Algebra 1 - Sem2 PRACTICE Final Exam

Formulas & Information (to be provided on the final exam as well)

PEMDAS

$y = \mathbf{m}x + \mathbf{b}$

m: slope

b: *y*-intercept

$m = \frac{y_2 - y_1}{x_2 - x_1}$

x-intercept: (a, 0)

y-intercept: (0, b)

vertex: (**h**, **k**)

$\mathbf{h} = -\frac{b}{2a}$

k = f(h)

Quadratic formula:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

If (a)(b) = 0, then
either a = 0 or b = 0 or both.

FOIL
Diamond
Diamond & Box

Factoring/Multiplication Patterns

$(a)^2 + 2ab + (b)^2 = (a + b)^2$
$(a)^2 + 2ab - (b)^2 = (a - b)^2$
$(a)^2 - (b)^2 = (a + b)(a - b)$

Rules of Exponents

$\frac{1}{a^{-x}} = (a)^x$ $\quad (a)^{-x} = \frac{1}{a^x}$

$(a^x)^y = a^{(x \cdot y)}$ $\quad (a \cdot b)^x = a^x \cdot b^x$

$a^x \cdot a^y = a^{(x + y)}$ $\quad \frac{a^x}{a^y} = a^{(x - y)}$

$(n)^0 = 1$

Standard deviation: σx

mean: average
median: medium
mode: most

$1^2 = \mathbf{1}$

$2^2 = \mathbf{4}$

$3^2 = \mathbf{9}$

$4^2 = \mathbf{16}$

$5^2 = \mathbf{25}$

$6^2 = \mathbf{36}$

$7^2 = \mathbf{49}$

$8^2 = \mathbf{64}$

$9^2 = \mathbf{81}$

$10^2 = \mathbf{100}$

$11^2 = \mathbf{121}$

$12^2 = \mathbf{144}$

$13^2 = \mathbf{169}$

$14^2 = \mathbf{196}$

$15^2 = \mathbf{225}$

$16^2 = \mathbf{256}$

$17^2 = \mathbf{289}$

$18^2 = \mathbf{324}$

$19^2 = \mathbf{361}$

$20^2 = \mathbf{400}$

$25^2 = \mathbf{625}$

Directions: Work through the following questions, showing all work necessary. If you need extra space to show your work, attach additional paper. Full credit will not be given for answers only.

Show all work for full credit.

Simplify

1. $-(w - 5) =$

   a. $w - 5$

   b. $w + 5$

   c. $-w - 5$

   d. $-w + 5$

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

   a. $32x + 3$

   b. $32x + 24$

   c. $12x + 11$

   d. $84x + 3$

3. $5(3x - 4) - 2x =$

   a. $13x - 4$

   b. $-7x$

   c. $13x - 20$

   d. $15x - 22$

Evaluate

4. if $x = 4$
   $5x^3 =$

   a. 8000

   b. 320

   c. 60

   d. 400

5. $f(x) = 5x^2 - 1$
   $f(-1) =$

   a. 24
   b. –26
   c. 4
   d. – 6

6. if $u = 16$, $x = 12$, and $y = 9$
   $u + xy =$

   a. 145

   b. 37

   c. 124

   d. 28

Collect like terms.

7. $2m + 5 + 4m - 6$

   a. $7m - 2$

   b. $6m - 1$

   c. $7m - 11$

   d. $6m - 11$

Translate each into an algebraic expression.

8. Seven less than one-third of a number

   a. $7 - 3x$

   b. -7

   c. $7 - \frac{1}{3}x$

   d. $\frac{1}{3}x - 7$

9. Two times the sum of a number and five

   a. $2n + 5$

   b. $2(n + 5)$

   c. $2n + 5n$

   d. $2n + n + 5$

Solve for the given variable.

