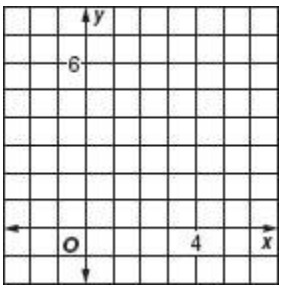
NAME _____ DATE _____ PERIOD _____

Parabolas

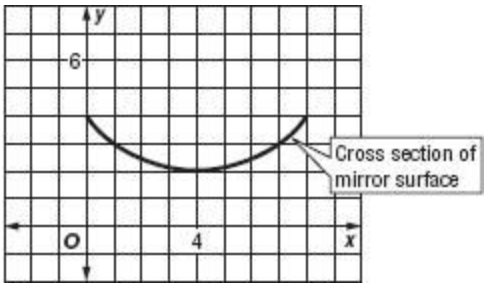
1. **PROJECTILE** A projectile follows the graph of the parabola $y = -\frac{3}{2}x^2 + 6x$. Sketch the path of the projectile by graphing the parabola.



2. **COMMUNICATION** David has just made a large parabolic dish whose cross section is based on the graph of the parabola $y = 0.25x^2$. Each unit represents one foot and the diameter of his dish is 4 feet. He wants to make a listening device by placing a microphone at the focus of the parabola. Where should the microphone be placed?

3. **BRIDGES** A bridge is in the shape of a parabola that opens downward. The equation of the parabola to model the arch of the bridge is given by $y = -\frac{x^2}{24} + \frac{5}{6}x + \frac{11}{6}$, where each unit is equivalent to 1 yard. The *x*-axis is the ground level. What is the maximum height of the bridge above the ground?

4. **TELESCOPES** An astronomer is working with a large reflecting telescope. The reflecting mirror in the telescope has the parabolic cross section shown in the graph whose equation is given by $y = \frac{1}{8}(x - 4)^2 + 2$. Each unit represents 1 meter. The astronomer is standing at the origin. How far from the focus of the parabola is the point on the mirror directly over the astronomer's head?



5. **BRIDGES** Part of the Sydney Harbor Bridge in Sydney, Australia, can be modeled by a parabolic arch. If each unit corresponds to 10 meters, the arch would pass through the points at (-25, 5), (0, 10), and (25, 5).

    a. Write the equation of the parabola to model the arch.

    b. Identify the coordinates of the focus of this parabola.