Unit 6 Lesson 13: Amplitude and Midline

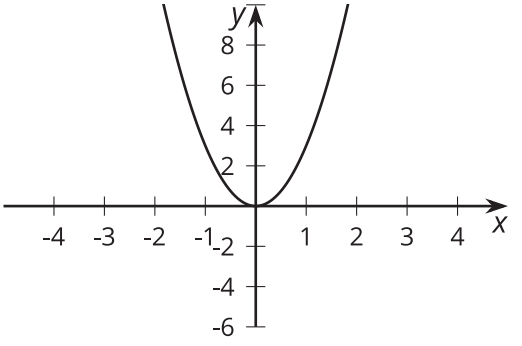
1 Comparing Parabolas (Warm up)

Student Task Statement

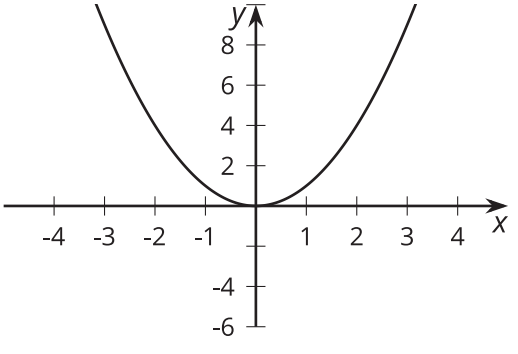
Match each equation to its graph.

1. $y = x^2$
2. $y = 3x^2$
3. $y = 3(x - 1)^2$
4. $y = 3x^2 - 1$
5. $y = x^2 - 1$

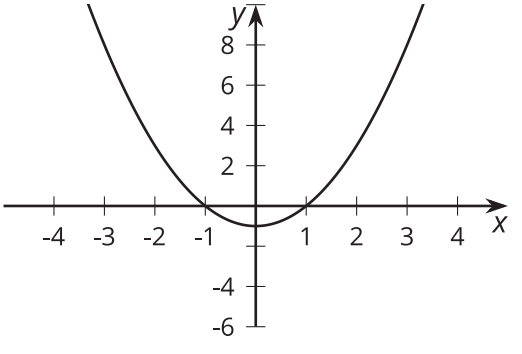
A



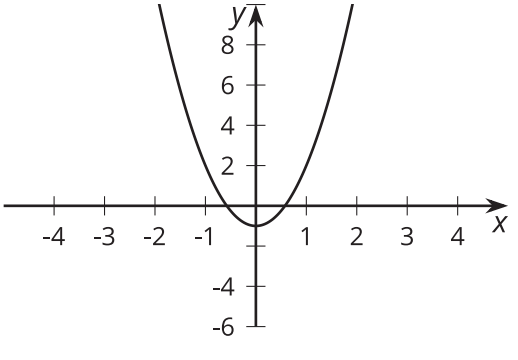
B



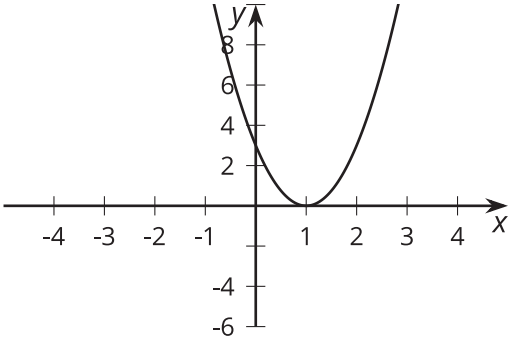
C



D



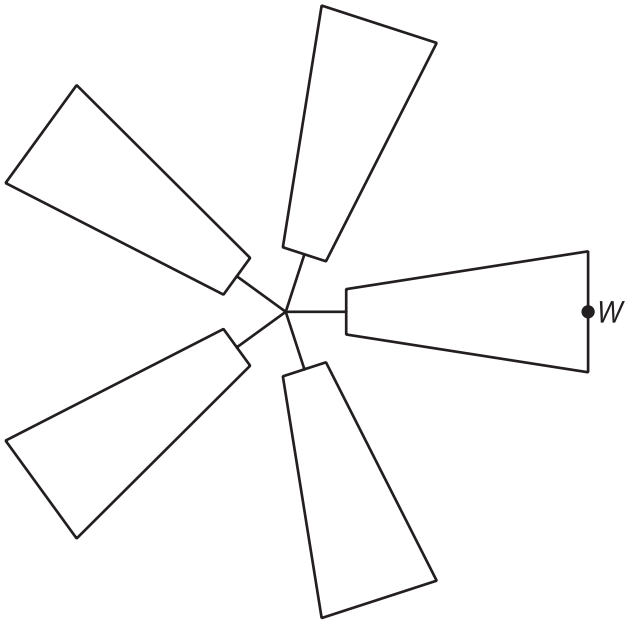
E



Be prepared to explain how you know which graph belongs with each equation.

2 Blowing in the Wind

Student Task Statement

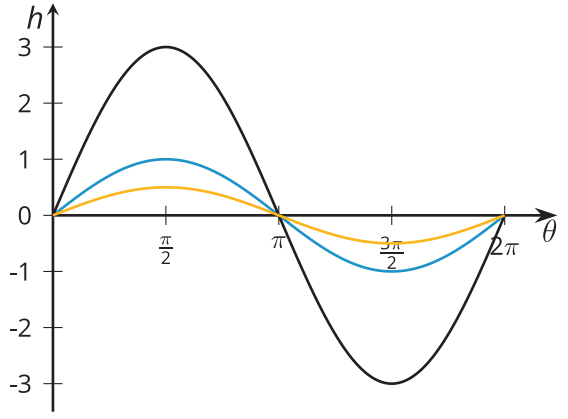


Suppose a windmill has a radius of 1 meter and the center of the windmill is $(0, 0)$ on a coordinate grid.

1. Write a function describing the relationship between the height h of W and the angle of rotation θ. Explain your reasoning.
2. Describe how your function and its graph would change if:
   a. the windmill blade has length 3 meters.

   b. The windmill blade has length 0.5 meter.
3. Test your predictions using graphing technology.

Activity Synthesis



3 Up, Up, and Away

Student Task Statement

1. A windmill has radius 1 meter and its center is 8 meters off the ground. The point W starts at the tip of a blade in the position farthest to the right and rotates counterclockwise. Write a function describing the relationship between the height h of W, in meters, and the angle θ of rotation.
2. Graph your function using technology. How does it compare to the graph where the center of windmill is at $(0, 0)$?
3. What would the graph look like if the center of the windmill were 11 meters off the ground? Explain how you know.

Images for Activity Synthesis