

Applications of Quadratic Functions

1. A pool is treated with a chemical to reduce the amount of algae. The amount of algae in the pool t days after the treatment can be approximated by the function $A(t) = 40t^2 - 300t + 500$.

- How many days after treatment will the pool have the no algae?
- How much algae is in the pool before treatments are started?
- How much less algae is in the pool after 1 day?

2. You toss a coin into the air with an initial speed of 2 meters per second into a well that is 30 meters deep. You toss the coin up into the air from a height of 3 meters. When will the coin hit the bottom of the well? (Hint: $a = -4.9 \text{ m/s}^2$)

3. Kim is drafting the windows for a new building. Their shape can be modeled by the function $h(w) = -w^2 + 4$, where $h(w)$ is the height and w is the width of points on the window frame, measured in meters.

- Find the width of each window at its base.
- Find the width of each window when the height is 3 meters.
- What is the height of the window when the width is 1 meter?

4. The cost, $C(x)$, in dollars of building x units per day is given by the equation $C(x) = 0.4(x - 25)^2 + 150$.

- How many units should your company manufacture to minimize the cost?
- What is the minimum cost?
- Determine the cost of building 45 units.

5. Your backyard borders a river so you will only need to fence in three sides. You buy 80 meters of fencing and need to use all of the materials. What dimensions will maximize the area of your backyard and what is the maximum area?

6. A horizontal bridge is in the shape of a parabolic arch. What is the height, $h(t)$, of the arch 2 feet from the shore?

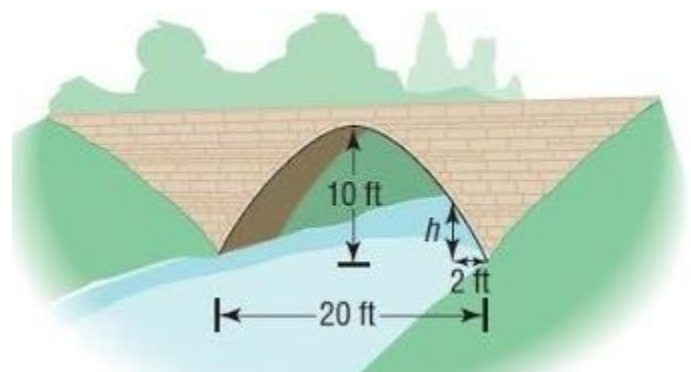
Step 1: What is the vertex?

Step 2: What another point on the parabola?

Step 3. Write an equation in vertex form using the vertex and the point.

Solve for a

Step 4. Now that you have an equation, use DESMOS to determine the height of the arch 2 feet from the shore.



Determine if the triangles are similar. If they are similar, write a similarity statement. Be sure to show all necessary work.

<p>7.</p>	<p>8.</p>	<p>9.</p>
<p>10.</p>	<p>11.</p>	<p>12.</p>
<p>13.</p>	<p>14.</p>	<p>15.</p>

16. $\triangle ABC$ is dilated by a scale factor of $\frac{2}{3}$ about the origin. $A(12, -2), B(0, 0), C(2, -4)$. Complete the following statements.

a. The dilation is an (enlargement or reduction).

b. \overline{AB} is (collinear or parallel) to $\overline{A'B'}$.

c. \overline{BC} is (collinear or parallel) to $\overline{B'C'}$.

d. \overline{AC} is (collinear or parallel) to $\overline{A'C'}$.

e. If $m\angle ACB = 105^\circ$, find $m\angle A'C'B'$?