MULTIPLICITY – BOUNCE	Y int.	Degree – odd or even?	Is "a" positive or negative?	End behavior
THE Y INTERCEPT OCCURS WHEN X = 0				
1. $P(x) = x^3 - 5x^2 + 6x$	0,0	3 ------ DEGREE	pos	↓ ↑
2. $f(x) = -x(x + 5)^2(x + 3)$	0,0	4 ------ DEGREE	neg	↓ ↓

Sketch the a possible graph for : $P(x) = x^3 + 3x^2 - 4x - 12$

y int = −12

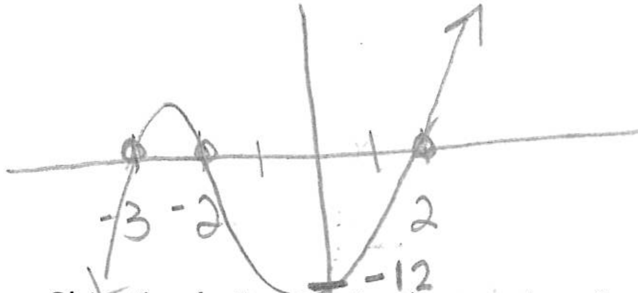
① factored form

$P(x) = x^2(x+3) - 4(x+3)$

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

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

Roots: −3, 2, −2 } S.T



Objective 4: I can write the equation of a polynomial from a graph:

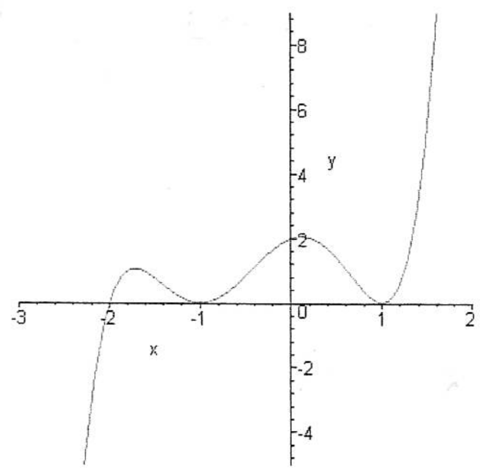
1. Determine the zeros. Write as factors.
2. What is the end behavior?
3. Is a positive or negative?
4. What is the degree of the function? Bounces? ST's? Adjust factors as needed
5. What is the y intercept? Do we have to find "a" in order to create this y intercept?

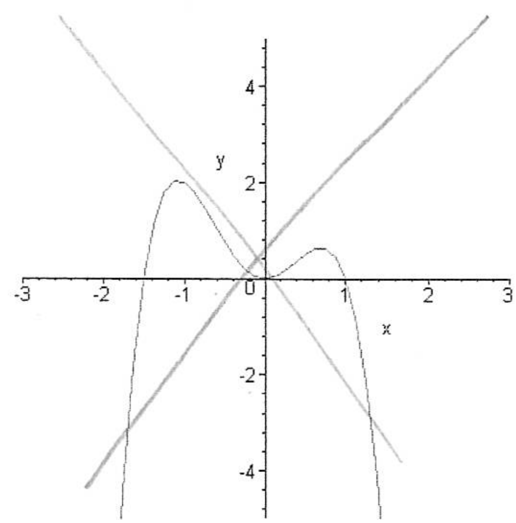
a pos ↓ ↑
odd deg

If you have y = x(x - a)(x - b). . . , the y intercept will always be 0,0

To find "a"

Substitute the coordinates of the y intercept for x and y. Solve for a.





roots: −2
−1 m2
1 m2

y inte (0, 2)

$y = a(x+2)(x+1)^2(x-1)^2$

$2 = a(0+2)(0+1)^2(0-1)^2$

$2 = a(2)(1)(1)$

$1 = a$

$\Rightarrow y = (x+2)(x+1)^2(x-1)^2$

Objective 5: I can write an equation to represent and go on to sove optimization problems.

A popular designer bag sells for $500. At this price, 45,000 are sold each month. The research department has concluded that, for each $20 decrease in price, the can sell 5000 more bags each month.
What should the company charge to maximize revenue?

REVENUE = PRICE x QUANTITY

let x = # price ↑'s

p	q	= R
(500 − 20x)	(45,000 + 5000x)	

GC

$y = (500 - 20x)(45000 + 5000x)$

x min = 0 y min = 0

x max = 25 (bag free!) y max = bigger than 500(45,000)

Calc max

x = 8

price = 500 − 20(8)

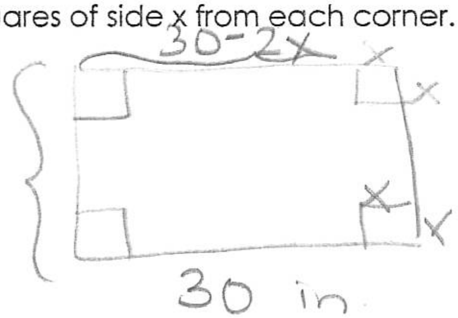
500 − 160

= 340

They should charge $340

Objective 6: I can optimize volume using a graphing calculator.
A piece of cardboard measuring 30 inches by 15 inches is made into an open box by cutting out squares of side x from each corner.

A. Sketch:



V=LWH

h=x

B. Write a polynomial, P(x) that represents the volume of the box.

$P(x) = (30-2x)(15-2x)(x)$

C. Find the value of x for which P(x) has the greatest possible volume.

Calc max. x min = 0 y min = 0

x max = 8 y max = 600

x = 3.75

y = 281.25

D. State the dimensions of this box.

The box:

L = 30 − 2(3.75) = 22.5 in

W = 15 − 2(3.75) = 7.5 in

H = 3.75 in.

for a max volume of 281.25 in^3.