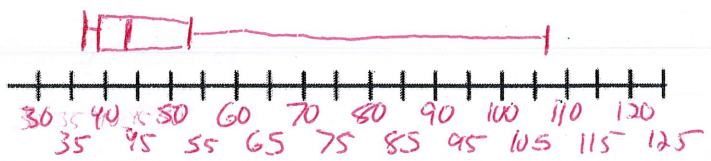
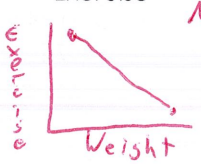
GSE Algebra I | Unit 6 – Describing Data | 6.7 - Study Guide

Name: Key | Date: _____

Use the following to review for you test. Work the Practice Problems on a separate sheet of paper.

What you need to know & be able to do	Things to remember	Problem	Problem
Central Tendency	• Mean • Median • Mode	**1.** 36, 39, 58, 42, 106, 39, 48, 45 $\bar{x} = 51.63$ Med = 43.5 Mode = 39	**2.** 50, 55, 60, 58, 62, 57, 68, 51, 63 $\bar{x} = 58.22$ Med = 58 Mode = None
Measures of Spread	• Q1 • Q3 • IQR • Minimum • Maximum • Range • MAD	**3.** (Use the same #s from 1) $Q_1 = 39$ Range = 70 $Q_3 = 53$ MAD = 15.19 IQR = 14 (see attached) Min = 36 Max = 106	**4.** (Use the same #s from 2) $Q_1 = 53$ Range = 18 $Q_3 = 62.5$ MAD = 4.47 IQR = 9.5 (see attached) Min = 50 Max = 68
Box-and-Whisker Plot and Outliers	• First dot: Min • First Line: Q1 • Middle Line: Median • Third Line: Q3 • Last dot: Max • Outlier: Q1 – 1.5(IQR) Q3 + 1.5(IQR)	**5.** Using the data from #1 & 3, construct a box and whisker plot.  30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120 125 **6.** Are there any outliers? Show your work! $39 - 1.5(14) = 18$ $53 + 1.5(14) = 74$ 106 > 74, so 74 is an outlier	
Correlation vs. Causation	• Positive: Both items are increasing/decreasing • Negative: one item increases as the other decreases • No Correlation: No relationship • Causation: One item causes the other.	**7.** Practicing Free Throws vs. Free Throw Percentage  Throws / Practice Positive, Probably Causation	**8.** Colors of the Sky vs. Time of Day No correlation, No causation
		9. Weight vs. Amount of Exercise  Exercise / Weight Negative, Possible Causation	**10.** Number of Followers on Twitter vs. Number of Friends on Facebook No correlation, No causation

Linear Regression

- $y = ax + b$
- r = correlation coefficient (if close to 0 bad fit; if close to 1 or -1 good fit.)

11. Determine the line of best fit. Is this model a good fit for the data?

$y = -13.72x + 130.28$

Price	4.00	5.50	3.50	8.00	5.50	7.00
# of Sandwiches	68	55	85	22	64	28

$r^2 = .94$ so it's a good fit

Quadratic Regression

Data Data 4 (clear)

Type in new data

2nd Data Quadratic Reg

Change to YES

Write your equation in Standard Form

To PREDICT values use f(on the TABLE button

The amount of medication in a patient's bloodstream varies over time. The table below shows the concentration of a certain medication in milligrams per liter at various time intervals after being administered.

Time (minutes)	0	30	60	90	120	150
Concentration (mg/L)	0	39.02	49.93	42.34	25.06	7.78

15. What is the quadratic regression model? Write in Standard Form and round to 4 decimal places.

$y = -0.0078x^2 + 1.1633x + 4.6421$

16. Predict the concentration of the medicine at 12 hours (720 minutes).

$f(720) = -3213.01$ mg/L, so 0 mg/L since the amount of medicine cannot be negative

Exponential Regression

- $y = a(b)^x$
- r = correlation coefficient (if close to 0 bad fit; if close to 1 or -1 then good fit.)

12. Determine the exponential regression model. Is this model a good fit for the data?

Year	0	2	4	7
Revenue	3	4	11	25

$y = 2.68(1.38)^x$ $r^2 = .9691$, so yes,

Probability

- Joint Probability: Individual Cell/Table Total
- Marginal Probability: Row or Column Total/ Table Total
- Conditional Probability: Individual Cell/Row or Column Total

Complete the table to answer the following questions.

	Football	Basketball	Soccer	Totals
Males	48	35	17	100
Females	22	38	40	100
Totals	70	73	57	200

13. What is the probability that a randomly chosen person is a female and likes soccer? $\frac{40}{200} = .2$

14. What is the probability that someone likes basketball? $\frac{73}{200} = .37$

15. Given that a person likes football, what is the probability they are male?

$\frac{48}{70} = 0.69$

#3) IQR = 53 - 39 = 14

Range = 106 - 36 = 70

MAD

pt. 1) $\bar{x} = 51.63$

pt 2) 15.63, 12.63, 6.37, 9.63, 54.37, 12.63, 3.63, 6.63

pt 3) $\frac{121.52}{8} = 15.19$

#4) IQR = 62.5 - 53 = 9.5

Range = 68 - 50 = 18

MAD

pt 1) $\bar{x} = 58.22$

pt. 2) 8.22, 3.22, 1.78, 0.22, 3.78, 1.22, 9.78, 7.22, 4.78

pt 3) $\frac{40.22}{9} \approx 4.47$