Algebra II Fall Final Review - REQUIRED EVEN IF YOU ARE EXEMPTING!!!

Show all work and solutions on separate paper. A calculator is allowed only on problems marked with an asterisk (*).

To which sets of numbers does the number belong?

1. $\sqrt{47}$
2. $-\frac{5}{14}$

Name the property of real numbers illustrated by the equation.

3. $2 \cdot \left(\sqrt{6} \cdot 4\right) = \left(2 \cdot \sqrt{6}\right) \cdot 4$
4. $\pi + 10 = 10 + \pi$
5. $5 \cdot \frac{1}{5} = 1$
6. $3.3 + 0 = 3.3$

Evaluate the expression for the given value of the variable(s).

7. $|2b - 6| + \left|3 - b^2\right| - b^3; b = 2$

Solve the equation.

8. $-3y - 12 = 4(y + 2)$
9. $4|2x + 3| + 6 = 2$
10. $4x^2 + 49 = 0$
11. $x^2 + 4x + 4 = 25$
12. $7(x - 0.4) - 0.5(4x - 3) = 4$

Solve for *x*. State any restrictions on the variables.

13. $ax + bx - 6 = -5$
14. $a(bx - 2) = cx - 11$

Solve the inequality. Graph the solution.

15. $|2x + 3| \geq 19$
16. $|2x + 10| < 26$
17. A spinner is numbered from 1 through 10 with each number equally likely to occur. What is the probability of obtaining a number less than 3 or greater than 8 in a single spin?
18. A bag contains 9 red marbles, 5 white marbles, and 3 blue marbles. Find *P*(red or blue).
19. For $f(x) = 3x - 7$, find $f(2)$.
20. Suppose $f(x) = 4x - 2$ and $g(x) = -2x + 1$. Find the value of $\frac{f(-5)}{g(-3)}$.

Find the slope of the line through the pair of points.

21. (–7, 11) and (1, –7)

Write in standard form an equation of the line passing through the given point with the given slope.

22. slope = 10; (–4, –4)

Find the slope of the line.

23. $y = -\frac{9}{4}x + 4$
24. $6x - 5y = 2$

Find an equation for the line:

25. through (–7, –3) and perpendicular to $y = \frac{1}{4}x + 1$.
26. through (–2, –4) and parallel to $y = 3x + 3$.

Determine whether *y* varies directly with *x*. If so, find the constant of variation *k*.

27. $-3y = 5x$
28. $4y - 4x = -9$
29. Graph $y = |x - 4|$
30. What is the vertex of the function $y = -|-2x - 5| - 6$?

Graph the inequality:

31. $-2x - 3y < -5$

32. $-x + y \leq -5$

Solve the system by graphing.

33. $\begin{cases} -2x - y = 8 \\ x - 5y = -4 \end{cases}$

34. A rental car agency charges a flat fee of $21.00 plus $2.00 per day to rent a certain car. Another agency charges a fee of $17.00 plus $3.00 per day to rent the same car.
    a. Write a system of equations to represent the cost c for renting a car at each agency for d days.
    b. Find the number of days for which the costs are the same.

Without graphing, classify each system as *independent, dependent,* or *inconsistent.*

35. $\begin{cases} -2x - y = -3 \\ x - y = 3 \end{cases}$

36. $\begin{cases} y = -7x - 7 \\ 21x + 3y = -21 \end{cases}$

37. Solve the system by substitution:

$$\begin{cases} 2x - 2y - z = -9 \\ z = 1 \\ -x + y - 3z = 1 \end{cases}$$

38. Solve the system by elimination:

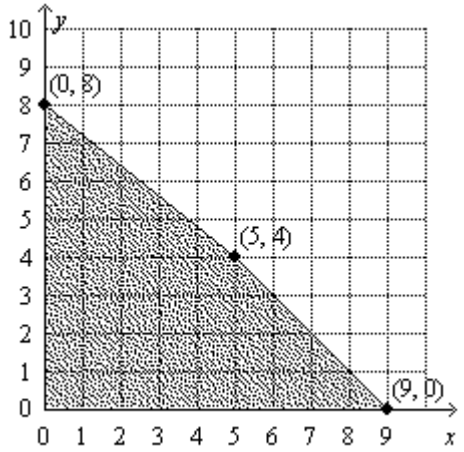
$$\begin{cases} 4x + 2y = 10 \\ 7x - 3y = -15 \end{cases}$$

Solve the system of inequalities by graphing.

