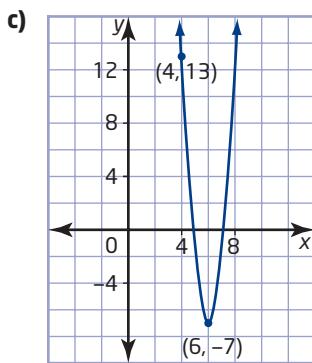
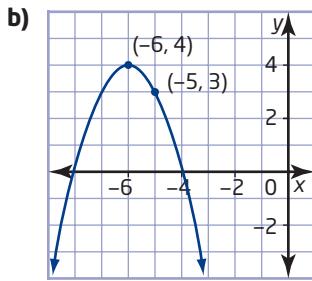
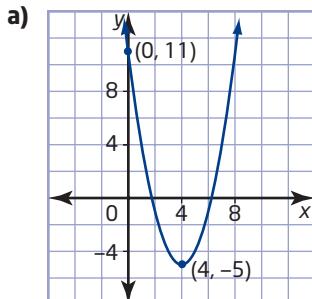


Opportunity to Learn: Complete all questions visible on this page and the next.

7. Write an equation for each parabola.



Connect and Apply

8. The graph of $y = x^2$ is stretched vertically by a factor of 3 and then translated 2 units to the left and 1 unit down. Sketch the parabola and write its equation.

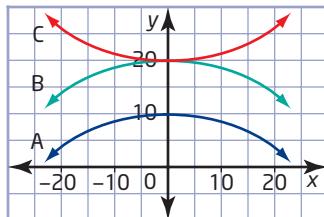
9. The graph of $y = x^2$ is reflected in the x -axis, compressed vertically by a factor of $\frac{1}{2}$, and then translated 2 units upward. Sketch the parabola and write its equation.

Sketch the parabola and write its equation.

10. a) Find an equation for the parabola with vertex $(1, 4)$ that passes through the point $(3, 8)$.

b) Find an equation for the parabola with vertex $(-2, 5)$ and y -intercept 1.

11. A stadium roof has a cross section in the shape of a parabolic arch with equation $y = -\frac{1}{45}x^2 + 20$. Which graph represents the arch? Justify your reasoning.



For help with questions 12 and 13, see Example 3.

12. The path of a soccer ball is modelled by the relation $h = -\frac{1}{16}(d - 28)^2 + 49$, where d is the horizontal distance, in metres, after it was kicked, and h is the height, in metres, above the ground.



a) Sketch the path of the soccer ball.
 b) What is the maximum height of the ball?
 c) What is the horizontal distance when this occurs?
 d) What is the height of the ball at a horizontal distance of 20 m?
 e) Find another horizontal distance where the height is the same as in part d).

13. A baseball is batted at a height of 1 m above the ground and reaches a maximum height of 33 m at a horizontal distance of 4 m.

- a) Determine an equation to model the path of the baseball.
- b) What is the height of the baseball once it has travelled a horizontal distance of 6 m?
- c) At what other horizontal distance is the baseball at the same height as in part b)?