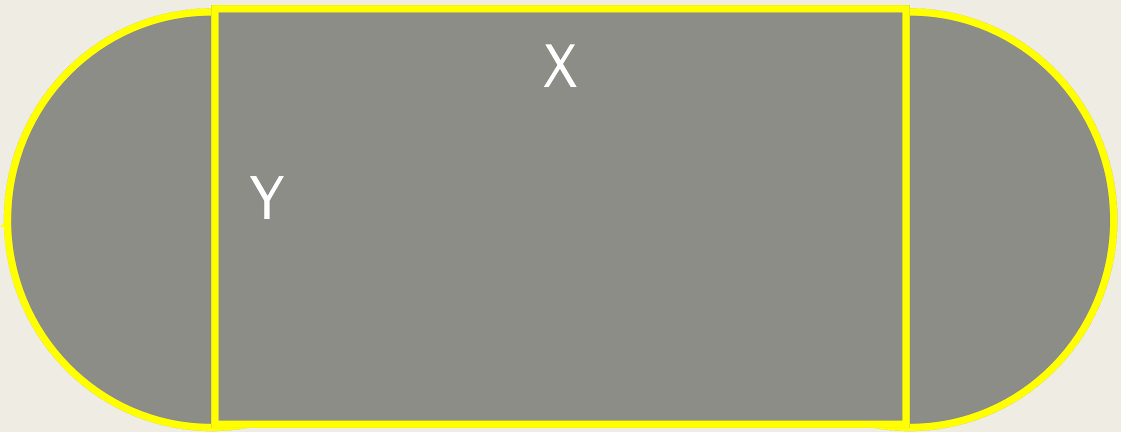
Bell Work (8–12 minutes to work on own or in small groups before going over answer)

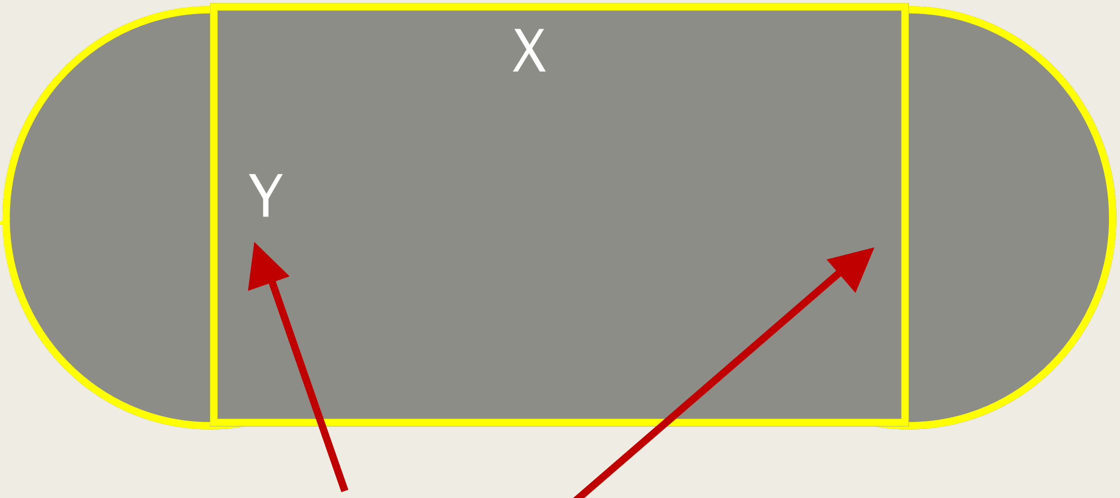
- If we want to build a track that is 200 meters around, but you also want to maximize the area of the rectangle. What dimensions of x and y will do that? What is the max area?
  - *Hint: How do you find area of a rectangle? Can you write an equation that you'd graph to find the maximum?*



Bell Work Answer (12– 15 minutes to analyze answer)

(Work together to understand where the answers came from… we'll discuss when I return)

- If we want to build a track that is 200 meters, but also want to maximize the area of the rectangle. What dimensions of x and y will do that? What is the max area?