39. $\begin{cases} y \leq -x - 2 \\ y > 3x - 3 \end{cases}$

40. $\begin{cases} x \geq 3 \\ y > -4 \end{cases}$

41. Find the values of x and y that maximize the objective function $P = 3x + 2y$ for the graph. What is the maximum value?



42. Graph the system of constraints. Then find the values of x and y that maximize $P = 50x + 10y$.

$$\begin{cases} x \geq 0 \\ y \geq 0 \\ -x + y \leq 1 \\ x \leq 2 \end{cases}$$

Find the sum or difference.

43. $\begin{bmatrix} 4 & 7 \\ -5 & 1 \end{bmatrix} - \begin{bmatrix} -3 & -2 \\ 0 & 6 \end{bmatrix}$

44. $\begin{bmatrix} -6 & -1 & 7 \\ 0 & -1 & 2 \end{bmatrix} + \begin{bmatrix} -2 & 0 & 3 \\ 4 & 5 & -1 \end{bmatrix}$

Find the values of the variables.

45. $\begin{bmatrix} -2-t & 0 \\ 8 & -8 \end{bmatrix} = \begin{bmatrix} -5 & 0 \\ 8 & -2y+2 \end{bmatrix}$

46. $\begin{bmatrix} -4 & -w^2 \\ 2f & 3 \end{bmatrix} = \begin{bmatrix} 2k & -16 \\ 0 & 3 \end{bmatrix}$

Solve the matrix equation.

47. $X + \begin{bmatrix} 2 & -5 & 8 \\ -8 & 3 & 0 \end{bmatrix} = \begin{bmatrix} 6 & -1 & 9 \\ -5 & 2 & 8 \end{bmatrix}$

48. $2X - 4\begin{bmatrix} 2 & -8 \\ -4 & 2 \end{bmatrix} = \begin{bmatrix} 4 & -6 \\ 2 & -8 \end{bmatrix}$

Find the product.

49. $\begin{bmatrix} 6 & -8 & 1 \end{bmatrix}\begin{bmatrix} -8 \\ 7 \\ -1 \end{bmatrix}$

50. $\begin{bmatrix} -5 & -7 \\ 2 & 4 \end{bmatrix}\begin{bmatrix} -4 & 7 \\ -1 & 9 \end{bmatrix}$

Evaluate the determinant of the matrix.

51. $\begin{bmatrix} -9 & 1 \\ -5 & 5 \end{bmatrix}$

52. $\begin{bmatrix} \frac{1}{2} & \frac{2}{3} \\ \frac{1}{3} & \frac{1}{2} \end{bmatrix}$

Find the inverse matrix, if it exists.

53. $\begin{bmatrix} -9 & -32 \\ 2 & 7 \end{bmatrix}$

54. $\begin{bmatrix} -1 & -1 \\ -3 & -2 \end{bmatrix}$

Use Cramer's Rule to solve the system.

55. $\begin{cases} -3x + 2y = 6 \\ 2x - y = 1 \end{cases}$

56. $\begin{cases} 2x - y = -5 \\ x + 2y = 20 \end{cases}$

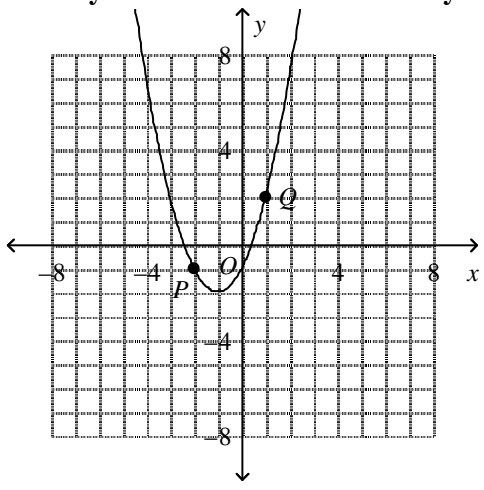
Solve the system using inverse matrices with your graphing calculator.

***57**. $\begin{cases} -5x + 4y - z = 11 \\ 3x - 3y - 5z = 17 \\ -2x - 5y + 4z = 0 \end{cases}$

***58**. $\begin{cases} 2w + x - 3y = 19 \\ 3w - x - 3y - 2z = 14 \\ w - 2x - y - 2z = -2 \\ -2w + 2x + 3y + z = -7 \end{cases}$

Identify the vertex and the axis of symmetry of the parabola. Identify points corresponding to *P* and *Q*.

