2.02 Curve of Best Fit Additional Practice Key

# Heading 1

**Solve the problems below. Then, compare your answers and work to the 2.02 Curve of Best Fit Additional Practice Key.**

1. Find the standard form of a quadratic equation that has a vertex (−2, 5) and passes through the point (1, 6).



The standard form of a quadratic equation is **y = a(x – h)² + k**, so we substitute the values given into this equation.

 Vertex (h, k) = (−2, 5)

 Point (x, y) = (1, 6)

 6 = a(1 – (–2))**² +** 5

 Simplify: 6 = a(3)² + 5

 Simplify: 1 = 9a

 $a=\frac{1}{9}$

Using the vertex and the value of a, write the quadratic equation.

 y = $\frac{1}{9}$ (x + 2)² + 5

2. Write a quadratic function that has x-intercepts (1, 0 ) and (5, 0) and passes through the point (–1, 8).



Use the intercept form of a quadratic function: y = a(x – p)(x – q) and substitute the given values into the equation.

 X-intercepts: p = 1 and q = 5

 Point: (x, y) = (–1, 8)

 8 = a(–1 – 1)(–1 – 5)

 8 = a(–2)( –6)

8 = 12a

a = $\frac{8}{12} $=$ \frac{2}{3}$

Using the x-intercepts and the value of a, write the quadratic equation.

 y = $\frac{2}{3}$ (x – 1)(x – 5)

3. The results in the table show the results of a study conducted to compare the speed in miles per hour to the fuel economy in miles per gallon. Find a quadratic model for the data.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Speed | 20 | 30 | 40 | 50 | 60 | 70 |
| Fuel economy | 22 | 28 | 30 | 32 | 31 | 29 |

Insert these as **List L1** and **List L2** in your calculator or TI-83 simulator.

Next make a **scatterplot** of these points on your calculator. Sketch your graph below.



Use the **quadratic regression** feature on your calculator to find the quadratic equation for the best fit to the data.

When you hit **Enter**, your screen should look like this:



Hit **Enter** again.

Now your screen will look like this:



The quadratic equation is found by substituting in the values for a, b, and c. Round your answers to three decimal places.

 y = −.009x² + .967x + 6.657

Click **Y=** on your calculator and type this equation in **Y1**. Then Click **GRAPH**.

Your graph should look like this:



Notice that the quadratic equation is close to all the points. This means the equation is a good representation of the data.