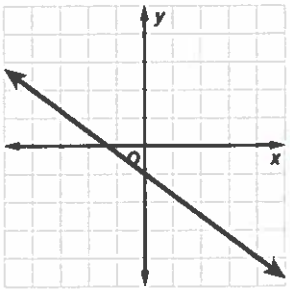
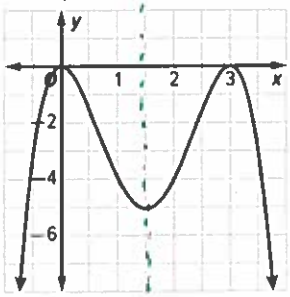
Shapes of Graphs

Line Symmetry: Graphs have line symmetry if one half of the figure matches the other half exactly.

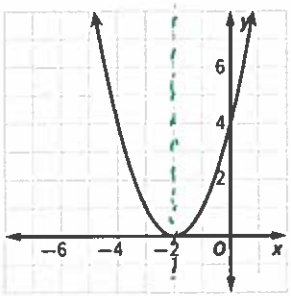
1. Determine which of the graphs below have line symmetry.



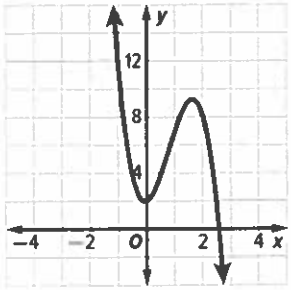
No



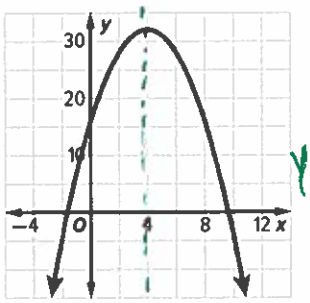
Yes at $x = 1.5$



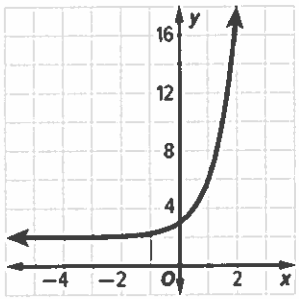
Yes at $x = -2$



No

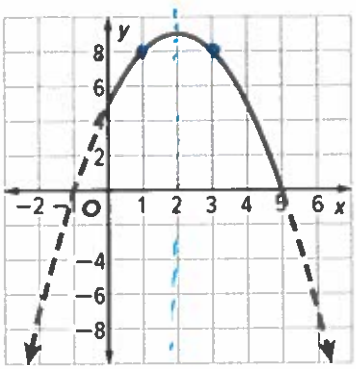


Yes at $x = 4$



No

2. A fountain is spraying a stream of water into the air. The graph represents the path of the water, where x is the distance from the fountain and y is the height in feet of the stream. Find and interpret any symmetry in the graph of the function.

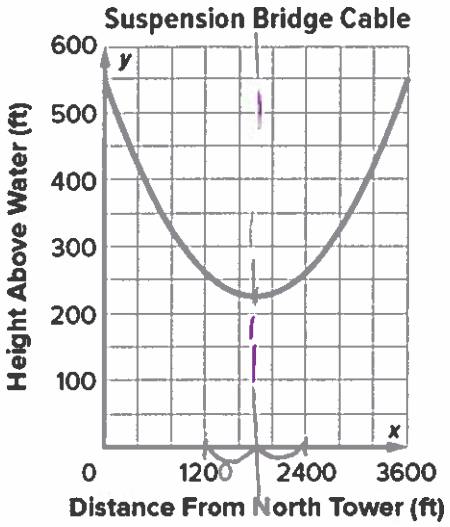


Symmetry @ $x = 2$

Interpret: the height was the same from 0 to 2 as it was from 2 to 4.

Shapes of Graphs

3. The graph represents the height y in feet that the main cables of a suspension bridge are above the water x feet from the north tower.



a. Describe any symmetry in the function.