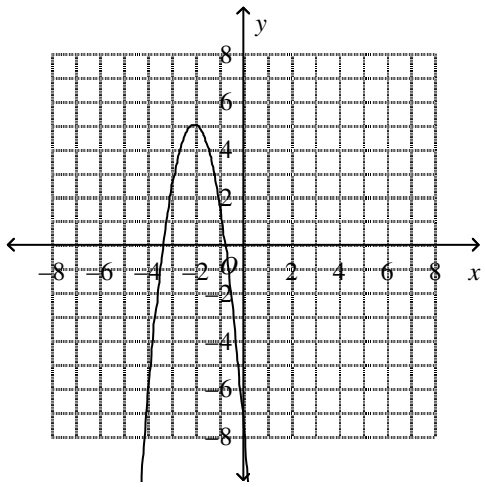
59.



***60**. Find a quadratic model for the given values: (–2, –20), (0, –4), (4, –44)

61. Write the equation of the parabola in vertex form.

62. Write $y = -4x^2 + 32x - 67$ in vertex form.



Factor the expression.

63. $10x^2 + 25x$

64. $x^2 + 14x + 48$

65. $x^2 - 13x + 40$

66. $2x^2 - 7x - 30$

67. $9x^2 + 24x + 16$

68. $25x^2 - 36$

Simplify the expression.

69. $(-1 - 5i) + (-2 - 5i)$

70. $(-4 - i) - (2 - 3i)$

71. $(7i)(-2i)$

72. $(-3 - 4i)(2 - 3i)$

Solve the quadratic equation by completing the square.

73. $x^2 + 8x + 9 = 0$

74. $x^2 + 4x + 14 = 0$

Use the Quadratic Formula to solve the equation.

75. $3x^2 - 7x - 2 = 0$

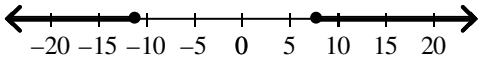
76. $2x^2 + x + 2 = 0$

77. Graph $y = x^2 - 2x - 5$. What is the minimum value of the function?

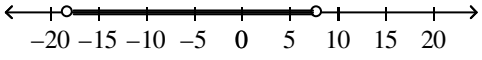
78. Graph $y = -3x^2 + 6x + 5$. Does the function have a maximum or minimum value? What is this value?

Algebra II Fall Final Review Solutions - REQUIRED EVEN IF YOU ARE EXEMPTING!!!

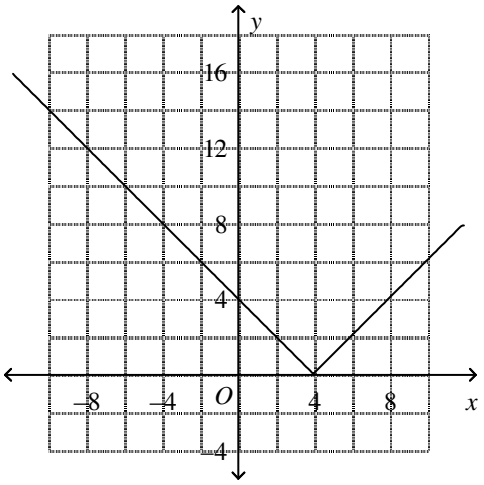
1. irrational numbers, real numbers
2. rational numbers, real numbers
3. Associative Property of Multiplication
4. Commutative Property of Addition
5. Inverse Property of Multiplication
6. Identity Property of Addition
7. -5
8. $-2\frac{6}{7}$
9. $x = -2$ or $x = -1$
10. $-\frac{7}{2}i, \frac{7}{2}i$
11. $3, -7$
12. $\frac{53}{50}$ or 1.06
13. $x = \frac{1}{a+b}; a \neq -b$
14. $x = \frac{-11+2a}{ab-c}; ab \neq c$
15. $x \leq -11$ or $x \geq 8$



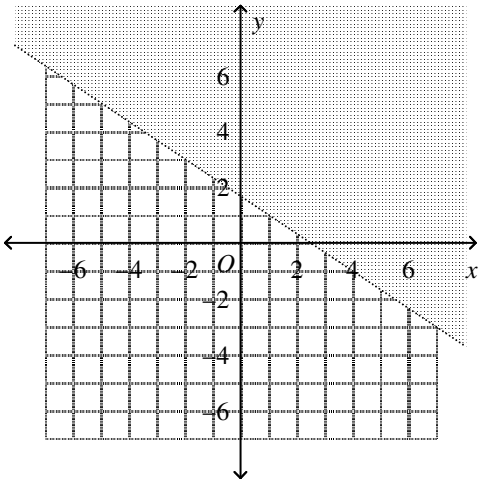
16. $-18 < x < 8$



17. $\frac{2}{5}$
18. $\frac{12}{17}$
19. -1
20. $-3\frac{1}{7}$
21. $-\frac{9}{4}$
22. $-10x + y = 36$
23. $-\frac{9}{4}$
24. $\frac{6}{5}$
25. $y = -4x - 31$
26. $y = 3x + 2$
27. yes; $-\frac{5}{3}$
28. no
29.



