

# Writing Quadratic Equations



## KEY IDEA

### Writing Quadratic Equations

**Given a point and the vertex  $(h, k)$**

Use vertex form:

$$y = a(x - h)^2 + k$$

**Given a point and the  $x$ -intercepts  $p$  and  $q$**

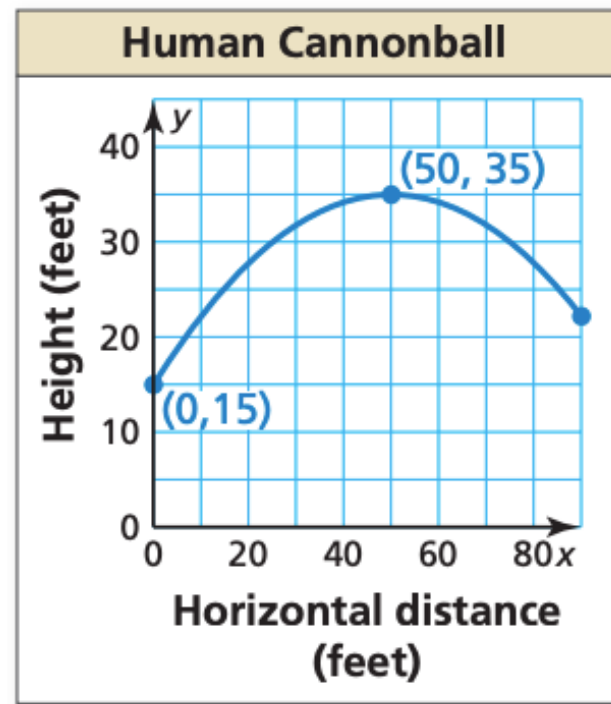
Use intercept form:

$$y = a(x - p)(x - q)$$

**Given three points**

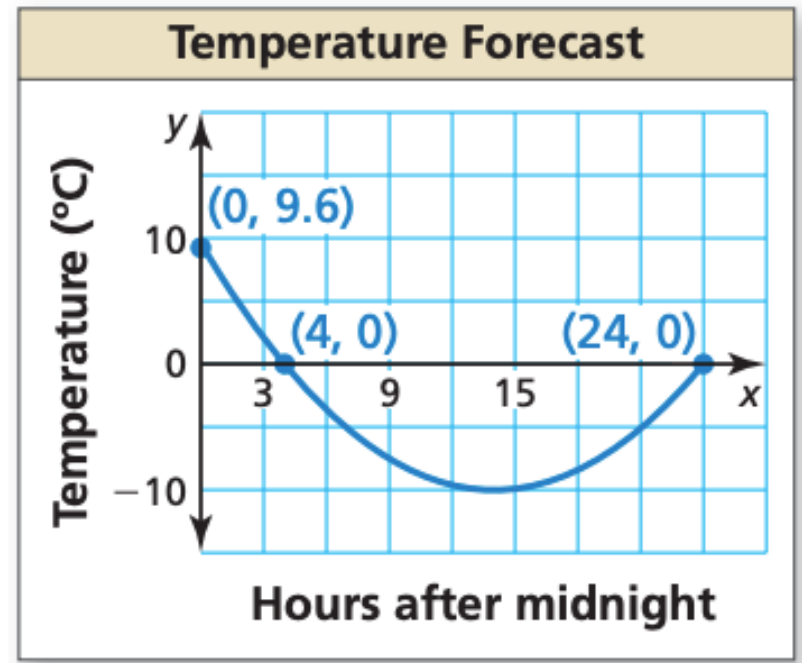
Write and solve a system of three equations in three variables.

The graph shows the parabolic path of a performer who is shot out of a cannon, where  $y$  is the height (in feet) and  $x$  is the horizontal distance traveled (in feet). The performer lands in a net 90 feet from the cannon. What is the height of the net?

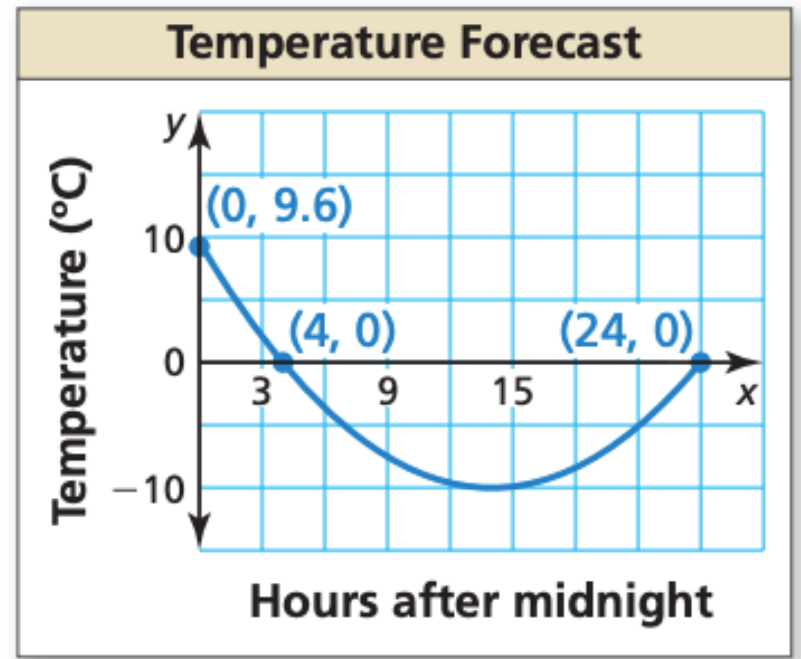


A meteorologist creates a parabola to predict the temperature tomorrow, where  $x$  is the number of hours after midnight and  $y$  is the temperature (in degrees Celsius).

a. Write a function  $f$  that models the temperature over time. What is the coldest temperature?



b. What is the average rate of change in temperature over the interval in which the temperature is decreasing? increasing? Compare the average rates of change.



NASA can create a weightless environment by flying a plane in parabolic paths. The table shows the heights  $h(t)$  (in feet) of a plane  $t$  seconds after starting the flight path. After about 20.8 seconds, passengers begin to experience a weightless environment. Write and evaluate a function to approximate the height at which this occurs.

<b>Time, <math>t</math></b>	<b>Height, <math>h(t)</math></b>
10	26,900
15	29,025
20	30,600
25	31,625
30	32,100
35	32,025
40	31,400

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