Yes at $x = 1800$

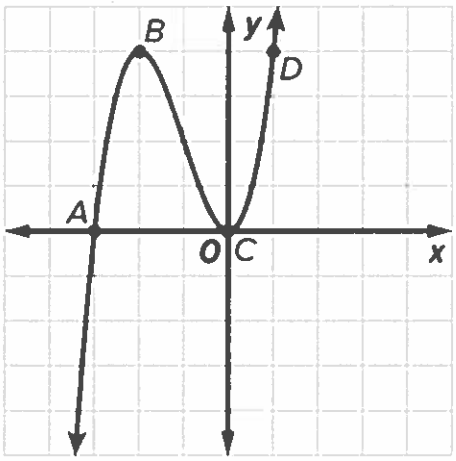
b. Interpret the symmetry in context of the situation.

the height of the cable is the same from a distance of 0 to 1800 as it is from 1800 to 3600

Extreama: Extrema of graphs are high or low points that are "extremes" compared to the rest of the graph. They can be **minimums** (low points) or **maximums** (high points).

4. Determine the extrema of each graph. Label each point as a minimum or maximum.

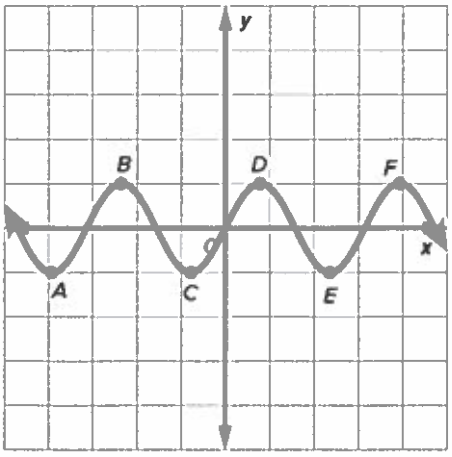
a.



Max: B

Min: C

b.

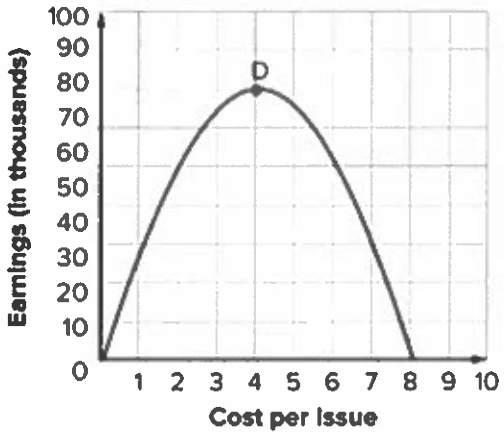


Max: B, D, F

Min: A, C, E

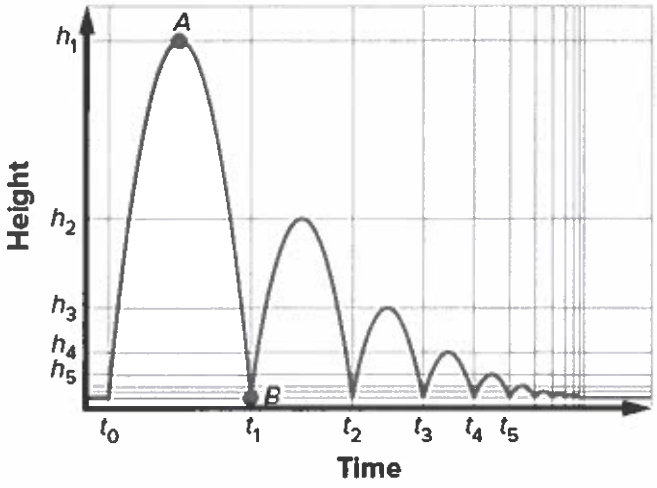
Shapes of Graphs

5. A comic book store uses a function to model its profit in thousands of dollars given the price in dollars that it charges for individual issues. Determine whether point D is a relative minimum, relative maximum, or neither. Then interpret its meaning in the context of the situation.



Max The highest profit is $80k when they charge $4 per issue

6. The function $f(x)$ models the height of a ball in feet given the number of seconds after it is thrown in the air.



a. Determine the extrema.

Max: A

Min: B

b. What does point B represent in the context of the situation? What does the behavior of $f(x)$ immediately before and after point B represent?

B: It hits the ground

The ball is bouncing