10. $y + 9 = 15$

a. $\frac{5}{3}$ b. 24

c. 135 d. 6

11. $-6w = 42$

a. –7 b. 7

c. 48 d. 36

12. $\frac{t}{13} = -2$

a. 26 b. $\frac{2}{13}$

c. –26 d. $-\frac{2}{13}$

13. $a + 0.8 = 0.6$

a. –0.2 b. 0.2

c. 0.14 d. 1.4

14. $-4x + 3 = 12$

a. $\frac{9}{4}$ b. $-\frac{9}{4}$

c. –6 d. 0

15. $\frac{2}{3}w - 5 = 7$

a. 3 b. 8

c. 18 d. $1\frac{1}{3}$

16. $5 - y = 12$

a. 7 b. –7

c. 17 d. –17

17. $3(4x - 7) = 15$

a. 3 b. 13

c. 12 d. 2

18. $3v + 4v = 14$

a. 7 b. 2

c. 98 d. 14

19. $5x = 8 + x$

a. –3 b. 13

c. 2 d. $\frac{5}{8}$

20. $7x + 2(5x + 1) = 14x$

a. $-\frac{2}{3}$ b. $\frac{2}{3}$

c. $-\frac{1}{3}$ d. $\frac{1}{3}$

21. $\frac{3}{5} = \frac{12}{y}$

a. 0.05 b. 20

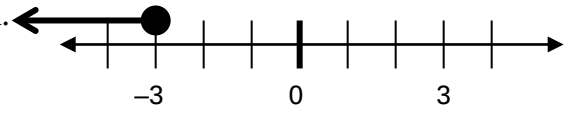
c. 60 d. 12.6

Solve for the given variable.

22. $|x - 2| = 20$

a. $x = -22,\ x = 22$
b. $x = 22$
c. $x = -18, x = 22$
d. no solution

23. Which graph represents $x \geq -3$?

a.


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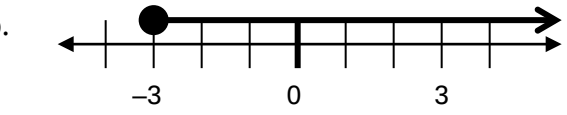

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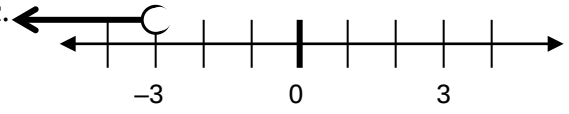

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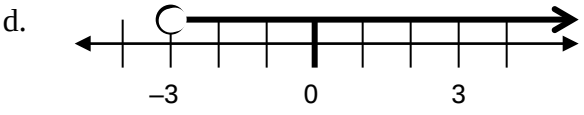


24. Which is equivalent to $-2 < x$?

a. $x < 2$ b. $x < -2$

c. $x > 2$ d. $x > -2$

Solve each inequality for the given variable.

25. $x - 5 \leq 8$

a. $x \geq 13$ b. $x \leq 13$

c. $x \geq 3$ d. $x \leq 3$

26. $-2y < 18$

a. $y < -9$ b. $y < 9$
c. $y > -9$ d. $y > 9$

27. $7 - 4x < -1$

a. $x > 2$ b. $x < 2$

c. $x < \frac{3}{2}$ d. $x > \frac{3}{2}$

28. Which of the following does **not** represent a function?

a. {(0, 4)}
b. {(1, 3), (2, 4), (5, 7), (6, 8)}
c. {(1, 4), (0, 2), (–5, 4)}
d. {(2, 5), (3, –2), (2, 0)}

29. What is the domain, D, and the range, R, of the relation defined by:
{(8, 1), (8, 4), (8, 2), (8, 3)}

a. D = {1, 2, 3, 4}
R = {8}

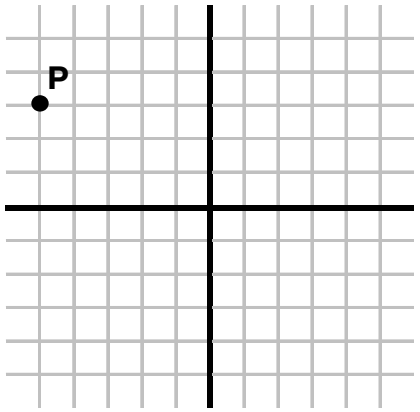
b. D = {8}
R = {1, 2, 3, 4}

c. D = {1, 2, 3, 4, 8}
R = all real numbers

d. D = all real numbers
R = {1, 2, 3, 4, 8}

30. What are the coordinates of point P?

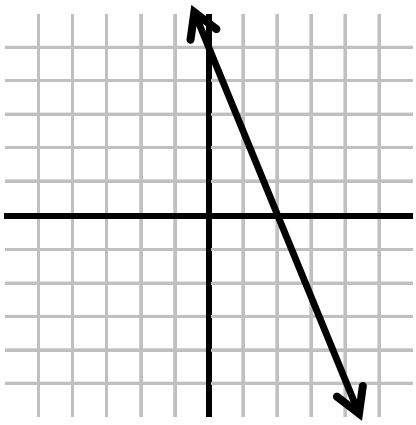
a. (3, – 5)
b. (– 3, 5)
c. (5, – 3)
d. (– 5, 3)



31. In which Quadrant is (– 2, 6) located?

a. Quadrant I c. Quadrant II
b. Quadrant III d. Quadrant IV

32. What are the coordinates of the y-intercept?



a. (0, 2)
b. (2, 0)
c. (0, 5)
d. (5, 0)

