Just In Time Quick Check
Standard of Learning (SOL) A.9

Strand: Statistics

Standard of Learning (SOL) A.9

The student will collect and analyze data, determine the equation of the curve of best fit in order to make predictions, and solve practical problems, using mathematical models of linear and quadratic functions.

Grade Level Skills:

- Determine an equation of a curve of best fit, using a graphing utility, given a set of no more than twenty data points in a table, a graph, or a practical situation.
- Make predictions, using data, scatterplots, or the equation of the curve of best fit.
- Solve practical problems involving an equation of the curve of best fit.
- Evaluate the reasonableness of a mathematical model of a practical situation.

Just in Time Quick Check

Just in Time Quick Check Teacher Notes

Supporting Resources:

- VDOE Mathematics Instructional Plans (MIPS)
  - A.9 Curve of Best Fit 1 with Desmos / (PDF)
  - A.9 Curve of Best Fit 2 / (PDF)
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- VDOE Word Wall Cards: Algebra I (Word) | (PDF)
  - Scatterplot
  - Positive Linear Relationship
  - Negative Linear Relationship
  - No Linear Relationship
  - Curve of Best Fit (linear)
  - Curve of Best Fit (quadratic)
  - Outlier Data (graphic)
- Desmos Activities
  - 400 Meter Modeling
  - Charge!
  - Commuting Times
  - Line of Best Fit
  - Line of Best Fit "Games"
  - Penny Circle

Supporting and Prerequisite SOL: A.1b, A.6a, A.6b, A.6c, A.7f, 8.13a, 8.13b, 8.13c, 8.14a, 8.16a, 8.16d, 8.16e, 7.10e, 7.11

SOL A.9 - Just in Time Quick Check

1. The table shows the horizontal distance, *y*, (in feet) traveled by a baseball hit at various angles, *x*. Write the equation for the curve of best fit rounded to the nearest hundredths.

x (degrees)	*y* (feet)
15	157.2
20	189.2
24	220.8
30	253.8
34	269.2
40	284.8
45	285.0

2. A diver jumps off a high dive into the water. The table represents the time (in seconds from when his feet leave the platform to when he lands in the water) and the height (in feet) of a diver throughout his jump off the high dive.

Time (seconds)	Height (feet)
0	6
0.3	6.4
0.5	6.7
0.92	6.5
1.01	6.3
1.4	5.6
1.7	4.8
2	4.1

Use the equation of the quadratic curve of best fit to find the approximate height of the diver at 2.1 seconds. Round your answer to the nearest tenth.

3. The table shows the number of people (in millions) who cast a ballot in the U.S. Presidential election. Using the equation for the line of best fit, in which year would we expect to have 2.5 million voters?

Year	1988	1992	1996	2000	2004	2008
Voters	1.74	1.82	1.89	1.97	2.19	2.29

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Common Errors/Misconceptions and their Possible Indications

1. The table shows the horizontal distance, *y*, (in feet) traveled by a baseball hit at various angles, *x*. Write the equation for the curve of best fit rounded to the nearest hundredths.

x (degrees)	*y* (feet)
15	157.2
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34	269.2
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45	285.0

A common misconception is some students may write a linear equation for the given data. This indicates they may need help visualizing the quadratic function. Teachers may want to have students graph the points on paper or use Desmos to model the graph of the points in the table to help visually identify a quadratic curve. Also, have students practice setting an appropriate window with a graphing calculator so they can fully see how the function behaves.

2. A diver jumps off a high dive into the water. The table represents the time (in seconds from when his feet leave the platform to when he lands in the water) and the height (in feet) of a diver throughout his jump off the high dive.

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Use the equation of the quadratic curve of best fit to find the height of the diver at 2.1 sec. Round your answer to the nearest tenth.

A common misconception some students may make is a rounding error during the intermediate step of writing the equation for the curve of best fit. This may indicate they need a review of rounding. One strategy to help students understand the impact of rounding errors may be to demonstrate how rounding differently when writing the equation can affect the final answer. Using Desmos may help students visualize the height of the diver at 2.1 seconds.

3. The table shows the number of people (in millions) who cast a ballot in the U.S. Presidential election. Using the equation for the line of best fit, in which year would we expect to have 2.5 million voters?

Year	1988	1992	1996	2000	2004	2008
Voters	1.74	1.82	1.89	1.97	2.19	2.29

A common misconception is students may struggle with finding the year, x, when given the voters, y. This type of common error might indicate students need to review how to substitute a value in a given equation and then solve for the missing variable. One strategy to use would be to reread the question and check your final answer for reasonableness.