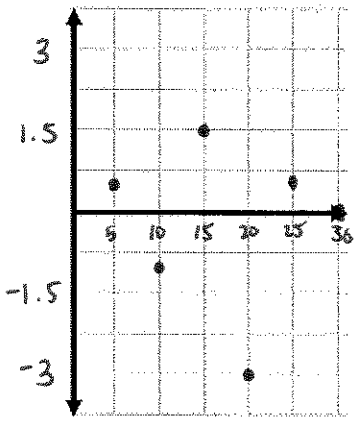
Accelerated Coordinate Algebra Name ANSWERS

Residual Plots Worksheet

Complete each table using the given linear regression (Round answers to one decimal place). Construct a residual plot.

1. Linear regression equation: y = 0.5x

x	y	Predicted Value	Residual Value
5	3	2.5	0.5
10	4	5	-1
15	9	7.5	1.5
20	7	10	-3
25	13	12.5	0.5
30	15	15	0

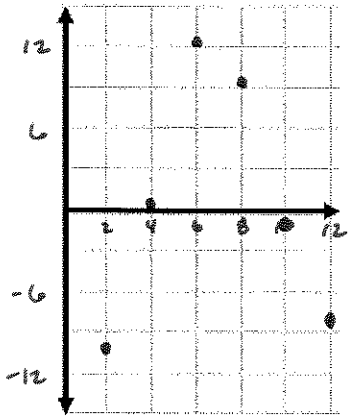


Does the residual plot suggest a linear relationship? Explain.

YES, NO CURVED PATTERN

2. Linear regression equation: y = -0.4x + 16.3

x	y	Predicted Value	Residual Value
2	5	15.5	-10.5
4	15	14.7	0.3
6	26	13.9	12.1
8	23	13.1	9.9
10	11	12.3	-1.3
12	3	11.5	-8.5

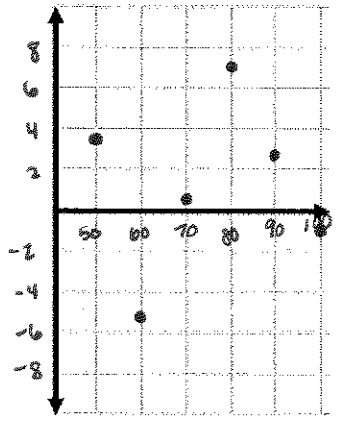


Does the residual plot suggest a linear relationship? Explain.

NO, THERE IS A CURVED (U-SHAPED) PATTERN

3. Linear regression equation: y = 4.9x + 16.4

x	y	Predicted Value	Residual Value
100	505	506.4	-1.4
90	460	457.4	2.6
80	415	408.4	6.6
70	360	359.4	.6
60	305	310.4	-5.4
50	265	261.4	3.6



Does the residual plot suggest a linear relationship? Explain.

YES, NO CURVED SHAPE PATTERN

4. The table shows the percent of the United States population who did not receive needed dental care services due to cost. Find the linear regression equations. Construct a residual plot to analyze the linear regression model.

$y = 0.512x + 7.541$

Year	1999 (0)	2000 (1)	2001 (2)	2002 (3)	2003 (4)	2004 (5)	2005 (6)	2006 (7)	2007 (8)	2008 (9)	2009 (10)
Percent	7.9	8.1	8.7	8.6	9.2	10.7	10.7	10.8	10.5	12.6	13.3
PREDICTED	7.5	8.1	8.6	9.1	9.6	10.1	10.6	11.1	11.6	12.1	12.7
RESIDUAL	0.4	0	0.1	-0.5	-0.4	0.6	0.1	-0.3	-1.1	0.5	0.6

5. The following is the duration of the eruption (in minutes) of Old Faithful and the interval between eruptions. The National Park Service wants to predict the time between eruptions based on the duration of each eruption. Calculate the least squares regression line to find a model comparing the duration of the eruption to the interval between eruptions. Construct a residula plot to analyze the linear regression model.

$y = 12.902x + 31.604$

Duration	1.4	2.1	2.6	3.2	3.4	4	4.3	4.9
Interval	51	58	65	71	76	82	89	95
PREDICTED	49.7	58.7	65.1	72.9	75.5	83.2	87.1	94.8
RESIDUAL	1.3	-0.7	-0.1	-1.9	0.5	-1.2	1.9	0.2

6. An experiment was conducted in which a colony of bacteria was exposed to X-rays. The number of surviving bacteria (in hundreds) is shown for time periods up to 15 min. Find the linear regression equations. Construct a residual plot to analyze the linear regression model.

$y = -23.020x + 302.458$

Time	Number	PREDICTED	RESIDUAL
1	355	279.4	75.6
4	166	210.4	-44.4
7	104	141.3	-37.3
9	56	95.3	-39.3
11	36	49.2	-13.2
12	32	26.2	5.8
15	10	3.2	6.8

