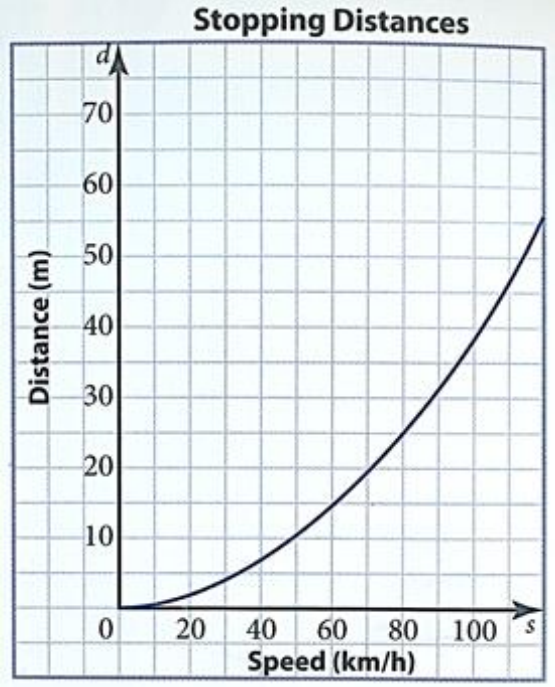
Quadratic Models



1. Describe the relationship between stopping distance and speed.

2. Use the graph to estimate the stopping distance at 50 km/h and at 100 km/h.

3. If the speed doubles, does the stopping distance double? If not, describe the change in the stopping distance when the speed doubles. Be sure to use multiple points.

4. Consider the rate of change of stopping distance with respect to speed. What are appropriate units for this rate of change?

5. Is the rate of change of stopping distance with respect to speed increasing, constant, or decreasing? Justify your answer.

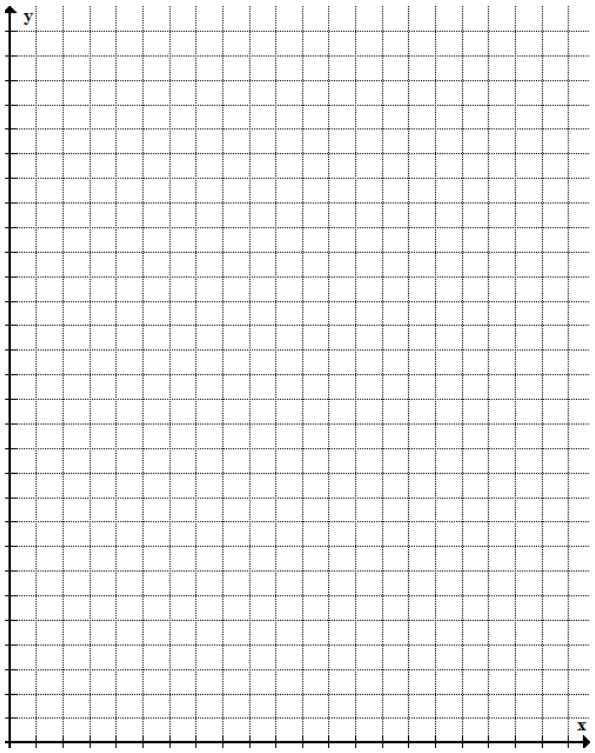
Time (s)	Distance (m)
0.0	0.0
0.2	0.2
0.4	0.8
0.6	1.8
0.8	3.2
1.0	5.0
1.2	7.2
1.4	9.8
1.6	12.8
1.8	16.2
2.0	20.0
2.2	24.2
2.4	28.8
2.6	33.6

The table to the left shows distance and time data for a free-fall ride at an amusement park.

1. Does the time column show equal intervals? If yes, what are they?

2. Does the distance column seem to model a linear relation? Explain your answer.

3. Determine the first differences of the table. Do the first difference imply an increasing, decreasing or constant rate of change with respect to time?



4. Calculate and record the second differences. What do you notice? What do you think this means?

5. Create a scatter plot with time on the horizontal axis and distance on the vertical axis. What does your graph suggest about this relationship?