

Name: _____

Period: _____

WS – 4.1 & 4.2

Graph the function on graph paper. Label the vertex and axis of symmetry.

1. $y = 3x^2 - 6x + 4$

2. $y = -4x^2 + 8x + 2$

3. $f(x) = -6x^2 - 4x - 5$

4. $g(x) = -4(x - 2)^2 + 4$

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

6. $y = \frac{1}{2}(x - 3)^2 + 2$

7. $y = (x + 3)(x - 3)$

8. $f(x) = -2(x - 3)(x + 4)$

Problem Solving. Show your work on a separate sheet of paper.

9. A woodland jumping mouse hops along a parabolic path given by $y = -0.2x^2 + 1.3x$ where x is the mouse's horizontal position (in feet) and y is the corresponding height (in feet). Can the mouse jump over a fence that is 3 feet high. *Explain.*

10. Each cable joining the two towers on the Golden Gate Bridge can be modeled by the function

$$y = \frac{1}{9000}x^2 - \frac{7}{15}x + 500$$

where x and y are measured in feet. What is the height h above the road of a cable at its lowest point?

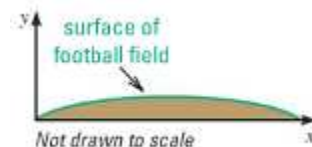


11. The function $y = -0.03(x - 14)^2 + 6$ models the jump of a red kangaroo where x is the horizontal distance (in feet) and y is the corresponding height (in feet). What is the kangaroo's maximum height? How long is the kangaroo's jump?

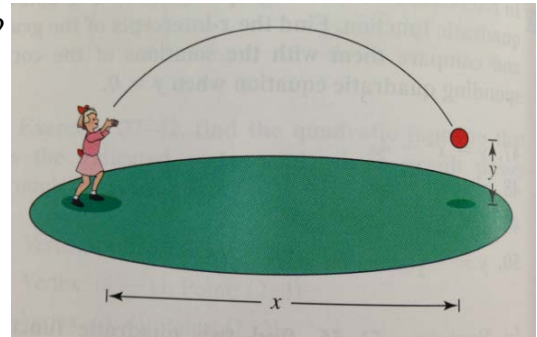
12. Although a football field appears to be flat, its surface is actually shaped like a parabola so that rain runs off to both sides. The cross section of a field with synthetic turf can be modeled by $y = -0.000234x(x - 160)$ where x and y are measured in feet.

a. What is the field's width?

b. What is the maximum height of the field's surface?



13. The arch of the Gateshead Millennium Bridge forms a parabola with equation $y = -0.016(x - 52.5)^2 + 45$ where x is the horizontal distance (in meters) from the arch's left end and y is the distance (in meters) from the base of the arch. What is the width of the arch?
14. Find the number of units that produce a maximum revenue $R = 900x - 0.1x^2$ where R is the total revenue in dollars and x is the number of units sold.
15. A manufacturer of lighting fixtures has daily production costs of $C = 800 - 10x + .25x^2$ where C is the total cost in dollars and x is the number of units produced. How many fixtures should be produced each day to yield a minimum cost?
16. The profit for a company is given by $P = -0.0002x^2 + 140x - 250000$ where x is the number of units sold. What sales level will yield a maximum profit?
17. The height y (in feet) of a ball thrown by a child is given by $y = -\frac{1}{2}x^2 + 2x + 4$ where x is the horizontal distance (in feet) from where the ball is thrown (see figure).
- How high is the ball when it leaves the child's hand? (Note: Find y when $x=0$.)
 - How high is the ball when it is at its maximum height?
 - How far from the child does the ball strike the ground?



18. The path of a diver is given by $y = -\frac{4}{9}x^2 + \frac{24}{9}x + 12$ where y is the height in feet and x is the horizontal distance from the end of the diving board in feet. What is the maximum height of the dive?
19. A jump on a pogo stick with a conventional spring can be modeled by $y = -0.5(x - 6)^2 + 18$, and a jump on a pogo stick with a bow spring can be modeled by $y = -1.17(x - 6)^2 + 42$, where x and y are measured in inches.

- Compare the maximum heights of the jumps on the two pogo sticks.
- Which constants in the functions affect the maximum heights of the jumps?
- Which constants do not affect the heights of the jumps?

