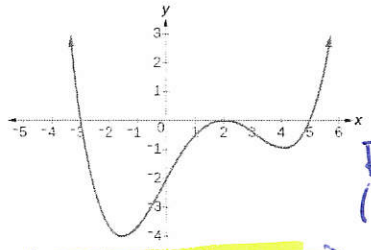
Unit 1 Day 3

U1D3 Pre-Calc Day 3 More Algebra 2 RETRO Date: _____

key

Warm Up:

Write an equation to represent the graph of the polynomial sketched below.



zeros: -3 (m1) 2 (m2) 5 (m1)

point (0, -2) = x, y

$y = a(x+3)(x-2)^2(x-5)$

$-2 = a(0+3)(0-2)^2(0-5)$

$-2 = a(3)(4)(-5)$

$-2 = -60a$

$a = 1/30$ ✓

$y = \frac{1}{30}(x+3)(x-2)^2(x-5)$

Given a polynomial with zeros at -4, -1 and 2, (all with multiplicities of 1) and a y intercept at 1, write the math model that represents this graph. Then sketch the graph and check it on your gc!

y int (or point other than (0,0)) (0,1)

$y = a(x+4)(x+1)(x-2)$

sub in point

$1 = a(0+4)(0+1)(0-2)$

$1 = -8a$

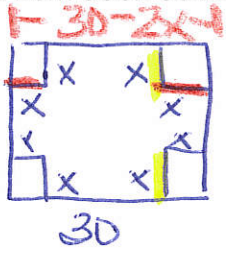
$a = -1/8$

$\rightarrow y = -\frac{1}{8}(x+4)(x+1)(x-2)$

Objective 6: I can optimize volume using a graphing calculator.

1. 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:



$V = LWH$

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

input in calc

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

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

window

Xmin = 0

Xmax = 15

Ymin = 0

Ymax = 450

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

Calc Max: LB → enter, RB → enter, Guess → enter

(3.17, 649.5)

D. State the dimensions of this box.

h = 3.17 in

w = 15 - 2(3.17) = 8.66 in

L = 30 - 2(3.17) = 23.66 in

max volume 649.5 in^3

Unit 1 Day 3

Objective 7: I can analyze a polynomial graph that models a scenario

The revenue in millions of dollars for a fictional cable company from 2006 through 2013 can be modeled by the polynomial function

$$R(t) = -0.037t^4 + 1.414t^3 - 19.777t^2 + 118.696t - 205.332$$

where R represents the revenue in millions of dollars and t represents the year, with $t = 6$ corresponding to 2006.

Graph on your gc. What values of t make sense? Use those as your xmin and xmax.

[6, 13] xmin = 6

xmax = 13

According to the model, how much money did they bring in in 2006? Use this number as a base to estimate a ymax.

options Sub in 6 for x

or Calc Value, x = 6

In what year did they maximize their revenue?

options [redacted] = calc max

Over what time period(s) were revenues INCREASING?

Objective 8: To solve radical equations

1. Isolate the radical. 2. Undo the radical 3. Solve 4. Check solutions!

EX 1. $5\sqrt{2x+1} - 7 = 3$

$\sqrt{2x+1} = 2$

$2x+1 = 4$

$2x = 3$

$\boxed{x = 3/2}$

ck

$5\sqrt{2(\frac{3}{2})+1} - 7 \stackrel{?}{=} 3$

$5\sqrt{4} - 7 = 3$

$5(2) - 7 = 3$ ✓

EX 2. $\left(\sqrt{x+7}\right)^2 = (x-5)^2$ (x-5)(x-5)

$x + 7 = x^2 - 10x + 25$

$0 = x^2 - 11x + 18$

$0 = (x-9)(x-2)$

$x = 9 \quad x = 2$

Check 9: $\sqrt{9+7} = 9-5$

$4 = 4$ ✓

Check 2: $\sqrt{2+7} = 2-5$

$3 = -3$ ✗

EX 3. $\sqrt{x-3} + \sqrt{x+5} = 4$

$\sqrt{x-3} = 4 - \sqrt{x+5}$

$x - 3 = 16 - 8\sqrt{x+5} + (x+5)$

$-24 = -8\sqrt{x+5}$

$3 = \sqrt{x+5} \rightarrow 9 = x+5$ $\{x = 4\}$ → check $\sqrt{4-3} + \sqrt{4+5} = 4$ ✓

$x = 9$

CW/HW: Practice: Complete back of Analyzes worksheet. Book: Optimization page 251 9, 1, 16 (and also find the height of the box that will maximize its volume.

Systems: page 724 58, 59, 61, 65 and page 251 5, 7 Solving radical EQS: Algebra 2 part 2 worksheet.