Name: _____ **Class:** _____ **Date:** _____ **ID: A**

2014 Oak Park Back to School Packet for incoming 10th graders.
Please show all work in the space provided for each question.

Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 1. Which number represents a_4?

$a_n = 2n + 4$

a. 6
b. 8
c. 10
d. 12

____ 2. James earns $6.25 an hour at work. Which algebraic equation shows the amount of money E that James earns in n hours?

a. $E = 6.25 + n$
b. $E = \frac{6.25}{n}$
c. $n = 6.25E$
d. $E = 6.25n$

____ 3. Which of the following shows the fractions $\frac{5}{6}, \frac{7}{9}$, and $\frac{3}{5}$ in order from least to greatest?

a. $\frac{5}{6}, \frac{7}{9}, \frac{3}{5}$
b. $\frac{3}{5}, \frac{5}{6}, \frac{7}{9}$
c. $\frac{5}{6}, \frac{3}{5}, \frac{7}{9}$
d. $\frac{3}{5}, \frac{7}{9}, \frac{5}{6}$

____ 4. Which is NOT an example of a rate? Why isn't it?

a. $\frac{75 \text{ miles}}{1 \text{ hour}}$
b. $\frac{4 \text{ feet}}{3 \text{ feet}}$
c. $\frac{10 \text{ cups}}{3 \text{ parts}}$
d. $\frac{8 \text{ ounces}}{1 \text{ cup}}$

____ 5. The total profit p from selling n sweatshirts is given by the equation

$p = 15n - 30$.

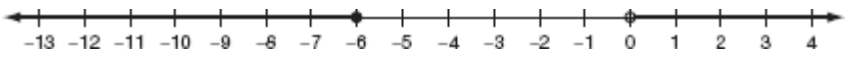
If the total profit was \$720, how many sweatshirts were sold?

a. 46
b. 48
c. 50
d. 52

____ 6. A person with a systolic blood pressure greater than 120 mmHg and less than or equal to 139 mmHg is said to have prehypertension. Which inequality represents the range of systolic blood pressure for a person with prehypertension?

a. $120 < x < 139$
b. $120 < x \leq 139$
c. $120 \leq x < 139$
d. $120 \leq x \leq 139$

____ 7. Which inequality is represented by the graph below?



a. $-6 \leq x > 0$
b. $-6 \leq x < 0$
c. $x < -6$ or $x \geq 0$
d. $x \leq -6$ or $x > 0$

____ 8. Let $f(x) = -6x + 8$. What is $f(2)$?

a. $f(2) = -4$
b. $f(2) = 2$
c. $f(2) = 4$
d. $f(2) = 20$

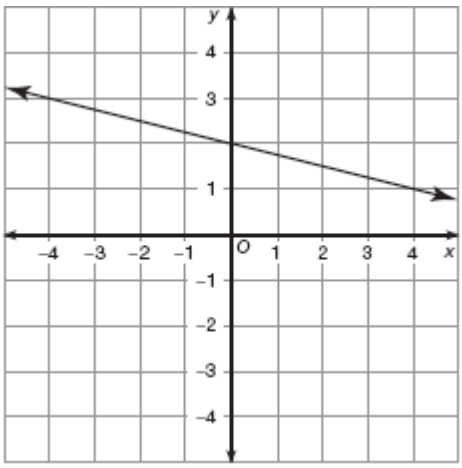
____ 9. What is the y-intercept of the graph of $6x + 5y = 30$? Justify your answer.

a. 6
b. 5
c. −5
d. −6

____ 10. Which point lies on the line defined by $4x - 3y = 9$? Justify your answer.

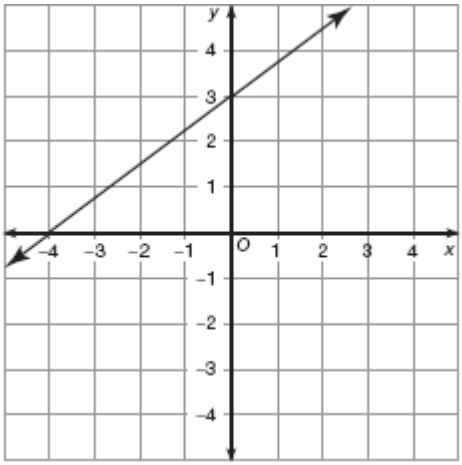
a. (3, 7)
b. (0, 3)
c. $\left(2, -\frac{1}{3}\right)$
d. $\left(2, \frac{17}{3}\right)$