Note: If you push the ends together it makes a circle with a diameter of y… Therefore the radius is y/2… we can find the circumference ($C = 2\pi r$) by plugging in $r = y/2$, and add it to the two sides of x

Lets talk about Perimeter first:

Perimeter = 200 (given to us)

So that means that the 2 curves, plus the 2 'x' sides of the track must equal 200

We need to add up those distances…

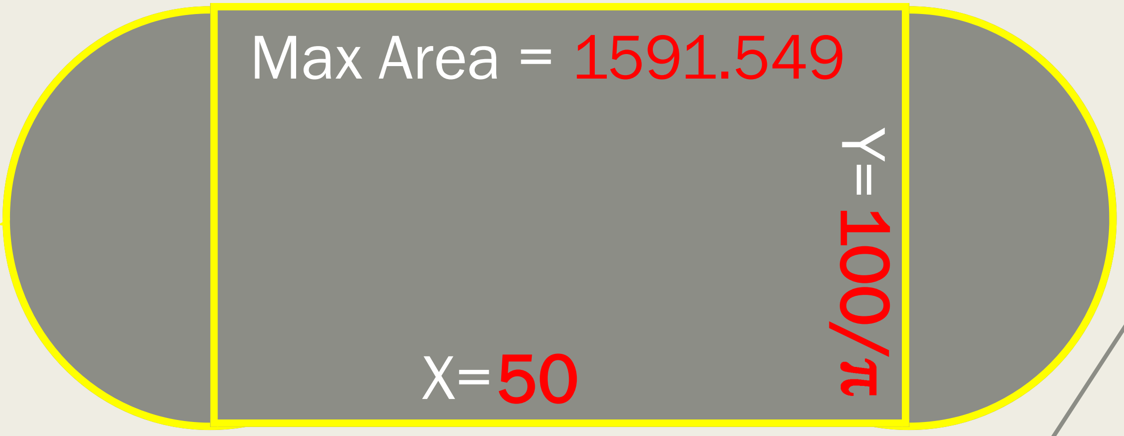
$200 = x+x + 2\pi(y/2)$ (plug in)

$200 = 2x + \pi y$ (simplify)

$y = (200 - 2x)/\pi$ (solve for y)

So…. NOW we can maximize the area & find dimensions!

- If we want to build a track that is 200 meters, but also want to maximize the area of the rectangle. What dimensions of x and y will do that? What is the max area?



Remember from previous slide we found what y equals.

$y = (200 - 2x)/\pi$

Now we can find the max area:

Area of rectangle = $x\ y$

$A = x\ ((200 - 2x)/\ \pi)$

Graph the area formula above in your calculator (think of A – output -- as the y and x is the input so it is still x).

Max: located at (50, 100/π)

Dimensions: $x = 50$ by $y = 100/\pi$

Area of rectangle = $x\ y \rightarrow (50)(100/\ \pi)$

Max Area = 1591.549

From Last Time… (finish 5 – 15 minutes)

depending on how class went last time

- Page 132 #7-12, 21-27 (odd), 76, 77, 81

PRE-CALC TRIG

Day 14

2.2 Polynomial Functions of Higher Degree

Objective: To become familiar with the features of polynomial graphs of higher degree

HLQ: As you increase the degree of a polynomial, what impact does this have on the graph (curves?, x-intercepts?, end behavior?, etc…)?

