

Name: _____ Period _____ Date: _____

Algebra 1 - Fall Final Review

This review packet is due at the beginning of your final exam.

In addition to this packet, you should study each of your unit reviews and your notes. For extra practice, you could even redo some problems from the reviews. Your grade is up to YOU!

Part 1

1. Simplify: $2x^3 - 7 + 4x^2 + 6x - 7x^2 + 3 + 4x^3$

2. Add: a. $(2y^2 - 4y + 3) + (6y - 1)$

b. $(3a^2 + 4a - 3) + (6a^2 - 3a + 7)$

3. Subtract: a. $(5x^2 + x - 7) - (-9x^2 - 4x + 2)$

b. $(7a^2 + 3a - 9) - (4a^2 - 6a - 10)$

4. Multiply: $-6x^2(3x^2 - 4x + 8)$

5. Multiply: $(5r - 3)(r + 2)$

6. Multiply: $(x - 2)(3x + 4)$

7. Write the degree of each expression below:

a. $(x - 2)(x + 3)$

b. $2x^3 - x^4 + 8$

c. $3x^2 - 7$

d. $4x^3 - 4^5 + x$

8. Evaluate $2x^3 - 3x + 1$ for:

a. $x = 2$

b. $x = -2$

9. Simplify the following exponent problems, leaving answers with positive exponents:

a. $(3x^3y^{-4})^2$

b. $(-2a^{-5}b^2)^4$

c. $4x^{-2}y^3 \cdot 2x^7y^3z^0$

d. $-6ab^{-6}c \cdot 5a^{-1}bc^4$

e. $\frac{3x^{-4}y^{-4} \cdot 2x^0y^{-4}}{2x^4}$

f. $\frac{u^4v^3}{4uv^4 \cdot 4vu^2}$

g. $\frac{3xy^2}{y^3 \cdot 3y^2x^4}$

10. Identify the properties shown below:

a. $x + (y + z) = (x + y) + z$

b. $m + n = n + m$

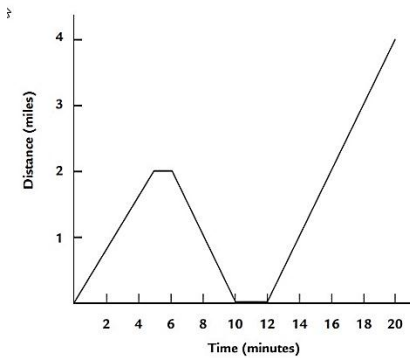
c. $xy = yx$

d. $(pq)r = p(qr)$

e. $x(m + n) = xm + xn$

11. Use the graph below to tell a story about how your drive to school went.

What is the average rate of change in miles per minute between 6 and 10 minutes?

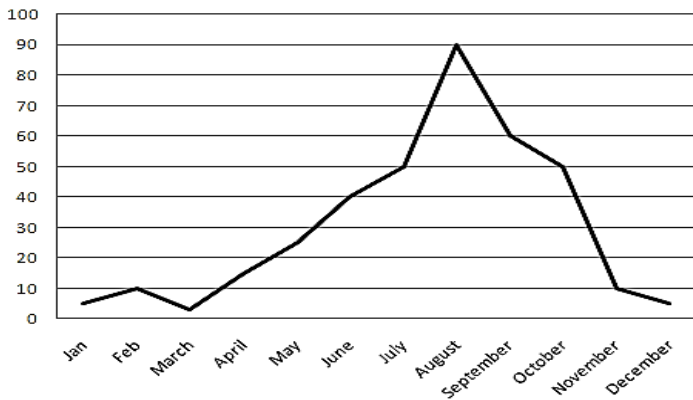


12. This chart shows the cost of Apple Stock at various times during the day. What is the average rate of change in cost per hour between 1pm and 5pm?

Time	Cost of Apple Stock (\$)
8 am	50.50
10 am	55.00
1pm	53.40
3 pm	51.75
5 pm	53.00

Use the following graph for #13-17.

