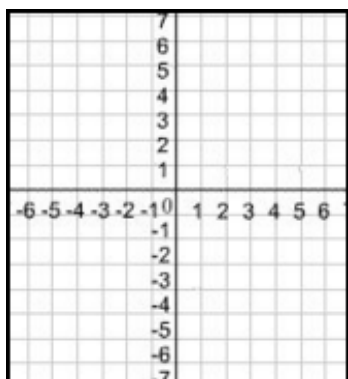# Algebra FINAL EXAM REVIEW

Solve the linear system by graphing.
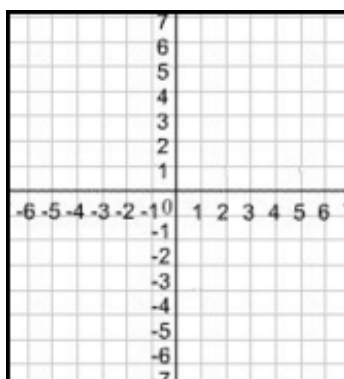
1. $y = -x + 2$

$y = x - 4$

2. $y = -\dfrac{1}{4}x - 1$
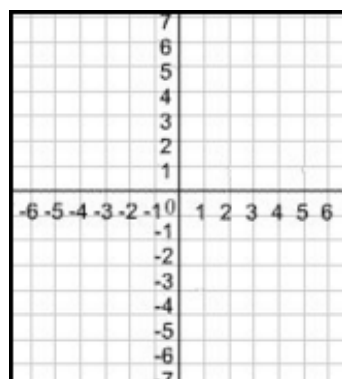
$y = \dfrac{3}{4}x + 3$

3. $y = -4x + 8$

$y = 2x - 4$

Directions: Without graphing, tell whether the linear system has *one solution, no solutions, or infinitely many solutions.* *SHOW YOUR WORK OR EXPLAIN.*

4) $y = 4x + 7$

$-8x + 2y = 14$

5) $y = 3x - 3$

$y = 3x - 2$

6) $y = -2x - 3$

$y = 4x - 3$

Solve each system by substitution.

7. $y = 2x - 9$

$x + 3y = 8$

8. $y = 3x$

$y = -x + 4$

9. $3y + 2x = 4$

$2x + y = -7$

Solve the system by elimination.

10. $4x - y = 6$
    $3x + 2y = 21$

11. $x + 2y = 9$
    $3x + 2y = 7$

12. $3x + 5y = 10$
    $x - 5y = -10$

13. Your teacher is giving you a test worth 100 points containing 40 questions. There are two-point and four-point questions on the test. How many of each type of question are on the test?

14. Suppose you are starting an office-cleaning service. You have spent $315 on equipment. To clean an office, you use $4 worth of supplies. You charge $25 per office. How many offices must you clean to break even?

15. The math club and the science club had fundraisers to buy supplies for a hospice. The math club spent $135 buying six cases of juice and one case of bottled water. The science club spent $110 buying four casesof juice and two cases of bottled water. How much did a case of juice cost? How much did a case of bottled water cost?

16. Suppose you invest $1500 in equipment to put pictures on T-shirts. You buy each T-shirt for $3. After you have placed the picture on a shirt, you sell it for $20. How many T-shirts must you sell to break even?

17. Suppose you bought supplies for a party. Three rolls of streamers and 15 party hats cost $30. Later, you bought 2 rolls of streamers and 4 party hats for $11. How much did each roll of streamers cost? How much did each party hat cost?

Simplify the expression.

18. xy^{-3}

19. $\dfrac{1}{x^{-7}}$

20. $\dfrac{d^{-4}}{e^{-7}}$

21. $8a^{-3}b^2c^{-2}$

22. $\dfrac{6m^{-8}n}{p^{-1}}$

23. $\dfrac{a^{-2}b^{-1}}{cd^{-3}}$

24. $(-8m^4)(4m^8)$

25. $x^{-9} \cdot x^3 \cdot x^2$

26. $(4a^5)^3$

27. $(x^5 y^3)^3 (xy^5)^2$

28. $(a^4)^{-5} \cdot a^{13}$

29. $2^5 \cdot (2^4)^2$

Write each answer in scientific notation:

30. $(7 \times 10^7)(5 \times 10^{-5})$

31. $(3 \times 10^8)(3 \times 10^4)$

32. $(3 \times 10^{-6})^3$

33. $(3 \times 10^5)^4$

34. $5(3 \times 10^9)$

35. $0.9(.7 \times 10^{-2})$

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36. Graph the function: $y = 2 \cdot 3^x$

37. Graph the function: $y = \dfrac{1}{2} \cdot 5^x$

Evaluate the function rule for the given value.

38. $y = 4 \cdot 5^x$ when x = -4

39. $y = \frac{1}{2} \cdot 4^x$ when x = 2

40. Suppose an investment of $4500 doubles every 4 years. How much is the investment worth after 32 years?

41. Suppose the population of a town is 9734 and is growing by 6% every year. Write an equation to model the population growth and predict the population of the town in 14 years.