30. $(-\frac{5}{2}, -6)$
31.



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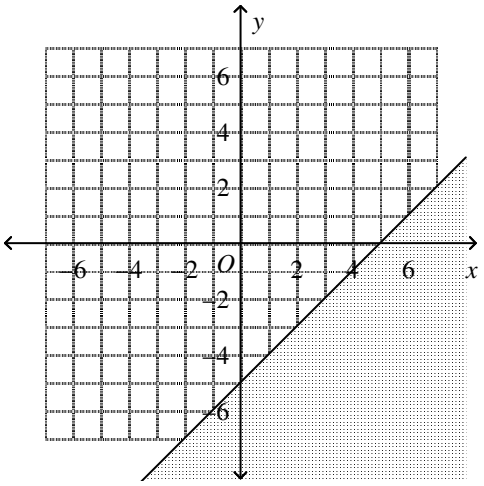

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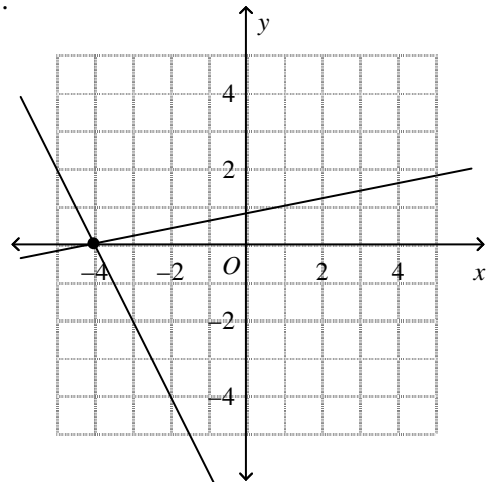


(–4, 0)

34. **a.** $\begin{cases} c = 2.00d + 21.00 \\ c = 3.00d + 17.00 \end{cases}$

b. 4

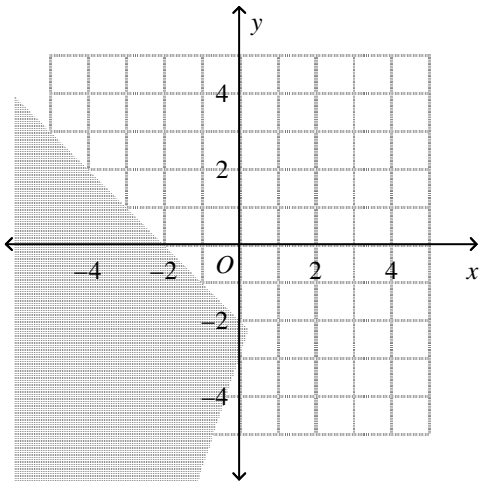
35. independent

36. dependent

37. (–6, –2, 1)

38. (0, 5)

39.



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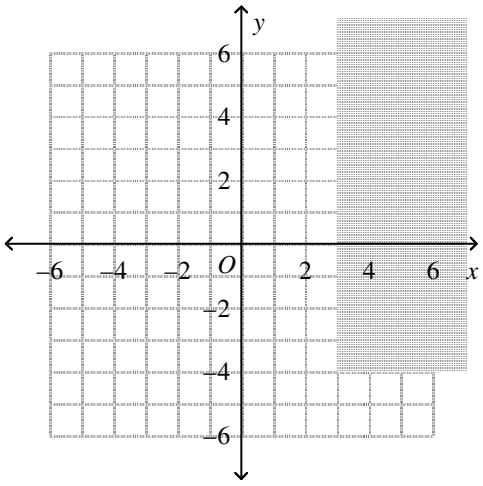
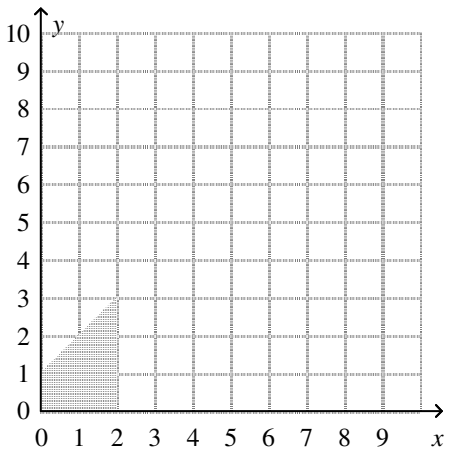


41. maximum value at (9, 0); 27

42.



