Algebra 1: 2nd Semester Exam Review **Name _____ Period _____**

1. Write each expression in rational exponent form.

a. $\sqrt[3]{10}$ **b.** $\sqrt[4]{d}$

2. Write each expression in radical form.

a. $11^{\frac{1}{2}}$ **b.** $a^{\frac{1}{5}}$

What is the simplified form of each expression?

3. $(-3.2)^0$ **4.** $6c^{-3}t^3$ **5.** $\frac{1}{a^{-5}}$

6. $\frac{6}{g^{-3}h}$ **7.** $7x^{-8} \cdot 6x^3$ **8.** $x^8 \cdot 2y^{10} \cdot 5x^5$

9. $-4x^3 \cdot 2y^{-2} \cdot 5y^5 \cdot x^{-8}$ **10.** $(p^6)^2$ **11.** $(3h^3)^4$

12. $(-5g^4h^6)^2(g^5h^5)^5$ **13.** $\frac{t^{11}}{t^2}$ **14.** $\frac{a^{-2}}{a^4}$

15. $\frac{g^7h^8}{g^{11}h^2}$ **16.** $\left(\frac{1}{2j^4}\right)^2$ **17.** $\left(\frac{6t^4}{5y^2}\right)^5$

Clear the fractions in both equations below (you do not have to solve).

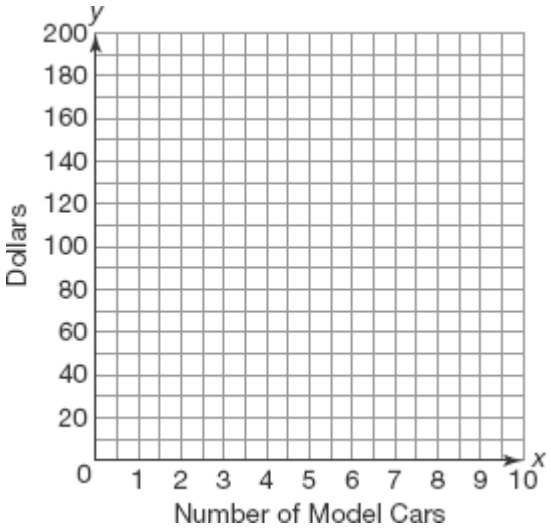
18. $\begin{cases} \frac{1}{2}x + \frac{3}{2}y = 4 \\ \frac{2}{3}x - \frac{1}{3}y = 7 \end{cases}$

Solve each system of equations by substitution.

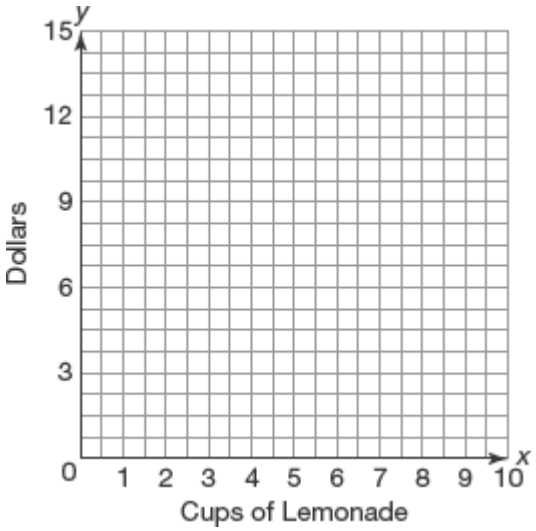
19. $\begin{cases} y = 2x - 3 \\ x = 4 \end{cases}$ **20.** $\begin{cases} 2x + y = 9 \\ y = 5x + 2 \end{cases}$

Write a system of linear equations to represent each problem situation. Define each variable. Then, graph the system of equations and estimate the break-even point. Explain what the break-even point represents with respect to the given problem situation.

21. Eric sells model cars from a booth at a local flea market. He purchases each model car from a distributor for $12, and the flea market charges him a booth fee of $50. Eric sells each model car for $20.