____ 11. What is the slope of the linear function shown in the graph?



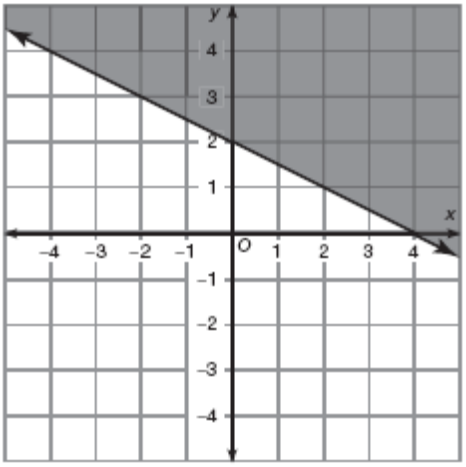
a. –4
b. $-\frac{1}{4}$
c. $\frac{1}{4}$
d. 4

____ 12. What are the *x*- and *y*-intercepts of the function that is graphed below?



a. (0, 4) and (–3, 0)
b. (0, – 4) and (3, 0)
c. (4, 0) and (0, – 3)
d. (–4, 0) and (0, 3)

____ 13. Which inequality is shown on the graph?



a. $y > -\frac{1}{2}x + 2$
b. $y \geq -\frac{1}{2}x + 2$
c. $y \geq \frac{1}{2}x + 2$
d. $y < -\frac{1}{2}x + 2$

____ 14. What is the solution to the given system of equations? Justify your answer.

$y = 4x + 12$

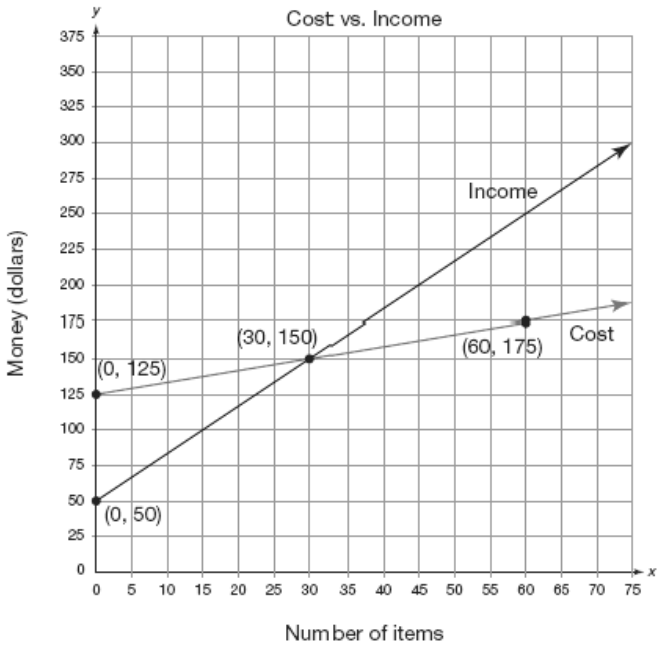
$3x + 2y = 46$

a. (20, 2)
b. (2, 20)
c. (−1, 8)
d. (4, 17)

____ 15. Which equation represents a line that is perpendicular to the line $y = \frac{1}{6}x - 2$? Justify your answer.

a. $y = -\frac{1}{6}x - 2$
b. $y = \frac{1}{6}x + 2$
c. $y = 6x - 2$
d. $y = -6x + 1$

____ 16. Which point on the graph represents the break-even point?



a. (0, 50)
b. (30, 150)
c. (0, 125)
d. (60, 175)

____ 17. How would you verify that (−5, 2) is the solution to the given linear system?

$2x + 12y = 14$

$-6x - 4y = -10$

a. Substitute −5 for x and 2 for y in both equations and see if the resulting equations are true.
b. Substitute 2 for x and −5 for y in both equations and see if the resulting equations are true.
c. Substitute −5 for x and 2 for y in the first equation and see if the resulting equation is true.
d. Substitute 2 for x and −5 for y in the second equation and see if the resulting equation is true.

Completion
Complete each statement.