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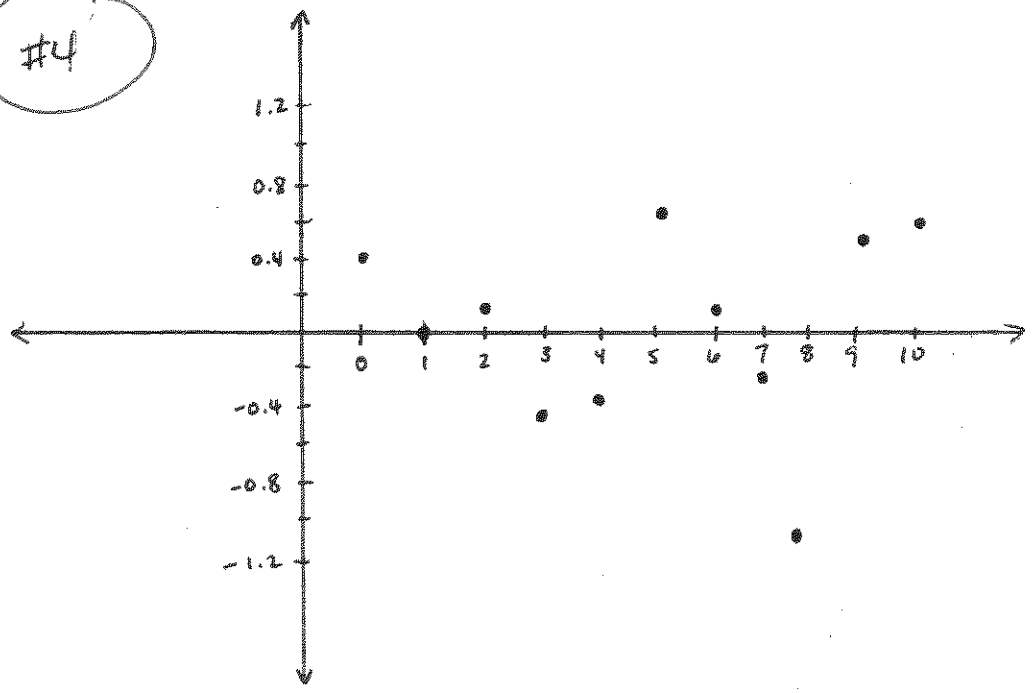
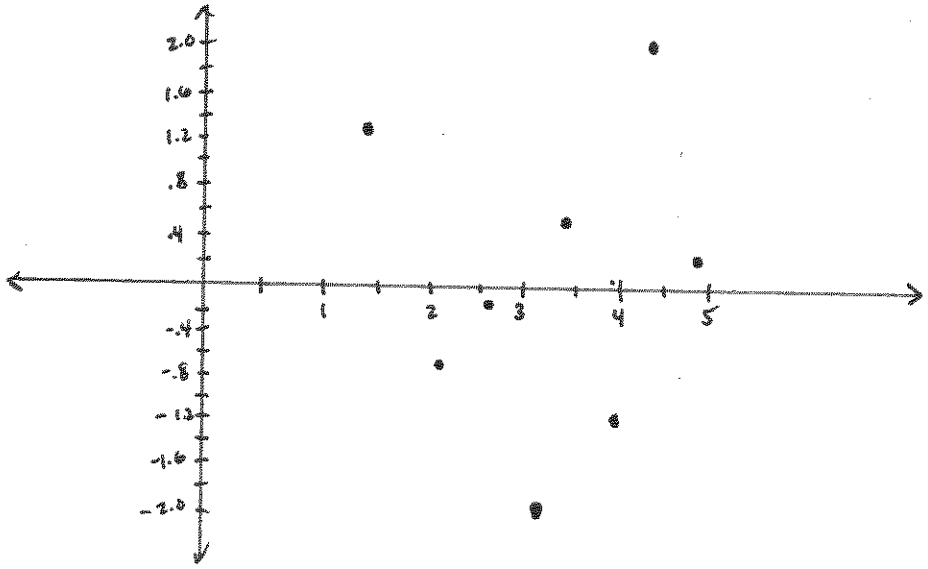

1.2
0.8
0.4
-0.4
-0.8
-1.2
0
1
2
3
4
5
6
7
8
9
10

#5


2.0
1.6
1.2
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-.8
-1.2
-1.6
-2.0
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2
3
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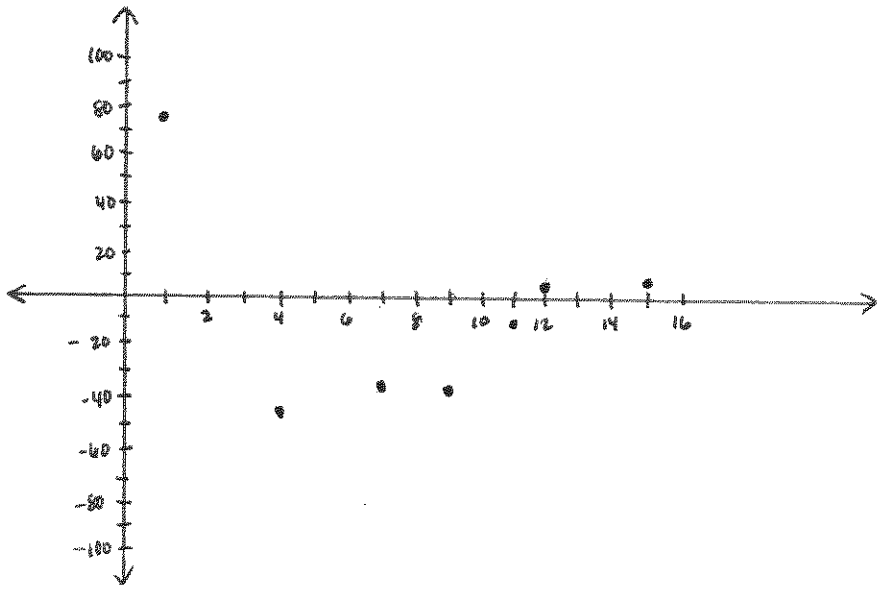
5

#6


100
80
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-20
-40
-60
-80
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4
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8
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16