22. Ramona sets up a lemonade stand in front of her house. Each cup of lemonade costs Ramona $0.30 to make, and she spends $6 on the advertising signs she puts up around her neighborhood. She sells each cup of lemonade for $1.50.



Solve each system of equations using the linear combinations (elimination) method.

23. $\begin{cases} 4x - y = 2 \\ 2x + 2y = 26 \end{cases}$

24. $\begin{cases} 3x + 5y = 8 \\ 2x - 5y = 22 \end{cases}$

Write a system of equations to represent each problem situation. Solve the system of equations using the linear combinations method.

25. Taylor and Natsumi are making block towers out of large and small blocks. They are stacking the blocks on top of each other in a single column. Taylor uses 4 large blocks and 2 small blocks to make a tower 63.8 inches tall. Natsumi uses 9 large blocks and 4 small blocks to make a tower 139.8 inches tall. How tall is each large block and each small block?

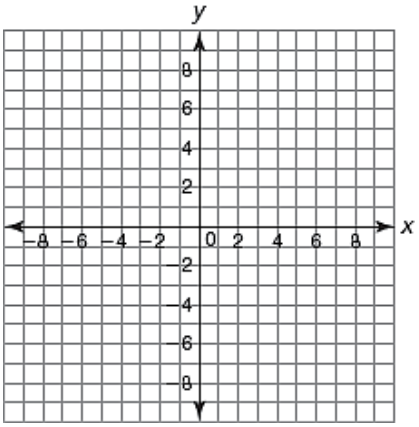
Tell whether the graph of each linear inequality will have a dashed line or a solid line. Explain your reasoning.

26. $x - 3y \leq 32$

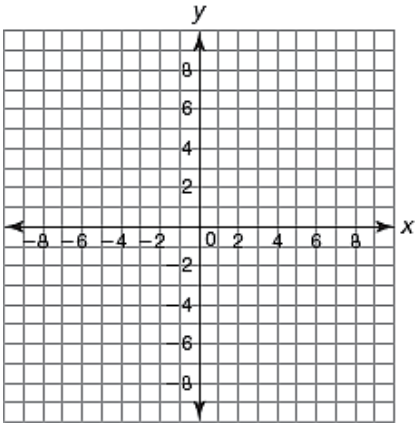
27. $y < 14x + 9$

Graph each linear inequality.

