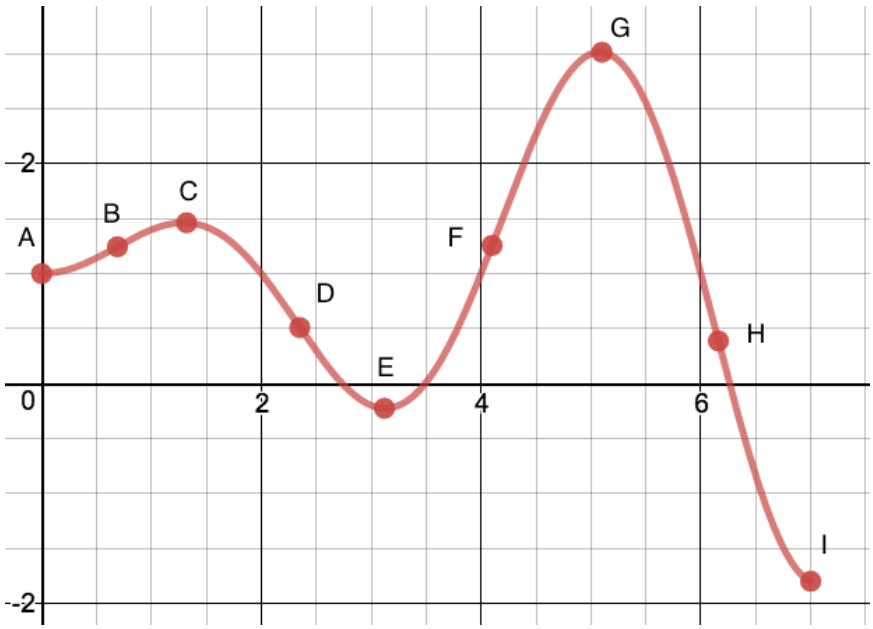
DoNow

1. Why is $\frac{a}{0}$ "undefined" for $a \neq 0$?
2. Why is $\frac{0}{0}$ "indeterminate?"

From Yesterday

3. Consider the graph of a continuous function, $f(x)$, defined on $0 \leq x \leq 7$. Nine points on the graph are labeled A though I. Using these points as end points, find all of the sections of the graph where $f(x)$ is:



   (a) increasing

   (b) decreasing

   (c) concave up

   (d) concave down

   (e) At least some of the nine labeled points can be described as having important roles. For example, G is the global maximum of the function because the value of f at G is greater than any other value of f. See how many of the points your group can describe.

Headlands Bicycle Problem

I bicycle across the Molden Mate Bridge, ride a flat road, then up the hill to the top of the Garin Headlands. At the top I turn around to go down the hill, over the flats, and back over the bridge. As I look at my speedometer, it appears that I go a steady 15 miles per hour [*mph*] on the flats (including the bridge), 6 *mph* on the "up-hill" and 24 *mph* on the "down-hill".

(a) If I add my speeds and divide by 3, I see that my average speed is 15 mph. Why do I divide by 3?

(b) It turns out that the entire ride takes an hour and a half and that I travel 18 miles. What does this say about my calculation in part (a)?

(c) Sketch a graph a very rough graph of *distance traveled* as a function of *time*.

(d) Using your distance vs time graph, sketch a graph of *speed* as a function of *time*.

(e) How many "flat" miles were in my ride? How many "up-hill" miles? How many "down-hill" miles? (Note that you may need to make an assumption about my ride to get a unique solution for flat, uphill, and downhill miles.)

(f) Use a grid and your answers to part (e) to produce an accurate *distance* as a function of *time* graph.

(g) Use grid to produce an accurate graph of *speed* as a function of *time* graph.

(h) From first graph [part (f)], how can I tell how fast I am going at any point in time?

(i) From second graph [part (g)], how can I find the total miles traveled at any point in time?