Find the next two terms in each sequence.

18. 2, 4, 8, 16, 32, _____, _____

19. Use the nth term to list the first five terms of the sequence. Show your work.

$a_n = 2n + 4$

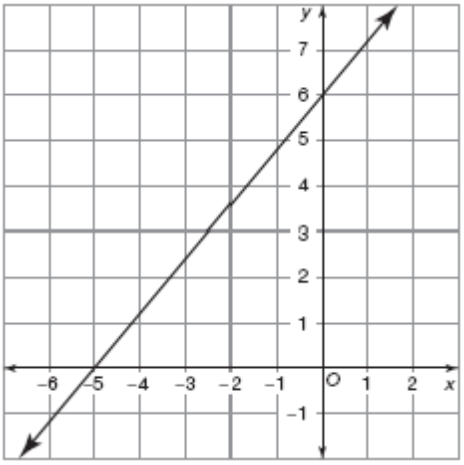
$a_1 =$ _____ $a_2 =$ _____ $a_3 =$ _____ $a_4 =$ _____ $a_5 =$ _____

Use the nth term to list the first five terms of each sequence. Show your work.

20. $a_n = (n-1)^2 + 3$

$a_1 =$ _____ $a_2 =$ _____ $a_3 =$ _____ $a_4 =$ _____ $a_5 =$ _____

Use the graph to identify the intercepts of each line.

21. 

x-intercept: _____ *y*-intercept: _____

Identify the slope and *y*-intercept of each equation.

22. $y = \frac{2}{3}x + 4$ slope: _____ *y*-intercept: _____

23. $y = 3x - 5$ slope: _____ *y*-intercept: _____

Short Answer

Each answer is graded on the following rubric.
4 pts - completely correct
3 pts - minor error(s)
2 pts - little understanding but work shown
1 pt - attempted problem with minimal understanding0 pts - no response

Find the next two terms in each sequence.

24. 

25. Write the power as a product.

3^4

26. Write the product as a power.

(7)(7)(7)(7)(7)(7)(7)

27. Perform the indicated operations. Show your work.

$4^2 + (8 - 3)6$

Use the sequence below to answer the following question.

Complete the table by filling in the number of triangles in each term of the sequence.

Term	1	2	3	4	5
Number of triangles					

28. Write an expression showing the relationship between the term and the number of triangles in that term. Let *n* represent the term.

29. Perform the indicated operations. Show your work.

$(2 + 1)^3 - 5(2)$

.

30. $(6 - 3)^3 + 2(1 + 4)$

31. $25 - (3 + 5) + 2^4$

Evaluate each expression for the given value of the variable. Show your work.

32. Evaluate $2r + 8$ when r is 12.

33. Evaluate $\frac{t}{4}$ when t is 36.

Use the table below to answer #34,35.

Grade	Blue eyes	Brown eyes	Other
8	13	14	3
9	5	18	7
10	9	8	13
11	2	25	3
Total number of students	29	65	26

34. Write the ratio of the number of blue-eyed students to the number of students surveyed. Write the ratio two different ways.

.

35. Write the ratio of the number of brown-eyed students in the 9th grade to the total number of brown-eyed students. Write the ratio two different ways.

Complete each proportion.

36. $\frac{4}{9} = \frac{\square}{54}$

Solve each proportion. Show all your work.

37. $\frac{40}{576} = \frac{5}{x}$

Write each percent as a fraction and as a decimal.

38. 30%

39. 78%

Write each fraction as a decimal and as a percent.

40. $\frac{29}{100}$

41. $\frac{37}{50}$

Solve each proportion. Show all your work.

42. $\frac{297}{x} = \frac{3}{11}$

43. $\frac{35}{90} = \frac{x}{18}$

Write each fraction as a decimal and as a percent.

44. $\frac{29}{100}$

45. $\frac{7}{10}$

Solve each equation. Show all your work.

46. $2y + 6 = 18$

47. $38 = 5s - 7$

48. $\frac{w}{3} + 10 = 17$

49. $28 = \frac{n}{2} - 4$

Find each sum or difference.

50. $-2 + 8 =$

51. $9 - (-3) =$

52. $-11 - 8 =$

Find each product or quotient.