Average Monthly Precipitation (in Inches)



13. Between which two months was there the most negative rate of change?

14. What is the rate of change between July and August?

15. Which month(s) had the greatest amount of rain?

16. On average, how many inches of rain does October get?

17. Name two months that have a similar amount of rain.

Part 2

Solve the following equations for x .

1. $2x - 5 = -43$

2. $\frac{2}{3}x - 7 = \frac{1}{12}$

3. $\frac{x}{5} = \frac{x+6}{10}$

4. $-93 = 2(6x+1)+1$

5. $5(x+8) - 7 = 103$

6. $5a + 2 = 6 - 7a$

7. $3(3m-2) = 2(3m+3)$

8. $5[2 - 3(4 + 2x)] = -2(x - 3)$

9. Given $-2 < 7x - 2 < 3$, which of these is **not** a solution to the inequality?

a. $x = \frac{1}{2}$

b. $x = 1$

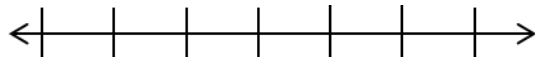
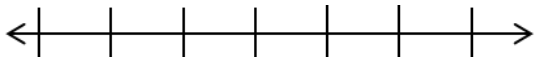
c. $x = \frac{1}{3}$

d. $x = \frac{1}{4}$

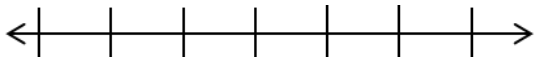
For 10 – 12: Solve, graph and write your answer in interval notation:

10. $-5x - 7 < 10x - 4$

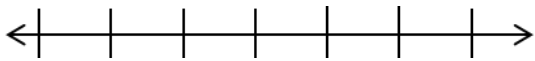
11. $-3(x + 4) \leq 6$



12. $x - 4 \leq 5$ or $3x > 36$



13. Draw a graph on a number line that represents the interval $(3, \infty)$?



14. Did you know that you can get a ticket for going too slow or too fast? On one stretch of road, you need to go 30 to 45 miles per hour to avoid a ticket. Write an inequality that describes this situation, where r represents the speed.

15. Solve each of the following literal equations for c .

a. $\frac{c}{b} - x = 2d$

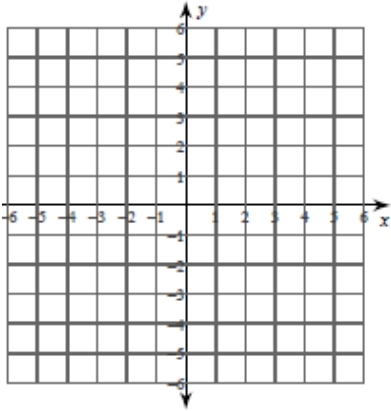
b. $ac + bd = x$

Part 3

Sketch the graph of the inequality or system of inequalities.

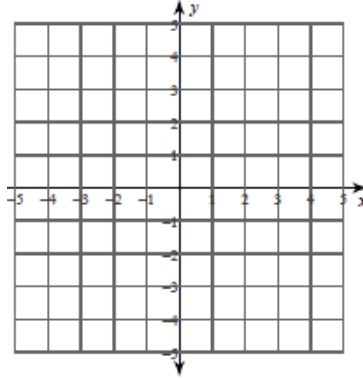
1.

$$y \geq 2x - 1$$



2.

