2015 – 2016 Algebra 1 Midterm Review

Permitted resources:
- FSA Approved Calculator
- Algebra 1 FSA Reference Sheet

1. Below are the results of a survey as to what species of fish were caught in Lake Target.

Fish Caught in Lake Target

Day	Perch	Bluegill	Sunfish	Total
Friday	32	42	43	117
Saturday	30	40	42	112
Sunday	20	26	22	68
Total	82	108	107	297

To the nearest percent, determine the following:
a) What percent of the fish caught were Sunfish?
b) What percent of the fish caught were Bluegill caught on Saturday?
c) What percent of the fish were caught on Friday?

2. Greg measured the actual volume of vinegar, in milliliters, in 10 bottles of distilled vinegar and in 10 bottles of apple cider vinegar. He noticed that the data was normally distributed and recorded the mean and standard deviation of each data set in the table below.

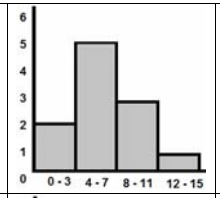
	Mean	Standard Deviation
Distilled Vinegar	472.1	0.12
Apple Cider Vinegar	472.2	1.01

a) What conclusions can be drawn from Greg's data?

b) Greg stated that it would be unusual to purchase a bottle of distilled vinegar that contained less than 472 milliliters of vinegar. Explain why Greg's conclusion is correct or why it is incorrect.

3. The data below are numbers of hours per week spent on exercise. Which of the following histograms represents the data?

2, 5, 8, 6, 4, 6, 5, 10, 11, 15, 3

A.


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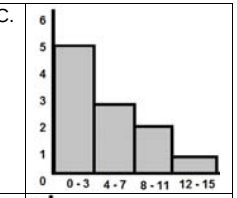

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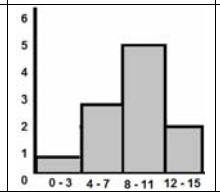

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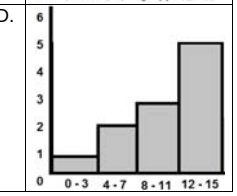
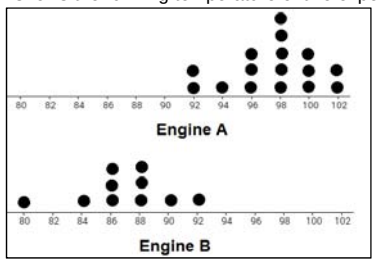


4. Gimley collected the data below to show the number of jewels mined by each of his miners. Create a histogram using Gimley's data.

6, 14, 20, 15, 16, 17, 4, 19, 21, 22, 25, 10, 13, 5, 2

5. The data display below shows the running temperature of two experimental engines.



a. Find the mean and median of each set of data displayed in the dot plots.

b. Which has the largest difference between the two data sets, the means or the medians?

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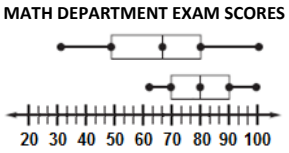
6. The lengths of earthworms Gerard collected from his garden are listed below. Construct a box-and-whisker plot using the data he collected.

4.5 4.5 9 5.2 6.3 5 6 3.2 3.2

7. The math department's scores from two exams are graphed below. What is the difference between the interquartile ranges of the two exams?



8. Ashley listed the length, in centimeters, of 15 lizards she caught in her garden. The results are given below.

6, 14, 20, 15, 16, 17, 4, 19, 21, 22, 25, 10, 13, 5, 2

a. Which measure of center best describes Ashley's data?

b. Which measure of variation best describes Ashley's data?

9. Evaluate the expression $10(27c + 8)$ when $c = \frac{2}{3}$.

10. Evaluate the expression $\frac{u}{z} + xy^2$ when $u = 20$, $x = 4$, $y = 7$, and $z = 10$.

11. The expression $13x + 5$ represents the number of marbles you have after purchasing 13 bags of marbles. What does the term $13x$ represent?

12. The expression $2(21x + 75)$ represents the monthly tuition and the one-time materials fee that Jaime pays for his two children to join a science club. What do the terms of the expression $21x + 75$ represent?