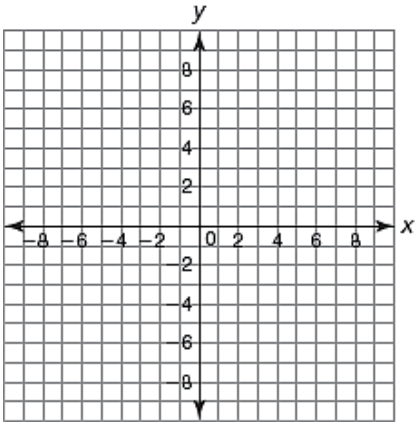
28. $y < 4x + 2$



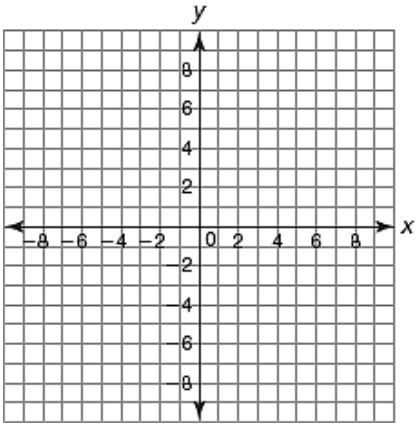
29. y ≥ -x +10



30. y > x + 1

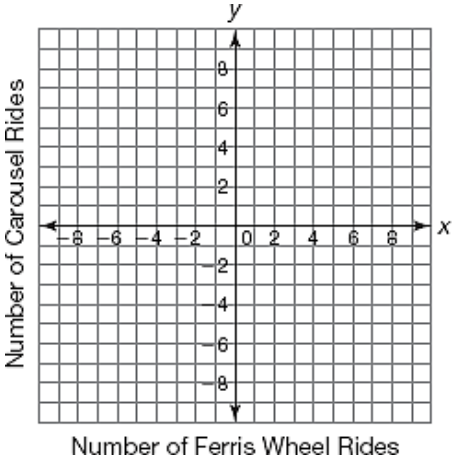


31. $3x - 4y \geq 8$



Graph each inequality and determine if the ordered pair is a solution for the problem situation.

32. Marcus has 50 tokens to spend at the school carnival. The Ferris wheel costs 7 tokens and the carousel costs 5 tokens. The inequality $7x + 5y \leq 50$ represents the possible ways Marcus could use his tokens on the two rides. Is the ordered pair (6, 3) a solution for the problem situation?



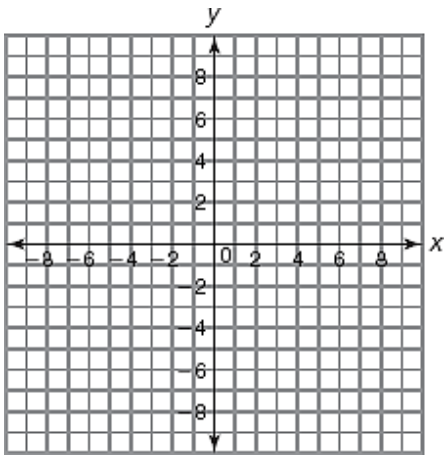
Write a linear inequality in two variables to represent each problem situation.

33. Tanya is baking zucchini muffins and pumpkin muffins for a school event. She needs at least 500 muffins for the event.

34. Patti makes decorative flower pots. It costs her $20 to purchase the materials for each pot. She wants to charge more than $6 per hour of labor plus her materials cost for each pot.

35. Graph the system of inequalities.

$$\begin{cases} y < 3x + 5 \\ y > -x + 3 \end{cases}$$



36. Carlos works at a movie theater selling tickets. The theater has 300 seats and charges $7.50 for adults and $5.50 for children. The theater expects to make at least $2000 for each showing. Write a system of inequalities to represent this situation. You do not have to solve.

37. Is the point (-2, -10) a solution to the system of inequalities? $\begin{cases} 2x - y > 4 \\ -x + y \leq 7 \end{cases}$

Calculate the first and second differences for each table of values. Describe the type of function represented by the table.

38.

x	*y*	First Differences	Second Differences
−2	−6		
−1	−3		
0	0		
1	3		
2	6		

39.

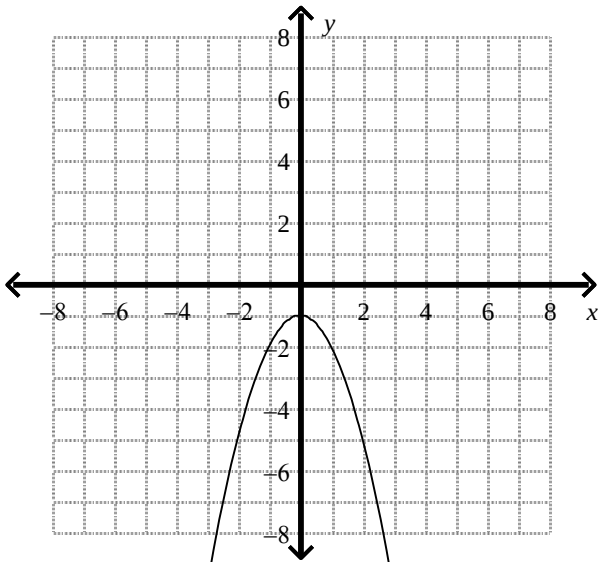
x	*y*	First Differences	Second Differences
−2	12		
−1	3		
0	0		
1	3		
2	12		

40. Write a quadratic function that represents a parabola that opens downward and has *x*-intercepts $(-2, 0)$ and $(5, 0)$.