$$\begin{cases} y < -3x - 1 \\ y \geq x + 3 \end{cases}$$



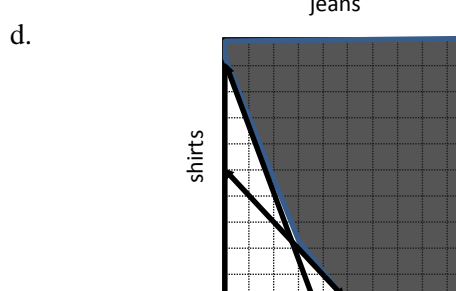
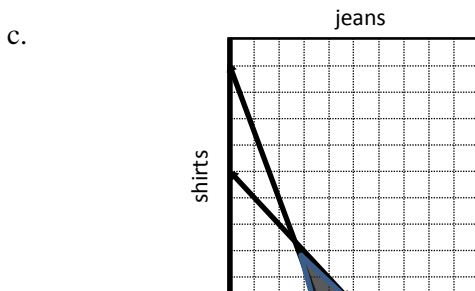
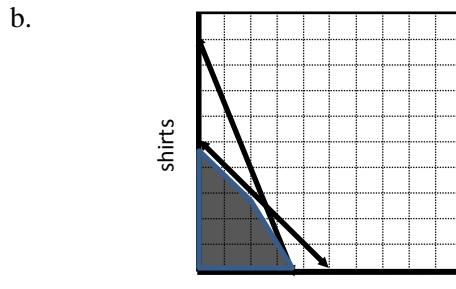
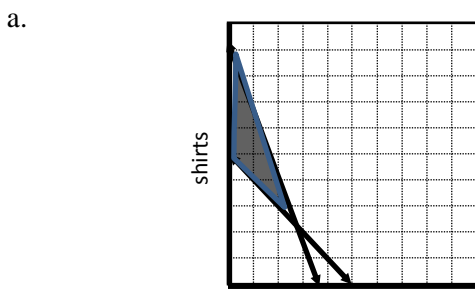
3. Describe the graph of the linear inequality: $y \leq -3x - 4$

For 4 and 5: You are buying jeans and t-shirts. Jeans cost \$35 and shirts cost \$15. You plan on spending no more than \$135 and getting at least 5 items.

4. Which of the following systems can be used to represent the above situation?

- a. $x + y \leq 5$
 $35x + 15y \leq 135$
- b. $x + y < 5$
 $35x + 15y > 135$
- c. $x + y \geq 5$
 $35x + 15y < 135$
- d. $x + y \geq 5$
 $35x + 15y \leq 135$

5. Which of the graphs below represent the set of possible solutions (#of jeans and # of shirts)?



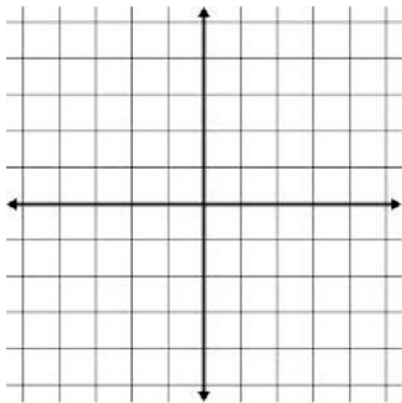
jeans

jeans

6 and 7: Solve the following systems by graphing:

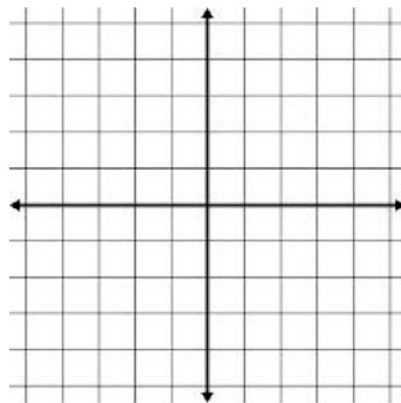
6. $y = 2x + 1$

$x = -2$



7. $y = -2x + 3$

$2x + y = 5$



8 and 9: Solve each system using substitution or elimination.

8. $2x + 5y = -16$
 $6x + y = -20$

9. $3x - 5y = 10$
 $-6x + 10y = -20$

10. Samantha is doing chores at home. She can vacuum a room for \$2 or wash and fold a load of laundry for \$3. One month she accomplished 25 chores and earned a total of \$64. Write a system of equations to model the situation, and then determine how many of each type of chore she did that month.

Write the equation of the line in point-slope form.

11. slope = -2 and goes through (5,6)

12. Goes through (-3,4) and (-6,17)

Write the equation of the line in slope-intercept form.

13. slope = $\frac{2}{3}$ and goes through (6,-1)

14. Goes through (1,-8) and (6,2)

Part 4

1. Which five statistics do we always use when creating a box plot?

2. Determine which of the following are true and which are false. Explain your conclusion.
 - a. Standard deviation is a measure of spread.

