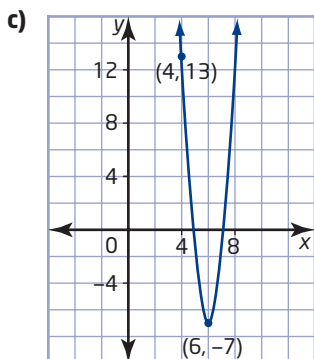
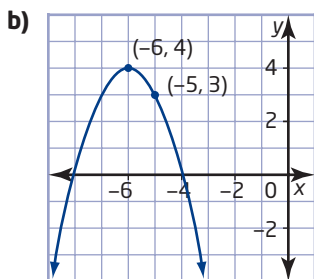
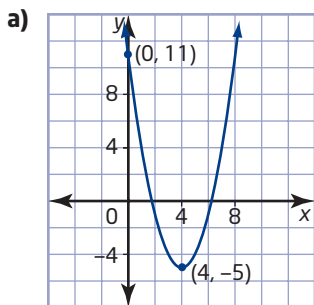
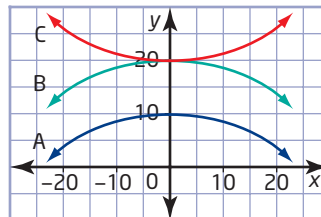


7. Write an equation for each parabola.



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.



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.

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.

- Sketch the path of the soccer ball.
- What is the maximum height of the ball?
- What is the horizontal distance when this occurs?
- What is the height of the ball at a horizontal distance of 20 m?
- 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)?