

# Coaster Track

NAME \_\_\_\_\_



The Top Thrill Dragster at Cedar Point Amusement Park in Sandusky, Ohio, was built in 2003 and is one of the longest and tallest roller coasters in the world.

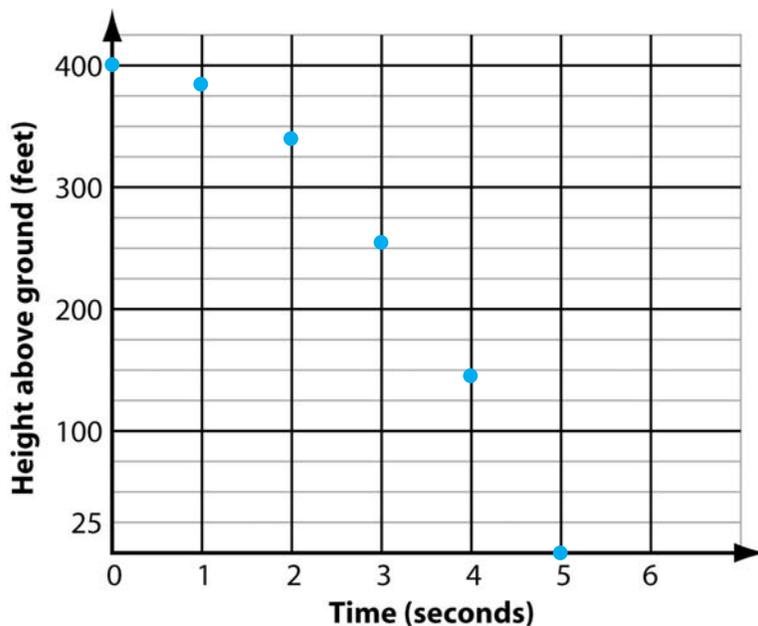
Use the following function to determine the height of the Top Thrill Dragster as it descends through its tallest drop. The variable  $h$  represents the height above ground (in feet), and  $t$  represents the time the coaster has been falling (in seconds).

$$h = 400 - 16t^2$$

1. Create a table of values to determine how long it takes the Top Thrill Dragster to reach the bottom. Show your work in the table. Write the data as an ordered pair.

TIME ( $t$ )	SUBSTITUTE INTO EQUATION	HEIGHT ABOVE GROUND ( $h$ )	ORDERED PAIR ( $t, h$ )
0	$h = 400 - 16(0)^2$	400	(0, 400)
1	$h = 400 - 16(1)^2$	384	(1, 384)
2	$h = 400 - 16(2)^2$	336	(2, 336)
3	$h = 400 - 16(3)^2$	256	(3, 256)
4	$h = 400 - 16(4)^2$	144	(4, 144)
5	$h = 400 - 16(5)^2$	0	(5, 0)

2. Graph the ordered pairs below.



3. What is the height of the coaster before it begins to drop? How do you know?

400 feet. The first point plotted on the graph occurs at (0, 400), indicating that the height of the coaster is 400 feet at 0 seconds.

4. After how many seconds does the Top Thrill Dragster reach the bottom? How do you know?

5 seconds. The last point plotted on the graph occurs at (5, 0), indicating that a height of 0 feet is reached at 5 seconds.

5. Determine the average velocity of the Top Thrill Dragster using the function below.

$$V = \frac{\Delta h}{\Delta t}$$

In this equation,  $V$  represents the velocity,  $\Delta h$  is the height of the drop, and  $\Delta t$  is the time it takes the coaster to reach the bottom.

$\Delta h = 400 - 0 = 400$  feet, and  $\Delta t = 5 - 0 = 5$  seconds, so  $V = 80$  feet per second.