 - b. The smaller the standard deviation means the data is more spread out.

 - c. The IQR is calculated by subtracting the minimum from the maximum

 - d. The range of a set of data is always 100.

3. What is one advantage of graphically displaying data with a dot plot?

4. Determine which of the following are true and which are false. Explain your conclusion.
 - a. A box plot divides the distribution into $\frac{1}{4}$'s

 - b. Histograms do not retain the original data in the distribution.

 - c. A histogram will not be misleading even if the columns are not equal widths.

 - d. Box plots are a good graphical representation to use if there are outliers in the distribution because the median is resistant to outliers.

 - e. On a box plot, outliers are $1.5 \times \text{IQR}$ (or more) away from Q1 and Q3 – and are often marked with a star or asterisk.

5. What percentage of a given set of data is included from Q1 to Q3? From Q1 to max?

6. If you collect data on the number of hours spent studying, and your standard deviation is 2.6 hours, how would the standard deviation change if every person studied an extra 3 hours?

7. One hundred people were interviewed and classified according to their attitude toward small cars and their personality type. Answer questions #22-26 using the results shown in the table below.

		Personality Type		Total
		Type A	Type B	
Attitude Toward Small Cars	Positive		12	37
	Neutral	11	9	20
	Negative	24		43
	Total	60	40	100

a. Fill in the empty boxes.

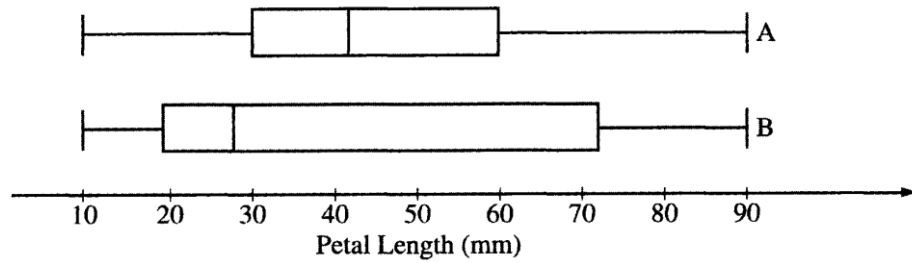
b. How many of those surveyed have a positive attitude toward small cars?

c. What proportion of those surveyed have a positive attitude towards small cars?

d. Given someone is Type A, what is the conditional relative frequency that represents the people with a neutral attitude towards small cars?

e. Given someone is negative towards small cars, what is the conditional relative frequency that they are a Type A personality?

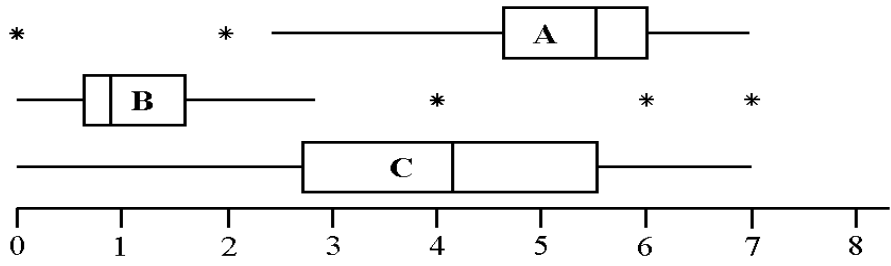
8. A botanist is studying the petal lengths, measured in millimeters, of two species of lilies. The boxplots below illustrate the distribution of petal lengths from two samples of equal size, one from species A and the other from species B.