13. Write an algebraic expression for the word phrase: 3 times the sum of *b* and *f*.

14. Write a word phrase that you can use to represent the algebraic expression $5x + 2$.

15. Write an inequality for the sentence: The product of a number and 12 is no less than 34.

16. Write a word phrase that you can use to represent inequality: $17x - 11 \leq 59$.

17. Write a rule for the function in the table below.

a)

x	1	2	5	7	11
y	10	13	22	28	40

b)

x	-18	-14	-10	-6	-2
y	-44	-34	-24	-14	-4

18. Explain why the relation below is or is not a function.

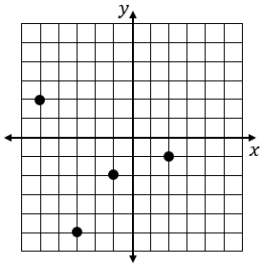
a)

x	-4	-9	-4	8
y	2	-5	12	-8

b)

x	1	3	7	15
y	15	7	3	1

19. Explain why the relation below is or is not a function.



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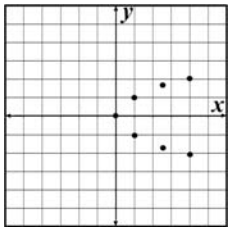
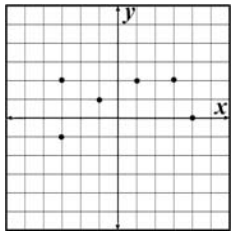
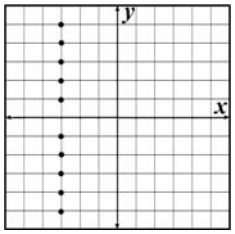
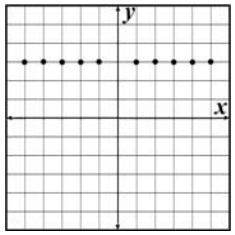
20. Which of the relations graphed below is a function?

a. 

c. 

b. 

d. 

21. Of the terms real, rational, irrational, integer, and whole number, list all that can be used to describe the value of the expressions below. Explain your answer.

a. $\frac{1}{4}+\sqrt{3}$

b. $23-\sqrt{529}$

22. Write an algebraic proof for the following:

a. Given: $\frac{2}{7}x+6=10$, prove: $x=14$.

b. Given: $8x-61=17$, prove: $x=\frac{39}{4}$.

23. Solve the equations below for x.

a. $\frac{x}{4}-3=9$

b. $7+\frac{2}{3}x=15$

24. There are a total of 36 cards in Aleera's collection. The number of baseball cards is 6 less than twice the number of football cards. The equation below represents the situation, where x represents the number of football cards.

$$x+(2x-6)=36$$

How many baseball cards does Aleera have?

25. The perimeter of a triangle is 84 meters. The longest side of the triangle is 7 meters less than twice the length of the shortest side, x. The middle side is 7 meters longer than the shortest side. The equation below represents the perimeter of the triangle.

$$x+(x+7)+(2x-7)=84$$

What is the length of each side of the triangle?

26. Solve the equation.

a. $70=-7(-2-2z)$ b. $16=5p+(40-9p)$

27. A copy center offers its customers two different pricing plans for black and white photocopies of 8.5 in. by 11 in. pages. Customers can either pay \$0.08 per page or pay \$7.50 for a discount card that lowers the cost to \$0.05 per page. Write and solve an equation to find the number of photocopies for which the cost of the two plans is the same.

28. Teddy has 23 boxes of juice packed already and plans to pack 3 additional boxes each hour. Charley has 7 boxes packed already and plans to pack 5 additional boxes each hour. The equation below represents when Teddy and Charley will have packed the same number of boxes, based on x number of hours.

$$23+3x=5x+7$$

After how many hours will Charley have packed the same number of boxes of juice as Teddy?

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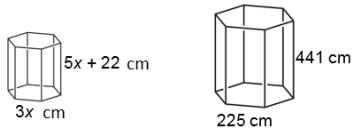
29. Solve the given the proportions.

a. $\frac{x-8}{5}=\frac{2}{4}$ b. $\frac{w+14}{4w+6}=\frac{3}{4}$

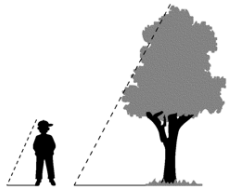
30. Rick carved similar models of regular hexagonal prisms as shown below.



What is:

a. The value of x?
b. The height, in centimeters, of the smaller hexagonal prism?
c. The length of one side of the base, in centimeters, of the smaller hexagonal prism?

31. A tree casts a shadow 10 feet (ft) long. A boy standing next to the tree casts a shadow 2.5 ft long. The triangle shown for the tree and its shadow is similar to the triangle shown for the boy and his shadow. If the boy is 5 ft tall, how tall is the tree?



2.5 ft 10 ft

Drawing not to scale.

32. Solve each equation for the specified variable.

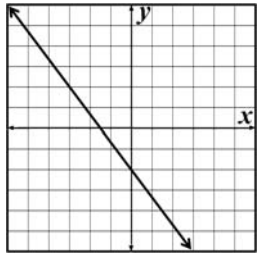
a. $a-q=a+sx$ for x. b. $kx-bf=\frac{fy}{m}$ for y.