Find the balance in the account.

42. $5700 principal, earning 2.5% after 8 years.

43. A car costs $32,500 and depreciates in value by 6% every year. How much is the car worth 7 years later?

44. Which function best represents the data?

x	y
1	3
2	9
3	27
4	81

A. $y = 3x$ **B.** $y = x^3$ **C.** $y = 3^x$

Simplify the expression.

45. $-4\sqrt{54}$ **46.** $\sqrt{81}$ **47.** $8\sqrt{24}$

48. $-3\sqrt{75m^4}$

49. $2\sqrt{32x^3}$

50. $\sqrt{\dfrac{5}{36}}$

51. $7\sqrt{16} \cdot \sqrt{7m^3}$

52. $\sqrt{\dfrac{88}{2}}$

53. $\dfrac{3}{\sqrt{11}}$

54. $\dfrac{-2\sqrt{24}}{\sqrt{18}}$

Simplify the expression.

55. $7\sqrt{3} + \sqrt{3}$

56. $\sqrt{2} + 7\sqrt{72}$

56. $\sqrt{5}\left(6\sqrt{10} + 7\right)$

Write each polynomial in standard form. Then name each expression based on its degree and number of terms.

57. $2x^3 - x^2 + 4x$

58. $y^2 + 3y + 6 - 4y^2 - 6y$

Simplify the sum or difference.

59. $(x^2 - 3x + 5) + (x^2 + 2x - 3)$

60. $(3x^2 + 4x - 10) - (2x + 7 - 4x^2)$

61. $(8x - 4x^2 + x^3) - (8x^2 + 4x^3 - 7x)$

Simplify each product. Write in standard form.

62. $8x(3x + 4 - x^2)$

63. $-y(8y^2 + y)$

64. $7x(3 - x + 6x^3)$

Factor out the GCF from each polynomial.

65. $6y^2 - 12y^3 + 36y^4$ **66.** $-10y^3 + 8y^2 - 20y$

Factor.

67. $x^2 + 7x + 10$ **68.** $m^2 + 12m + 27$ **69.** $x^2 + 3x - 28$

70. $d^2 - 5d - 6$ **71.** $x^2 - 7x - 30$ **72.** $w^2 + 12w + 36$

73. $n^2 - 36$ **74.** $z^2 - 121$

Simplify.

75. $(3x - 9)(2x - 7)$ **76.** $(7x - 5)(x + 1)$ **77.** $(5b + 2)(5b - 2)$

78. $(2x + 5)^2$ **79.** $(2x + 1)(4x^2 - 3x - 5)$

80. $(5x - 3)(6x^2 + 10x - 2)$

Graph the function. Give the equation of the axis of symmetry and the coordinates of the vertex.
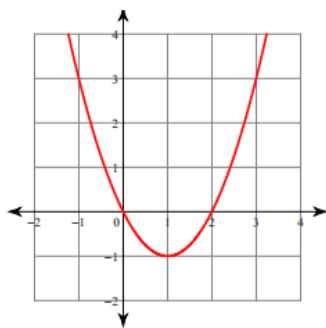
81. $y = x^2 + 3$

82. $y = 4x^2$
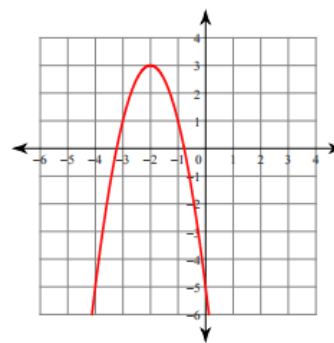
Order the quadratic functions from widest to narrowest.

83. $y = -2x^2$, $\quad y = \frac{1}{4}x^2$, $\quad y = -x^2$, $\quad y = 5x^2$,

Give the vertex and axis of symmetry in the graphs below.

84.

85.

Find the equation of the axis of symmetry and the coordinates of the vertex of the graph of each function.

86. $y = 2x^2 - 8x$

87. $y = x^2 + 4x - 6$

88. $y = -x^2 + 1$

GRAPH EACH FUNCTION ON GRAPH PAPER.
Label the AXIS OF SYMMETRY and the VERTEX.

89. $y = x^2 - 6x + 4$

90. $y = -2x^2 - 8x + 5$

Use the zero product property to solve.

91. $(x - 2)(x + 5) = 0$

92. $(3x + 4)(2x - 7) = 0$

Solve by factoring

93. $x^2 + 8x - 20 = 0$

94. $y^2 + 14y + 13 = 0$

95. $5x^2 - 45 = 0$

96. $a^2 + 6a - 72 = 0$

Solve using the Quadratic Formula

97. $4w^2 - 20w + 5 = 0$

98. $3x^2 + 12x = 10$

Determine if the model is LINEAR, QUADRATIC, or CUBIC. EXPLAIN your reasoning.

99. $(-1, 3), (1, 3), (3, 27), (5, 75), (7, 147)$

100.

x	y
−1	−2
0	−4
1	−6
2	−8