<p>a. Which one of the species of lilies has a greater interquartile range?</p>	<p>b. Which one of the species of lilies has a smaller range?</p>
<p>c. Which one of the species has more petal lengths that are less than 30 mm?</p>	<p>d. If 101 lilies are measure from species A, how many had petal lengths less than 30mm?</p>
<p>e. If a lily from Species A has petals that are 60 mm long, which of these points represents this lily – minimum, 1st quartile, median, 3rd quartile, or the maximum?</p>	

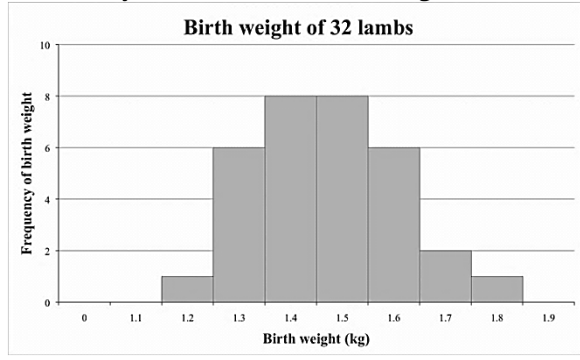
Use the graph on the right for 9-10

9. What is the range of B? What is the approximate IQR of B? How many outliers does B have?



10. If each sample was of equal size, is it true that there is more data less than 5 in C than A?

11. The Histogram below shows the birth weight of lambs. How many lambs were under 1.7 kg?



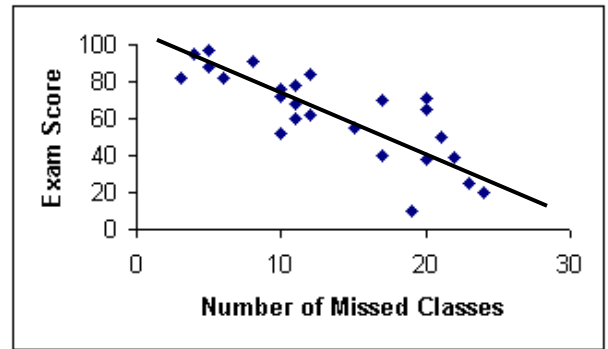
12. During a study with dogs and cats the standard deviations were calculated to be as follows:

Dogs: 5.7 Cats: 10.6

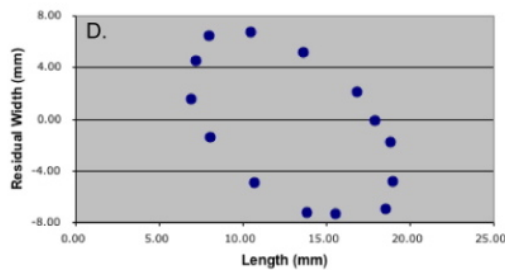
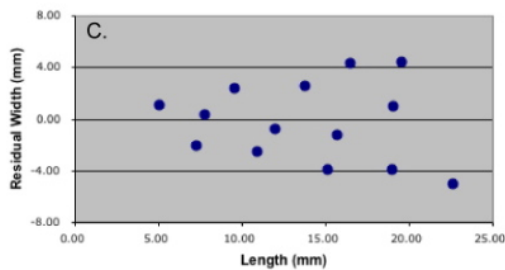
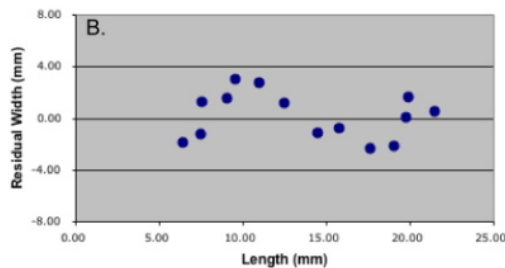
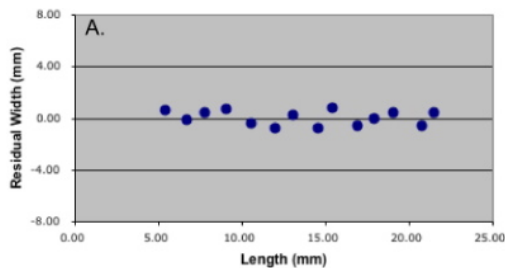
What does this tell us about our data?