Important Concepts (less important with graphing calculator)

- Polynomial functions are continuous graphs
  - *[they don’t stop or break]*
- Polynomial functions are have smooth curves
  - *[there aren’t corners, points, etc.]*
- Number of solutions = Same as the Degree
- Number of turning points = Degree - 1

Leading Coefficient Test: Determines End Behavior

[Not as important since we have calculators! End behavior is just… which direction is graph pointing at its ends]

- Even Degree → Both ends point up (if lead coefficient is positive)

  → Both ends point down (if lead coefficient is negative)

- Odd Degree → Right side points up and
  left side points down (if lead coefficient positive)

  → Right side points down and
  left sides point up (if lead coefficient negative)

More about Real Zeros

(we can go over this more next time if needed)

- $x = a$ is a zero of function
- $x = a$ is a solution of polynomial $f(x) = 0$
- $(x - a)$ is a factor of polynomial $f(x)$
- $(a , 0)$ is an x-intercept of the graph of f

- Repeated zeros when graph touches, but does not cross

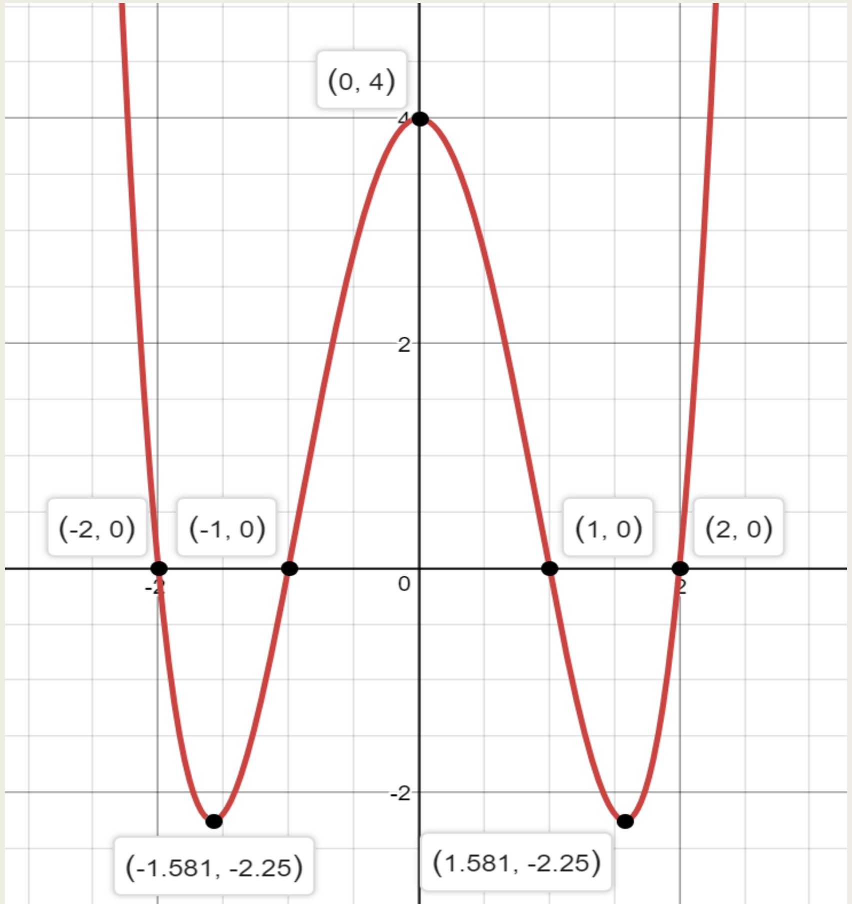
State the degree and # of turning points, describe the end behavior, find all real zeros, and sketch a graph

1.) $y = x^4 - 5x^2 + 4$

State the degree and # of turning points, describe the end behavior, find all real zeros, and sketch a graph

1.) $y = x^4 - 5x^2 + 4$

Degree: 4
Turning Points: 3
End Behavior: Right side goes up,
Left side goes up
Zeros: (-2, 0) (-1,0) (1,0), (2,0)



Note: notice the degree tells us how many zeros (x-intercepts) there will be

HLQ: Where are the turning points?

For next time…

- Page 146 #25, 29, 43, 47, 57, 97

If you finish this assignment, and your previous assignment, please find something to work on quietly, and we'll tie up any loose ends next time when I return. You are all awesome!