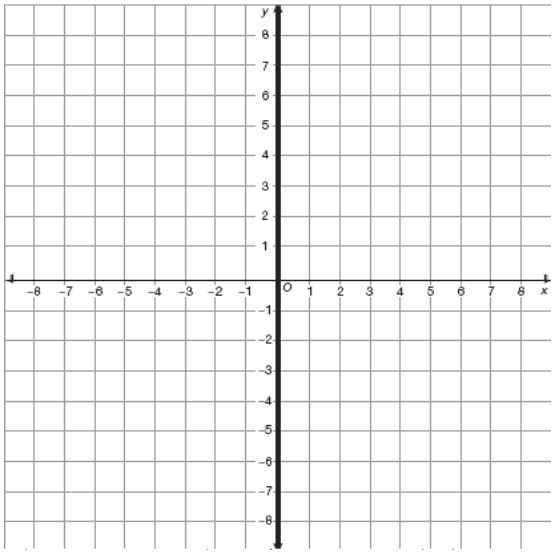
53. $-3(-7) =$

54. $2(-9) =$

55. $\frac{-24}{-3} =$

56. Plot and label each point in the coordinate plane.

$A(-5, 6)$ $B(4, 7)$ $C(3, -4)$ $D(-2, -5)$



Solve each equation. Show all your work.

57. $4x + 8 = 52$

.

58. $7p + 6 = 27$

Write and solve a percent equation to answer each question. Show all your work and use a complete sentence in your answer.

59. What is 38% of 150?

60. Write the integers in order from least to greatest.

2, – 8, 5, – 11, – 3, 8

61. An art museum offers a special admission price for children under the age of 5 and senior citizens who are 65 years or older. Everyone else must pay the full admission price to visit the museum. Write a compound inequality to show the age range for visitors paying full price for admission.

Graph each compound inequality on the number line provided.

62. $-6 \leq x < 5$

63. $x < 1$ or $x \geq 4$

Solve each inequality. Show all your work.

64. $3x + 4 > 10$

65. $-5x - 2 \leq 13$

Decide whether or not each relation is a function. If the relation is a function, identify the domain and range. If the relation is not a function, explain why not. Use complete sentences in your answer.

66. Relation: $\{(-1, 4), (-2, 3), (-3, 2), (-2, 1), (-4, 1)\}$

67. Relation: $\{(6, 4), (7, 5), (8, 6), (9, 7), (10, 8)\}$

Evaluate each function at the specified value. Show all your work.

68. $f(x) = 2x - 5$ at $x = 3$

Solve each equation. Show all your work.

69. $5x + 6 = 7x - 16$

70. $2(x + 3) = 3(4x - 8)$

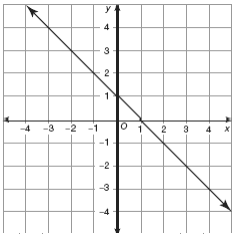
Graph each compound inequality on the number line provided.

71. $4 < x \leq 9$

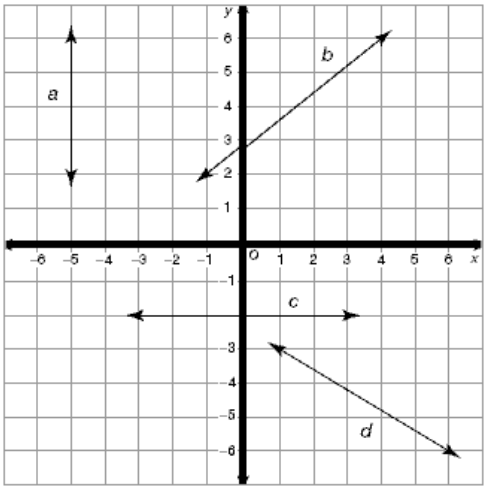
Evaluate each function at the specified value. Show all your work.