Part 5

Use the graph on the right to answer questions 1 – 5



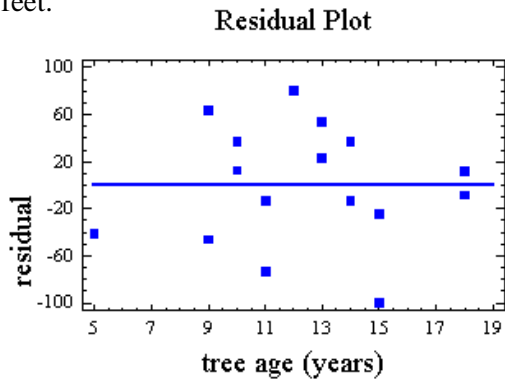
1. a. If a student missed 20 classes, what is their predicted exam score?
- b. If a student scored an 80 in their exam, what is their predicted number of missed classes?
2. Pick the best correlation coefficient: -1, -0.7, -0.3, 0.3, 0.7, or 1.
3. Generally, if a student missed more classes, was their exam score higher or lower?
4. Students that missed **less than** 10 classes, all scored in what range?
5. Consider the student that missed 19 classes and scored a 10% on the exam. If you found a line of best fit, created a residual plot, and found that the residual for this student was -19.2, what does that mean?



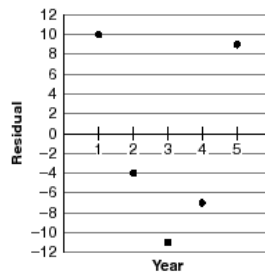
6. Which 2 residual plots above show that a line would be a good function to represent the data? Why?

7. What is a correlation coefficient?

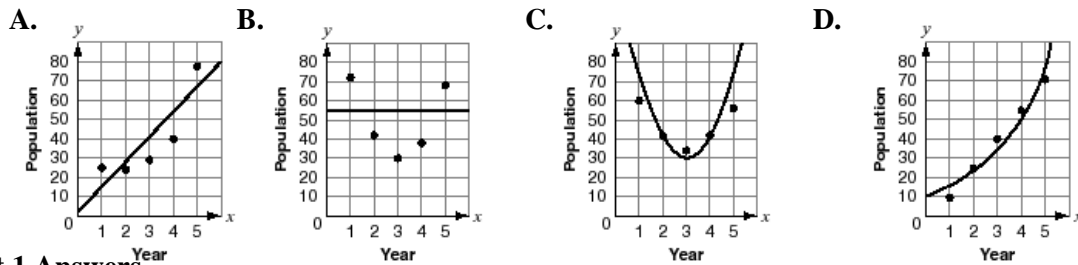
8. Based on the residual plot describe the meaning of the farthest left point. The original data compared tree age in years to height in feet.



9. Greg wrote an equation predicting how a population of rabbits in a park would change over time. Then he collected data on how the population really changed. This plot shows the residuals comparing the observed and predicted values.



Based on the residuals, which graph shows Greg's actual prediction (line) and data (points)?



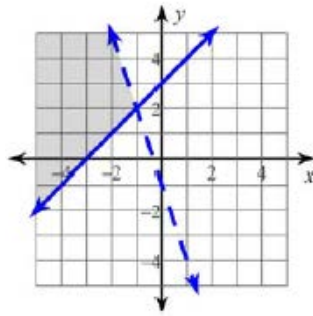
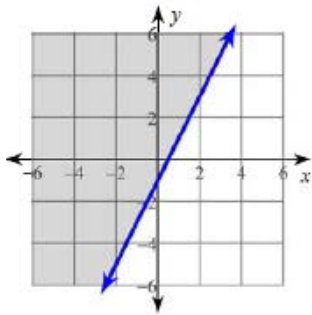
Part 1 Answers

