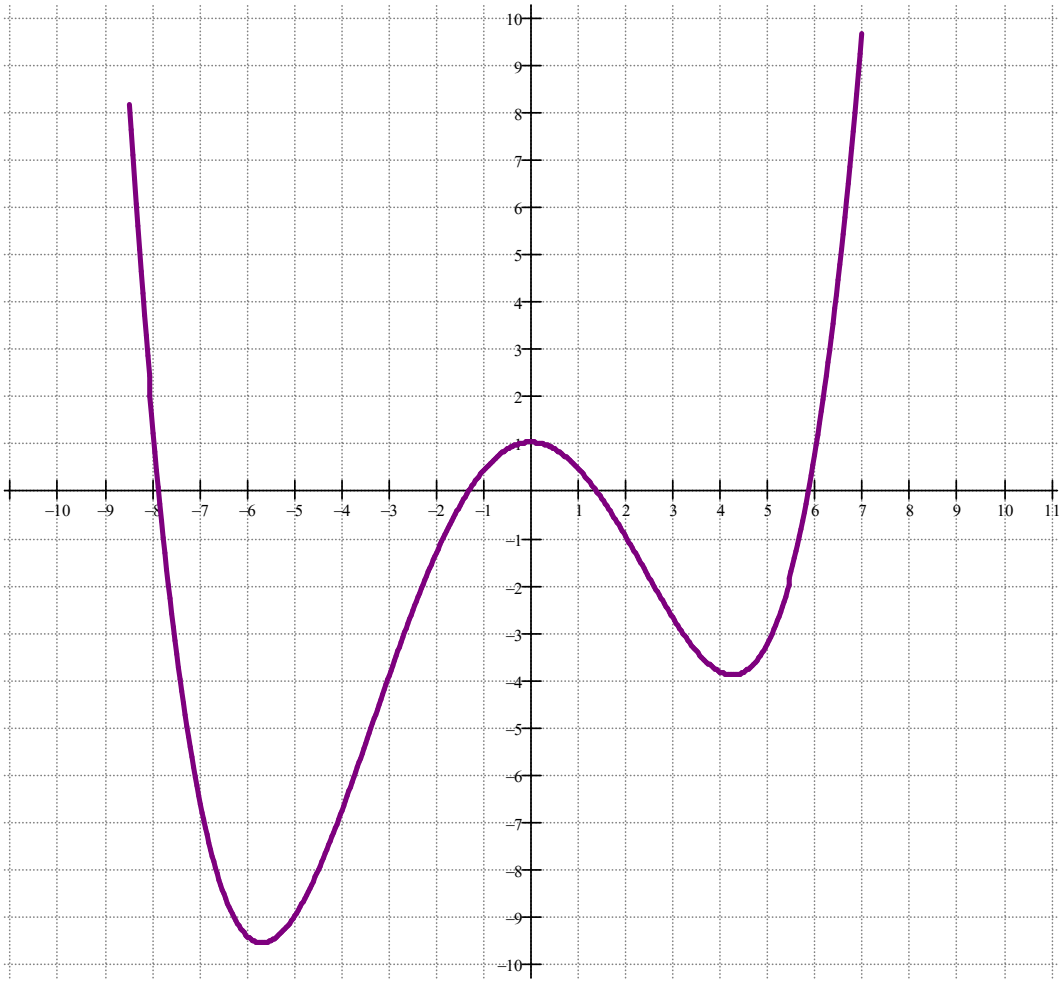
An exploration of the shape of a graph

Directions: Answer the questions below the graph. Estimate any numerical values to the nearest half-unit.



Part 1: As you move from left to right along the graph…

1. On what intervals are the function values (y-coordinates) decreasing?

2. On what intervals are the function values (y-coordinates) increasing?

3. The graph changes direction at three points. Estimate the coordinates of these points.

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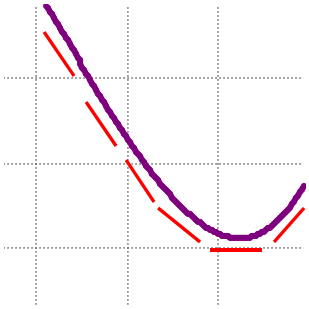
4. The graph has a somewhat uneven "U" shape on two intervals. Estimate these intervals.

5. The graph has an upside-down "U" shape on an interval. Estimate this interval.

Part 2:

Along the entire length of the graph above, draw a series of short segments parallel to the graph similar to those in the figure below.



Answer these questions about the *slope of the segments* that you drew. As you move from left to right along the graph …

6. On what intervals are the slopes of the segments negative?

7. On what intervals are the slopes of the segments positive?

8. At what points does the slope of the segments change from negative to positive? What must the slope be at this point? Why? What does the graph look like there?

9. At what points does the slope of the segments change from positive to negative? What must the slope be at this point? Why? What does the graph look like there?

10. On what intervals are the slopes of the segments increasing? What does the graph look like on these intervals? (Note: a steep negative slope, say maybe a slope of –8, changing to a less steep negative slope like –1, is an *increase* in the slope.)

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11. On what interval are the slopes of the segments decreasing? What does the graph look like on these intervals?

12. Estimate the point where the slopes change from increasing to decreasing. What happens on the graph at this point?

13. Estimate the point where the slopes change from decreasing to increasing. What happens on the graph at this point?

Part 3:

Consider your answers from Part 1 and Part 2. Write as many general statements comparing the *shape* and *activity* of the graph, and the *slopes* of the segments. Quantity counts!

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