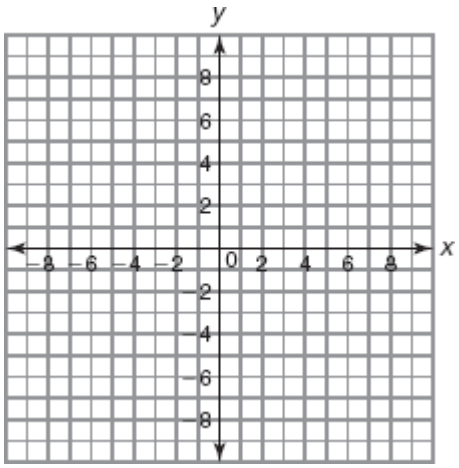
41. What are the x-intercepts of the function $f(x) = (x - 2)(x - 8)$?

42. Factor to determine the x-intercepts. $f(x) = x^2 + 8x + 12$

43. What are the coordinates of the vertex of the graph? Is it a maximum or minimum?



44. Graph the function $y = 0.5x^2$. State the domain and range.



45. How is the graph of $y = -4x^2 - 5$ different from the graph of $y = -4x^2$?

46. Factor: $6x - 24$

47. $f(x) = x^2 + 2x - 15$ Determine the vertex if the axis of symmetry is $x = -1$.

Determine the axis of symmetry of each parabola.

48. The *x*-intercepts of a parabola are (3, 0) and (9, 0).

49. Two symmetric points on a parabola are $(-1, 4)$ and $(5, 4)$.

Identify the form of each quadratic function as either standard form, factored form, or vertex form. Then state all you know about the quadratic function's key characteristics, based only on the given equation of the function.

50. $f(x) = -(x-8)(x-4)$

51. $f(x) = 2x^2 - 1$

52. $f(x) = 5(x-3)^2 + 12$

Determine the vertex of each quadratic function written in vertex form.

53. $f(x) = \frac{1}{2}(x-2)^2 + 6$

Describe the translation performed on each function *g(x)* to result in *d*(*x*).

54. $g(x) = x^2$

$d(x) = x^2 - 5$

Describe the translation performed on each function *g*(*x*) to result in *m*(*x*).

55. $g(x) = x^2$

$m(x) = (x+4)^2$

Determine whether each expression is a polynomial. If the expression is not a polynomial, explain why it is not.

56. $-2w^3 + w^2 - 5$

57. $6m^{\frac{1}{2}}$

Write each polynomial in standard form. Classify the polynomial by its number of terms and by its degree.

58. $x^3 - x^2 - x^5$

Simplify each expression.

59. $(5x-8) + (7x+10)$

60. $(4m^2 + 9m) - (2m^2 + 6)$

61. $(-x^2 + 5x - 12) + (2x^2 - 6)$

62. $(10t^2 - 3t + 9) - (6t^2 - 7t)$

63. $(-7m^3 - m^2 - m) - (-10m^3 - m - 1)$

Identify the terms and coefficients in each expression.

64. $-3w^4 + w^2 - 9$

Determine the product of the polynomials using the Distributive Property.

65. $3x(x^2 + 5x - 1)$

66. $(x + 2)(x^2 + 6x - 1)$

67. $2x(x + 6)$

68. $(2x + 1)(x + 8)$

Factor each of the following completely. If possible, factor out the greatest common factor first.

69. $x^2 - 9x + 18$

70. $4w^2 + 12w - 40$

71. $3m^3 + 36m^2 + 60m$

72. $x^2 - 2x - 8$

73. $x^2 + 4x - 12$

74. $x^2 + 4x + 4$

75. $x^2 - 10x + 25$

76. $5x^2 + 10x - 15$

77. $x^2 + 9x$

Factor and solve each quadratic equation. Check your answer(s).