33. What are the x- and y-intercepts of the line with equation $3x - 4y = 24$?

a. x- intercept = 8, y- intercept = − 6
b. x- intercept = 3, y- intercept = − 4
c. x- intercept = 8, y- intercept = 6
d. x- intercept = 3, y- intercept = 4

34. What is the y-intercept of the line $y = \frac{2}{5}x - \frac{1}{5}$?

a. $\frac{2}{5}$ b. $\frac{1}{5}$
c. $-\frac{1}{5}$ d. $\frac{1}{2}$

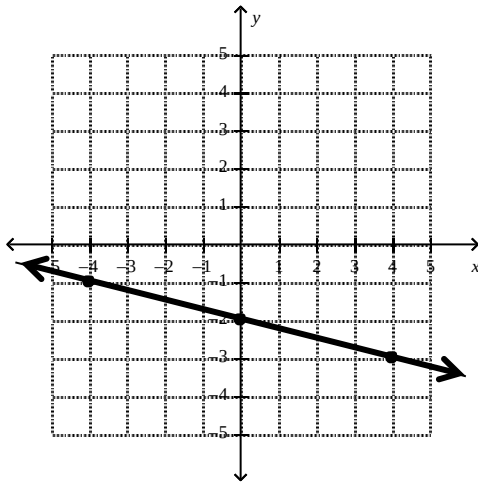
35. What is the slope of the line $y = -\frac{3}{4}x - 2$?

a. −2 b. $\frac{3}{4}$
c. 2 d. $-\frac{3}{4}$

36. A line passes through the points (0, − 8) and (− 2, 5). What is the slope of the line?

a. $-\frac{13}{2}$ b. $-\frac{3}{2}$
c. $\frac{13}{2}$ d. $\frac{3}{2}$

37. What is the slope of the line below?



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

38. The lines represented by $y = \frac{2}{3}x + 4$ and $y = \mathbf{m}x - 6$ are parallel. Which could be the value of **m**?

a. $\frac{3}{2}$ b. $\frac{2}{3}$
c. $-\frac{3}{2}$ d. $-\frac{2}{3}$

39. How are the lines $y = \frac{2}{3}x + 4$ and $y = -\frac{3}{2}x - 6$ related?

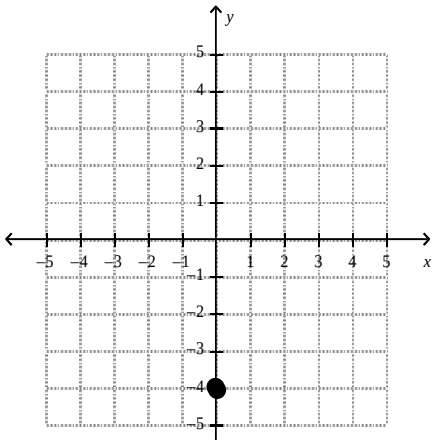
a. The lines are parallel.
b. The lines are perpendicular.
c. The lines intersect, but are not perpendicular.
d. The lines are the same.

40. How are the lines $y = \frac{2}{3}x + 4$ and $-3x + 2y = 6$ related?

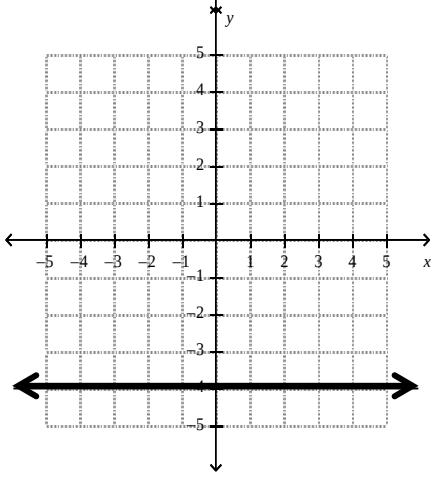
a. The lines are parallel.
b. The lines are perpendicular.
c. The lines intersect, but are not perpendicular.
d. The lines are the same.

41. Which graph represents y = −4?

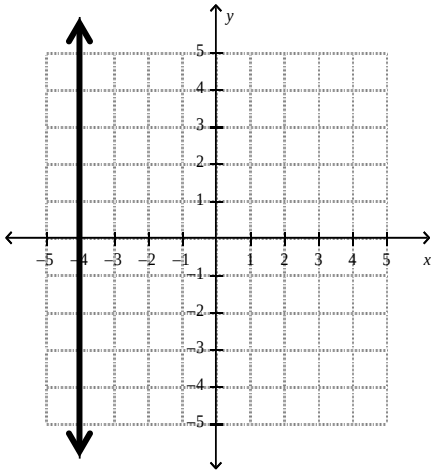
a.