72. $h(x) = 10x + 17$ at $x = -3$

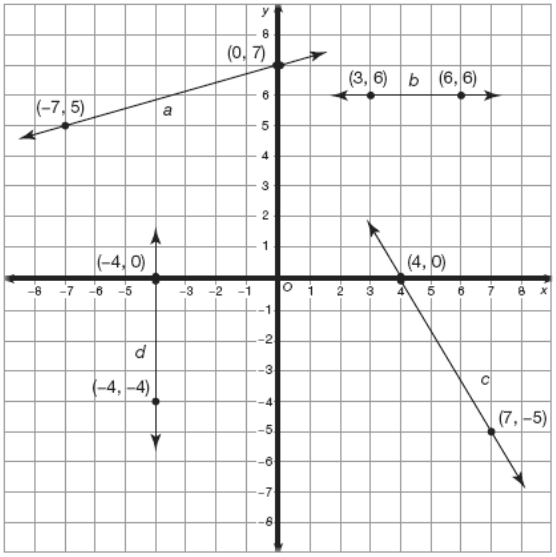
73. Is this the graph of a linear function? Use a complete sentence to explain why or why not.



74. Determine whether the slope of each line in the graph is positive, negative, zero, or undefined. Use complete sentences to explain your reasoning.



75. Use the coordinates of the points to find the slope of each line. Show all your work.



a. Slope of line *a*: _____ **b.** Slope of line *b*: _____

c. Slope of line *c*: _____ **d.** Slope of line *d*: _____

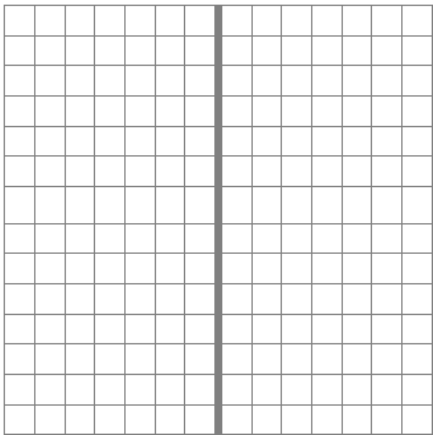
76. Write the equation of the line in slope-intercept form that has a slope of 2 and passes through the point (3, 1). Show all your work.

77. Write the equation in standard form. Show all your work. $y = -\frac{2}{5}x + 3$

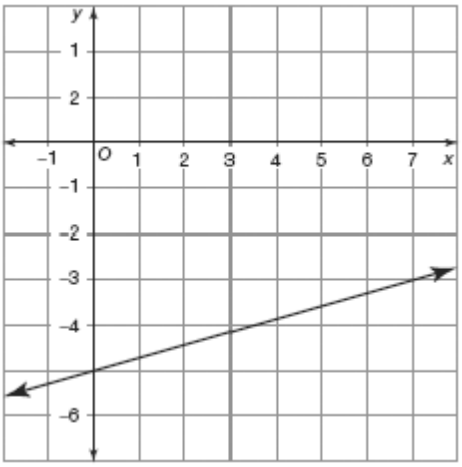
78. Write the equation of a line in slope-intercept form that has a slope of $-\frac{5}{9}$ and passes through the point (18, 7). Show all your work.

79. Draw a graph of the equation by using the slope and y-intercept.

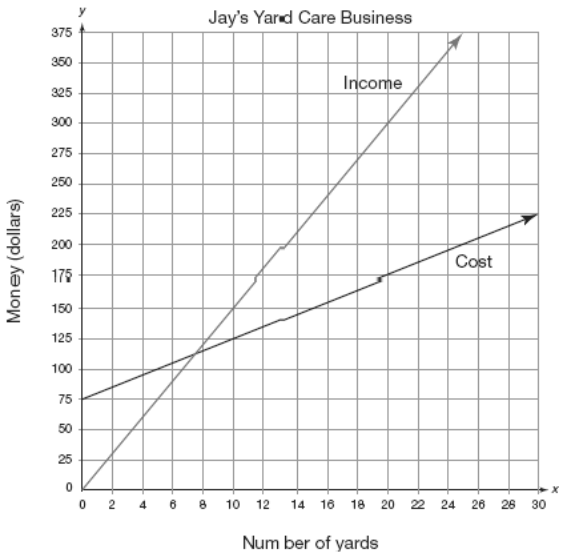
$y = \frac{1}{4}x - 7$



80. Write the equation of the line from its graph.



81. The graph below shows the cost and income equations for Jay's business. Use the graph to estimate the number of yards Jay must care for to break even. Use a complete sentence to explain how you found your answer.



