

Student Activity: Braking Distance

Overview: Students can develop an understanding of quadratic functions with real-world examples.

Objective: **Mathematical Models with Applications TEKS:**
1B, 2A

Terms: Quadratic function, second differences, and function notation $f(x)$

Materials: Graphing calculator

Procedures: Pair students for this activity.

Activity: Finding a Quadratic

1. Discuss the braking/distance speed model. Use guess and check to solve for a in each case.

Speed	Braking Distance
10	$8 = .08 (10)^2$
20	$20 = .05 (20)^2$
30	$55 = .06111 (30)^2$
40	$100 = .0625 (40)^2$
50	$160 = .05 (50)^2$
60	$220 = .064 (60)^2$
70	290
80	375
x	$y = ax^2 = .06 x^2$

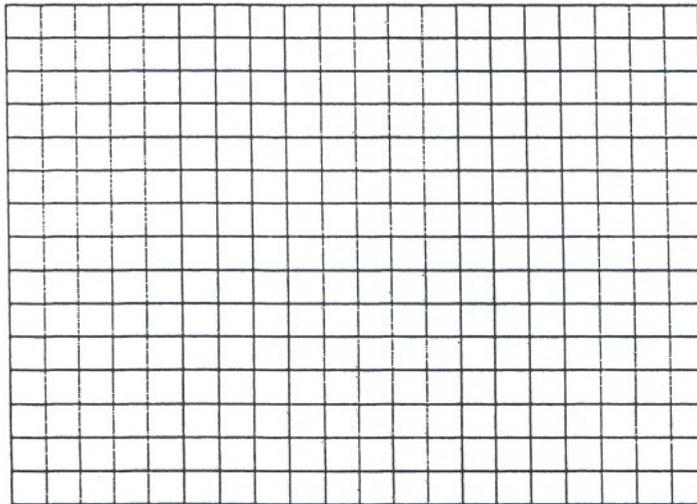
2. Refine the model on your calculator.

Braking Distance

1. The table shows the data collected in a braking distance/speed experiment.

Speed (mph)	Braking Distance (feet)
10	$8=a(10)^2$
20	$20=a(20)^2$
30	$55=a(30)^2$
40	$100=a(40)^2$
50	$160=a(50)^2$
60	$220=a(60)^2$
70	$290=a(70)^2$
80	$375=a(80)^2$
x	$y=ax^2$

a. Sketch a graph on the grid provided. Label your axes including units.



b. Compute a in each case.

2. Make a scatter plot and refine $f(x) = ax^2$ to fit the data. Begin with the model $y = x^2$, and adjust a in $y = ax^2$ to fit the data.