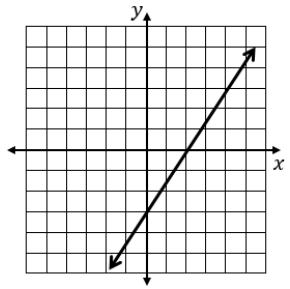
33. Sketch a graph of each function with the given domains.

a. $y=\frac{1}{2}x+1$ with domain {-4, -2, 2, 4}. b. $y=3x-2$ with domain {-1,0, 1, 2}.

34. Write the equations of the lines graphed below.

a. b.





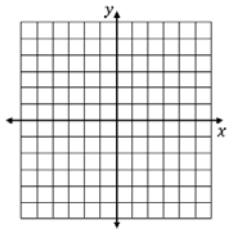
35. What is the x-intercept of the graph of the equation 12x + 4y = 288?

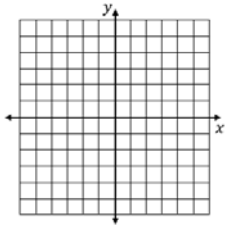
36. What is the y-intercept of the graph of the equation -3x – 9y = 162?

37. Jarek buys jerseys for his team online. He pays a constant shipping price plus a special rate for each jersey. During the spring season Jarek paid $151 for 24 jerseys. In the summer season he paid $79 for 12 jerseys. What is the special rate Jarek pays for each jersey and how much does he pay for shipping?

38. Mr. Cringle found a box of handmade holiday greeting cards in his garage and decided to make more to send to all his friends. After 2 hours had passed, Mr. Cringle had a total of 30 cards. After 6 hours had passed, he had a total of 40 cards. At what rate is Mr. Cringle making greeting cards and how many cards were in the box he found?

39. Graph each equation. a) $y=\frac{5}{2}x-1$ b) $y=-6x+4$





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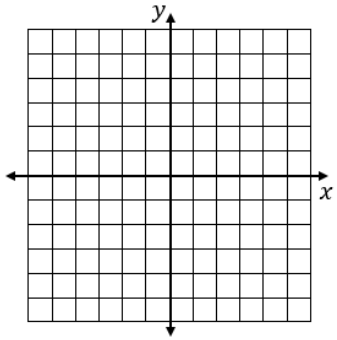
40. Suppose y varies directly with x, and $y = 15$ when $x = -3$. What direct variation equation relates x and y? What is the value of y when $x = -1$?

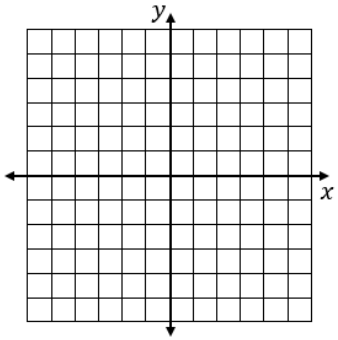
41. Suppose y varies directly with x, and $y = -7$ when $x = -3$. What direct variation equation relates x and y? What is the value of y when $x = 2$?

42. Graph each function.

a. $f(x) = -3x$.



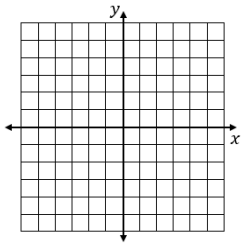
b. $f(x) = -x + 4$



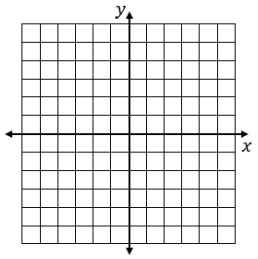
43. A taxi company charges passengers \$1.00 for a ride, and an additional \$0.30 for each mile traveled. The function rule $C(m) = 0.3m + 1$ describes the relationship between the number of miles m and the total cost of the ride C. If the taxi company charges you \$13.00 how far did you travel?

44. A gym charges its members a one-time \$10.00 sign-up fee, and \$25 per month. The function rule $f(x) = 25x + 10$ describes the relationship between the number of months x, and the total cost of membership $f(x)$. If a gym member paid \$185.00 how many months did the gym member pay for?

45. Translate the graph of the equation $y = \frac{5}{2}x + 2$ to the left 4 units. Graph the translation.



46. Translate the graph of the equation $y = 2x - 3$ up 3 units. Graph the translation.



47. Elias ships a popular video game to stores around the country. The graph below shows the number of games Elias has left in his warehouse and the number of shipments he has made.

a. What does the x-intercept of the graph above represent in this situation?
b. What does the y-intercept of the graph above represent in this situation?
c. What does the slope of the graph above represent in this situation?

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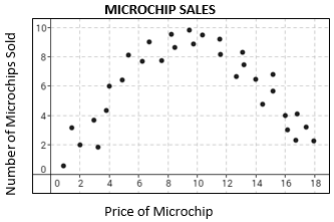
48. Write a equation, in slope-intercept form, for each of the following descriptions:
    a. slope of $\frac{2}{3}$ and passing through the point (6, 5).
    b. slope of 7 passing through the point (5, 35).
    c. passes through the points (2, 5) and (9, 2).
    d. passes through the points (2, 19) and (0, 7).