82. Algebraically, verify that the point (1, 2) is a solution of the given linear system. Show all your work.

$y = 4x - 2$

$y = -2x + 4$

Determine whether the graphs of each pair of equations are parallel, perpendicular, or neither. Show all your work. Remember: Parallel lines have the SAME slope and perpendicular lines have OPPOSITE RECIPROCAL slopes;)

83. $y = \frac{1}{2}x + 5$

$y = -2x - 9$

84. $y = -5x + 4$

$y = -5x - 3$

85. Solve the system of linear equations. Show all your work.

$6x - 4y = 24$

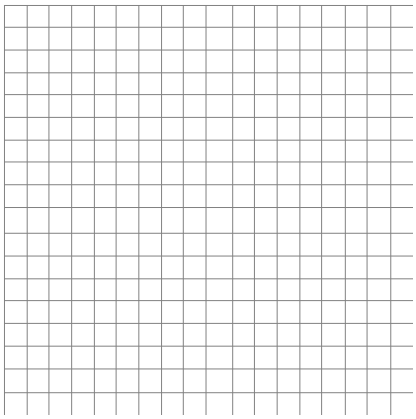
$y = 2x + 8$

86. Solve the system of linear equations. Show all your work.

$3x - 9y = 36$

$x + 3y = 18$

87. Graph the linear inequality $y < 2x + 3$.



88. Solve the system of linear equations. Show all your work.

$-6x + 5y = 2$

$4x - y = 8$

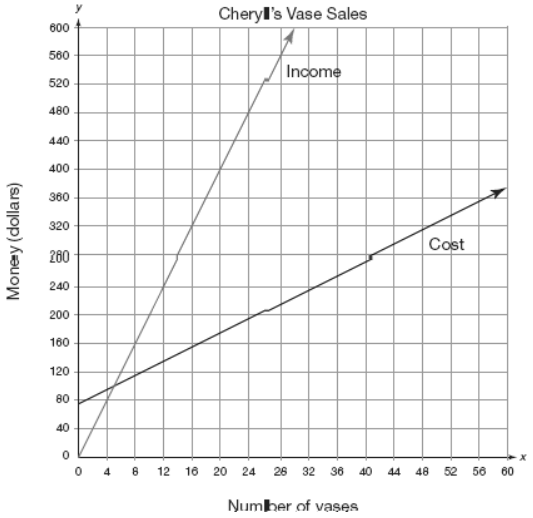
89. Solve the system of linear equations. Show all your work.

$10x - 4y = 56$

$5x + 3y = 8$

Read the scenario below. Use the scenario and graph to answer the following question.

Cheryl makes clay vases. She bought a used potter's wheel for $75 online. It costs her $5 to make each vase. She can sell the vases for $20 each. The graph below shows her cost and income equations.



90. Use the graph to estimate the break-even point. Explain what this means in the context of the problem situation.

For each polynomial, determine whether it is a monomial, binomial, or trinomial.

91. $7x^6 - 3$

92. $2x^5 + 3x^3 + 4x$

93. $4x$

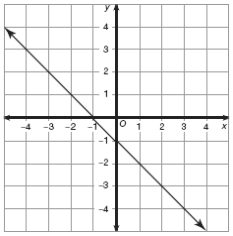
Determine the degree of each polynomial.

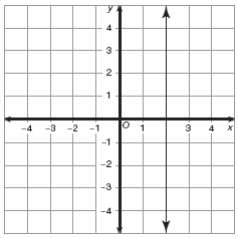
94. $15 - 4x^2$

95. $8x + 9$

96. $3x^2 - 4x^5 + 7x$

Use the Vertical Line Test to determine whether each graph is a function. Use a complete sentence in your answer.

97. 

98. 

Simplify each expression by calculating the sum or difference. Show all your work.

99. $(3x^5 + 2x^2 - 6) + (5x^4 + 8x^2 - 11)$

100. $(10x^4 + 13) - (7x^4 + 3x^2 - 7)$

Find each product . Show all your work.

101. $(x + 2)(3x^2 - 4x + 7)$

.

102. $(x + 2)(2x + 3)$

103. $(4x - 6)(x - 5)$

104. $(6x + 1)(3x - 4)$

.

105. $(2x + 7)^2$

106. $(x - 15)(x + 15)$

Factor each expression completely. Show all your work.

107. $x^2 + 6x + 8$

108. $x^2 - 9$