78. $x^2 + 8x = 0$

79. $2t^2 + t - 3 = 0$

80. $x^2 + 5x + 6 = 0$

81. $x^2 - 3x - 4 = 0$

Determine the zeros of each quadratic function, if possible. Check your answer(s).

82. $f(x) = x^2 - 9x - 36$

83. $f(x) = 2x^2 + 9x + 10$

Determine the root(s) of each quadratic equation. Check your answer(s).

84. $4x^2 - 9 = 0$

85. $x^2 - 100 = 0$

86. $m^2 - 16m + 64 = 0$

Simplify each square root. No decimal answers.

87. $\sqrt{45}$

88. $\sqrt{12}$

89. $\sqrt{32}$

Solve each quadratic equation. Approximate the roots to the nearest tenth.

90. $x^2 = 40$

91. $(x-5)^2 = 22$

92. $x^2 = 27$

Determine the unknown value that would make each trinomial a perfect square.

93. $x^2 - 10x +$ _____

94. $x^2 -$ _____$x + 81$

Determine the roots of each quadratic equation by completing the square. Round your answer to the nearest hundredth. Check your answer(s).

95. $x^2 + 4x - 6 = 0$

96. $x^2 + 10x + 2 = 0$

Determine the approximate zeros or roots of each function or equation using the Quadratic Formula. Round your answers to the nearest hundredth, if necessary.

97. $f(x) = x^2 + 3x - 5$

98. $f(x) = -3x^2 - x + 7$

Choose the term that best completes each statement.

dot plot	skewed left	box-and-whisker plot
five number summary	discrete data	skewed right
histogram		

99. A(n) _____ displays the data distribution based on a five number summary.

100. A data distribution is _____ if the peak of the data is to the right side of the graph with only a few data points to the left side of the graph.

101. A(n) _____ is a graph that shows how discrete data are distributed using a number line.

102. For a set of data, the _____ consists of the minimum value, the first quartile, the median, the third quartile, and the maximum value.

103. A(n) _____ is a graphical way to display quantitative data using vertical bars.

104. A data distribution is _____ if the peak of the data is to the left side of the graph with only a few data points to the right side of the graph.

Analyze the given dot plot which displays the number of gold medals won by the top 20 medal winning countries in the 2010 winter Olympics. Use the dot plot to answer each question.

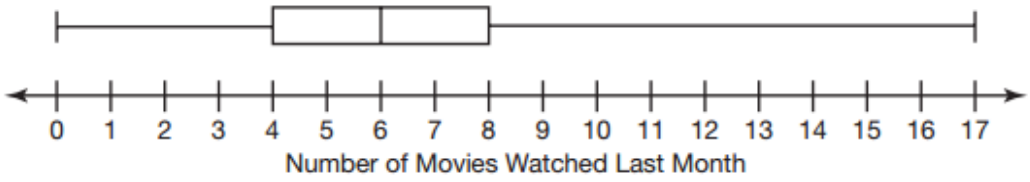
105. Describe the distribution of the data in the dot plot and explain what it means in terms of the problem situation.

106. How many gold medals were won by the top 20 medal winning countries?

107. How many countries won no more than 5 gold medals?

108. How many countries won at least 2 gold medals?

Analyze the given box-and-whisker plot which displays the number of movies watched by the students in Ms. Baker's class during the past month. Use the box-and-whisker plot to answer each question.



109. What is the range for the number of movies in the middle 50 percent?

110. How many students watched exactly 6 movies?

111. What percent of the students watched 6 movies or less?

Analyze the given histogram which displays the students' heights in Mrs. Carson's Math Class. Use the histogram to answer each question.

112. How many students are represented by the histogram?

113. How many of the students had a height of at least 55 inches?

114. How many students were less than 65 inches tall?

115. What percent of students are 60 inches or taller?

116. How many boys are over 50 inches tall?