49. Write the rule for the n^{th} term of each sequence.
    a. 7, 4, 1, -2, …
    b. - 11, -3, 5, 13, …

50. The graph of the equation $y + 28 = -7(x - A)$ passes through the point (-3, 14). What value of *A* accurately completes the equation?

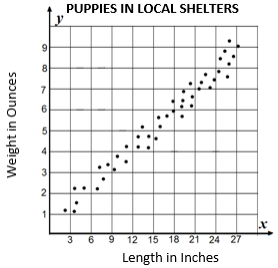
51. The graph of the equation $Dx + 9y = 27$ passes through the point (-18, 7). What value of *D* accurately completes the equation?

52. A microchip company created the graph below relating the price of their best microchip to the number of microchips sold.



If the correlation coefficient of the data is 0.12, what conclusions can the company draw?

53. Flora created the scatter plot below using the length and weight of puppies at all of the animal shelters in her area.



If the correlation coefficient of the data is 0.89, what conclusions can Flora draw?

54. The scatter plot below shows the linear trend of the number of golf carts a company repaired in the month of February. Write the equation that models the number of golf carts repaired as a function of the number of days in the month of February.

55. The scatter plot below shows the linear trend of the number of golf carts a company sold in the month of February. Write the equation that models the number of golf carts sold as a function of the number of days in the month of February.

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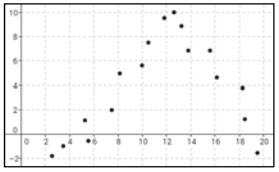
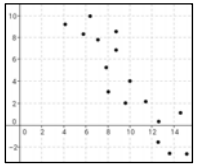
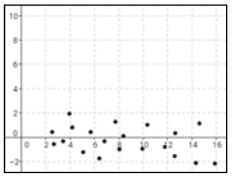
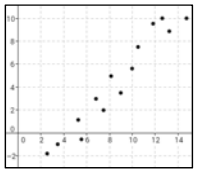
56. Stanley Statistics uses residual plots to help assess whether a function is a good fit for their data.

A. 

C. 

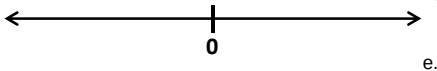
B. 

D. 

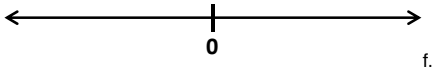
a. Which residual plot indicates that the function is a good fit for their data?
b. Explain why the residual plot you chose indicates that the function is a good fit for the data.

57. Solve each inequality and graph its solution set.

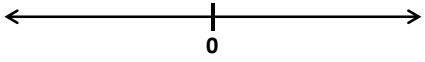
a. $q+\frac{1}{3}>\frac{1}{2}$



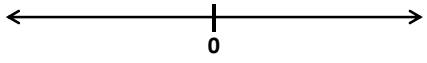
b. $17 \geq x-9$



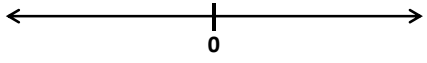
c. $-3x \leq -9$



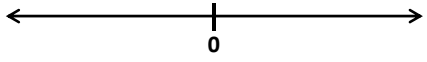
d. $\frac{1}{5}x \geq -2$



e. $4x < -6$



f. $x+12-2(x-22)>0$

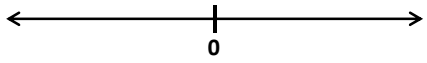


58. Millie needs the average height of the plants she is buying to be at least 73 inches. She has selected three plants that are 70, 71, and 72 inches tall. Write and solve an inequality that Millie could use to determine the possible heights of her fourth plant.

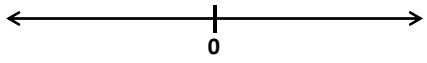
59. Mrs. Hawk assigns her students an average of no more than 15 questions on each assignment. On their first 5 assignments Mrs. Hawk's students had 11, 10, 13, 14, and 14 questions. Write and solve an inequality that Mrs. Hawk can use to determine the number of questions she can have on the sixth assignment.

60. Solve each inequality and graph its solution set.

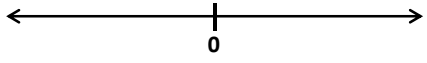
a. $\frac{2x-1}{3}+3 \leq -4$ or $\frac{8x-2}{2}-1 \geq 6$



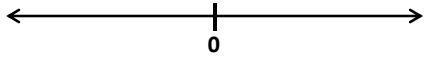
b. $2x-2<-12$ or $2x+3>7$



c. $-2<4x-10<6$



d. $-2 \leq 4-2x<8$



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