1. $6x^3 - 3x^2 + 6x - 4$	2. a. $2y^2 + 2y + 2$ b. $9a^2 + a + 4$	3. a. $14x^2 + 5x - 9$ b. $3a^2 + 9a + 1$
4. $-18x^4 + 24x^3 - 48x^2$	5. $5r^2 + 7r - 6$	6. $3x^2 - 2x - 8$
7. a. 2 b. 4 c. 2 d. 3	8. a. 11 b. -9	9. a. $\frac{9x^6}{y^8}$ b. $\frac{16b^8}{a^{20}}$ c. $8y^6x^5$ d. $\frac{-30c^5}{b^5}$ e. $\frac{3}{x^8y^8}$ f. $\frac{u}{16v^2}$ g. $\frac{1}{y^3x^3}$
10. a. associative of addition b. commutative of addition c. commutative of multiplication d. associative of multiplication e. distributive	11. Start driving to school, stop at the stop sign and realize you left your homework at home. Drive back home to get homework, then head back to school. Rate of change = $-1/2$ mile/minute.	12. $-\$0.10$ per hour
13. October to November	14. 40 inches/month	15. August
16. 50 inches	17. July and October, or February and November, or January and December	

Part 2 Answers

1. $x = -19$	2. $x = 85/8$	3. $x = 6$
4. $x = -8$	5. $x = 14$	6. $a = 1/3$
7. $m = 4$	8. $x = -2$	9. b
10. $x > -1/5$; $(-1/5, \infty)$; open circle on $-1/5$ colored to the right.	11. $x \geq -6$; $[-6, \infty)$; closed circle on -6 colored to the right.	12. $x \leq 9$ or $x > 12$; $(-\infty, 9] \cup (12, \infty)$; Closed circle on 9 colored to the left and open circle on 12 colored to the right.
13. Graph	14. $30 \leq r \leq 45$	15. a. $c = 2bd + bx$ b. $c = \frac{x - bd}{a}$

Part 3 Answers



3. A solid line, with a slope of -3 , shaded in below the line.	4. D	5. A
6. $(-2, -3)$	7. No solution	8. $(-3, -2)$
9. Infinitely Many Solutions	10. $V + L = 25$ and $2V + 3L = 64$: 11 rooms and 14 loads of laundry	11. $y - 6 = -2(x - 5)$
12. $y - 4 = -\frac{13}{3}(x + 3)$	13. $y = \frac{2}{3}x - 5$	14. $y = 2x - 10$

Part 4 Answers

1. Minimum, Q1, median, Q3, maximum	2. a. True. It explains how spread out or condensed a given distribution is/a given set of data is. It is typically used with the mean in histograms.	2. b. False. A small standard deviation means the data is less spread out (is closer together)
2. c. False. It is a measure of spread typically used with boxplots that is calculated by $Q3 - Q1$.	2. d. False. The range can be any non-negative value. It is calculated by maximum – minimum.	3. The original data is retained (unlike a histogram or a box plot, where the original data is lost/cannot be identified).
4. a. True. A box plot is divided into quartiles, which means quarters, 4th's.	4. b. True. A dot plot or a stem plot do retain original data though.	4. c. False. The columns must be the same width (so each class is 3 wide, or each class is 5 wide, etc.) or it will indeed be misleading.
4. d. True. The median is not influenced by outliers (this quality is called resistant). So if you have a distribution with an outlier (s), it is wise to display your distribution graphically using a box plot.	4. e. True.	5. $50\% \cdot 75\%$
6. The standard deviation would not change, because the entire set of data would shift up 3 hours, but the spread would not change.	7. a. Positive Type A = 25; Negative Type B = 19;	7. b. 37
7. c. $37/100$	7. d. 0.18	7. e. 0.56
8. a. Species B	8. b. Both are about the same.	8. c. Species B. (at least 50% of species B are less than 30, while only 25% of species A are less than 30).
8. d. 25	8. e. 3rd quartile	9. range = 7, IQR = 0.9, 3 outliers
10. Yes, it's true.	11. 29	12. The data for Cats is more spread out than the data for dogs.

Part 5 Answers

1. a. score of 40 b. 9 missed classes	2. -0.7	3. Lower
4. 80-100	5. They scored 19.2% lower than expected	6. A and C; there are points randomly scattered above and below the residual line.
7. Shows us the strength and direction of a relationship (the closer to 0 means it is not a strong relationship, close to 1 is a strong positive relationship, and close to -1 is a strong negative relationship)	8. A 5 year old tree was 40 ft less than predicted.	9. A