EXPLORATION

9-6 Modeling Real-World Data

For an object dropped from a height of x feet, the function $y = \frac{\sqrt{x}}{4}$ can be used to approximate the time in seconds that will pass before the object reaches the ground.

1. The table shows the heights of various objects. Complete the table by finding the time that passes before the object reaches the ground.

Height x	16	64	144	256	400	576
Time y						

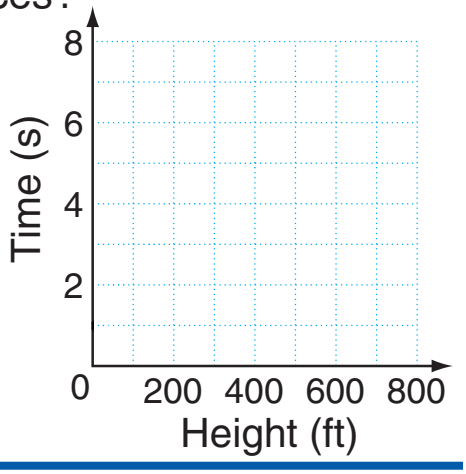
2. What do you notice about the times?

3. Find the first differences and second differences of the heights.

4. What do you notice about the differences?

5. Plot the data points on a coordinate plane.

6. Describe the general shape of the graphed data.



THINK AND DISCUSS

7. **Describe** the parent function that best models this data set.

8. **Explain** how you can recognize a square-root function from a table of values.

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1. The table shows the heights of various objects. Complete the table by finding the time that passes before the object reaches the ground.

Height x	16	64	144	256	400	576
Time y	1	2	3	4	5	6

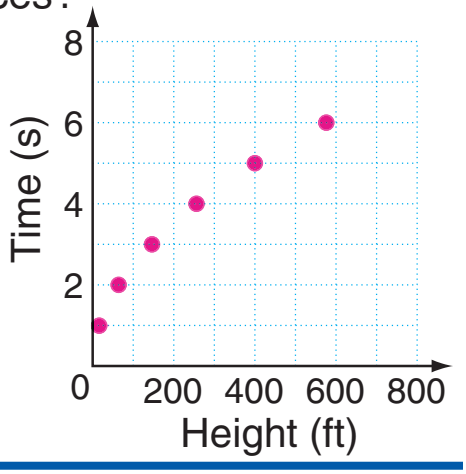
2. What do you notice about the times? The times are evenly spaced.

3. Find the first differences and second differences of the heights. first differences: 48, 80, 112, 144, 176; second differences: 32, 32, 32, 32

4. What do you notice about the differences?
The second differences are constant.

5. Plot the data points on a coordinate plane.

6. Describe the general shape of the graphed data.



THINK AND DISCUSS

7. **Describe** the parent function that best models this data set.

8. **Explain** how you can recognize a square-root function from a table of values.

6. The graph has a shape similar to a square-root function.
7. $f(x) = \sqrt{x}$
8. There are constant second differences between the x-values for evenly spaced y-values.