

Module 1 DCA, standard S.ID.6 Review

1) The table the population for a small town for each year from 2003 to 2010.

Year	2003	2004	2005	2006	2007	2008	2009	2010
Population	21,359	22,906	22,542	23,048	23,562	23,609	24,008	24,716

Let x represent the years since 2003.

a. Use Desmos.com to determine a linear regression equation for the data. Round the slope and y-intercept to the nearest whole number.

Equation: $y = 390x + 21,855$

b. Predict the population in 2020. Show your work, and explain your reasoning.

Answer: 28,485 people Work: $390(17) + 21,855$

Explanation: 2020 is 17 years after 2003. Since years are my x-values, I substituted 17 for x and calculated y .

2) Gandalf and Galadriel each drew a regression line to model a set of data. They both recorded the vertical distances between each point and the regression line. Both students believe they drew the least square regression line. Who is correct? Justify your choice.

Gandalf's vertical distances: 2, 3, 3, 3, 4

Galadriel's vertical distances: 1, 2, 2, 3, 7

$$2^2 + 3^2 + 3^2 + 3^2 + 4^2 = 47$$

$$1^2 + 2^2 + 2^2 + 3^2 + 7^2 = 67$$

Who is correct? Gandalf.

Why? When I calculated the sum of the squares, his was 47 & Galadriel's was 67. So, he had the least squares.

3) The weekly sales of an album have increased since it was first sold at a music store 6 weeks ago. The linear regression equation describing the change is $y = 1.9x + 13.3$, where x represents the week and y represents the number of albums sold per week.

a. Complete the table to determine the residuals for the number of albums sold per week.

Do not round your answers. Show your work.

Week	Number of Albums Sold	Predicted Number of Albums Sold	Residual Value
0	13	13.3	-0.3
1	16	15.2	0.8
2	17	17.1	-0.1
3	18	19	-1
4	21	20.9	0.1
5	23	22.8	0.2

$1.9(0) + 13.3, 13 - 13.3$
 $1.9(1) + 13.3, 16 - 15.2$
 $1.9(2) + 13.3, 17 - 17.1$
 $1.9(3) + 13.3, 18 - 19$
 $1.9(4) + 13.3, 21 - 20.9$
 $1.9(5) + 13.3, 23 - 22.8$

b. Construct a residual plot of the data.