Vertices

(0, 0): $P = 50(0) + 10(0) = 0$
(0, 1): $P = 50(0) + 10(1) = 10$
(2, 0): $P = 50(2) + 10(0) = 100$
(2, 3): $P = 50(2) + 10(3) = 130$

When $x = 2$ and $y = 3$, P has its maximum value of 130.

43. $\begin{bmatrix} 7 & 9 \\ -5 & -5 \end{bmatrix}$

44. $\begin{bmatrix} -8 & -1 & 10 \\ 4 & 4 & 1 \end{bmatrix}$

45. $t = 3, y = 5$

46. $f = 0, k = -2, w = 4$ or -4

47. $\begin{bmatrix} 4 & 4 & 1 \\ 3 & -1 & 8 \end{bmatrix}$

48. $\begin{bmatrix} 6 & -19 \\ -7 & 0 \end{bmatrix}$

49. [–105]

50. $\begin{bmatrix} 27 & -98 \\ -12 & 50 \end{bmatrix}$

51. –40

52. $\frac{1}{36}$

53. $\begin{bmatrix} 7 & 32 \\ -2 & -9 \end{bmatrix}$

54. $\begin{bmatrix} 2 & -1 \\ -3 & 1 \end{bmatrix}$

55. $\begin{bmatrix} 8 \\ 15 \end{bmatrix}$

56. $\begin{bmatrix} 2 \\ 9 \end{bmatrix}$

57. (–3, –2, –4)

58. (3, 4, –3, 0)

59. (–1, –2), $x = -1$
$P'(0, -1)$, $Q'(-3, 2)$

60. $y = -3x^2 + 2x - 4$

61. $y = -3(x + 2)^2 + 5$

62. $y = -4(x - 4)^2 - 3$

63. $5x(2x + 5)$

64. $(x + 6)(x + 8)$

65. $(x - 5)(x - 8)$

66. $(2x + 5)(x - 6)$

67. $(3x + 4)^2$

68. $(5x + 6)(5x - 6)$

69. $-3 - 10i$

70. $-6 + 2i$

71. 14

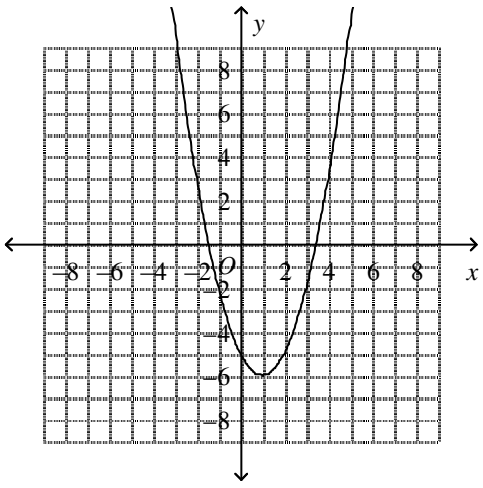
72. $-18 + i$

73. $-4 \pm \sqrt{7}$

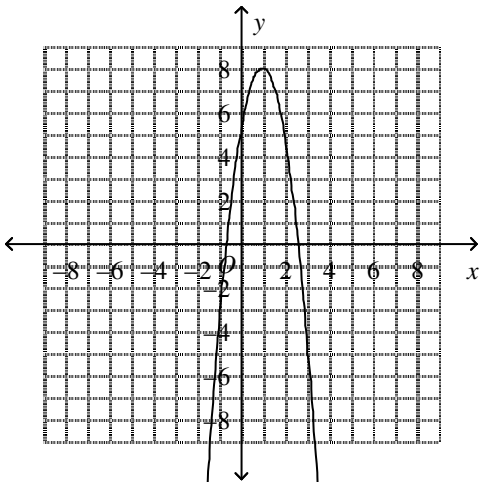
74. $-2 \pm i\sqrt{10}$

75. $\frac{7}{6} \pm \frac{\sqrt{73}}{6}$

76. $-\frac{1}{4} \pm \frac{i\sqrt{15}}{4}$

77. 

minimum: –6

78. 

maximum value; 8