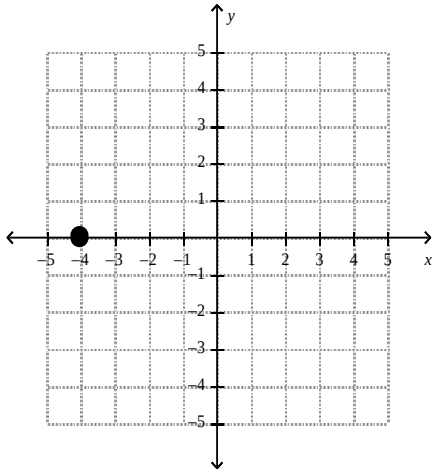
b.



c.

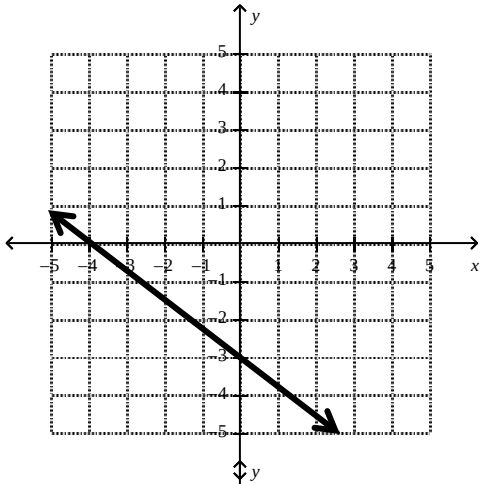


d.

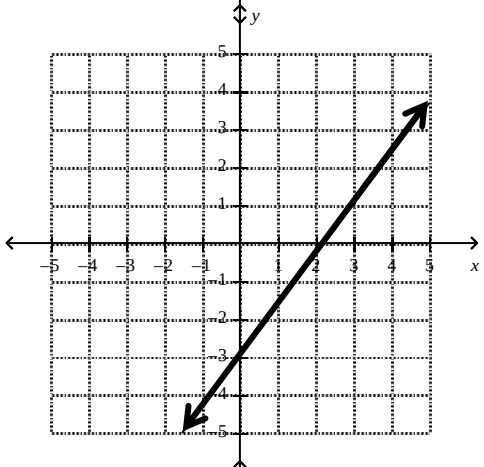


42. Which graph represents y = $\frac{3}{4}$ x – 3?

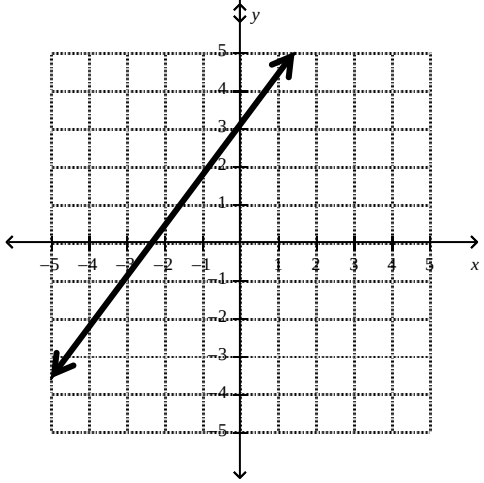
a.



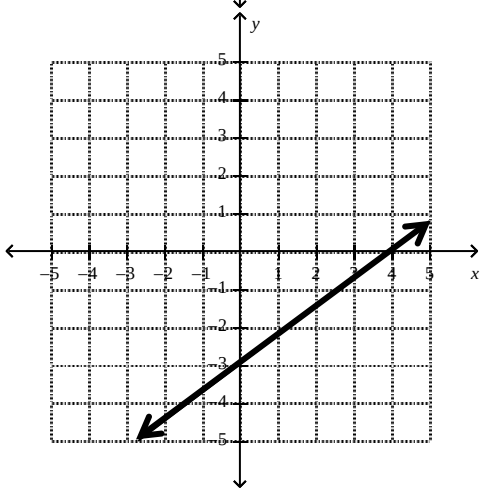
b.



c.



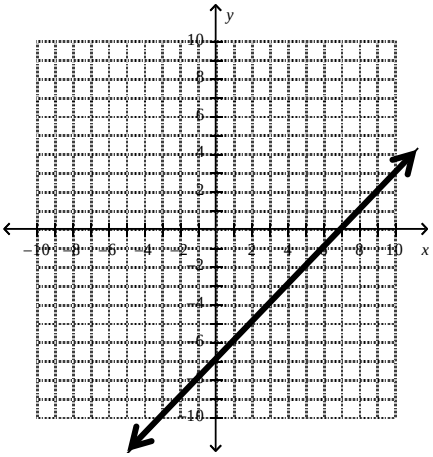
d.



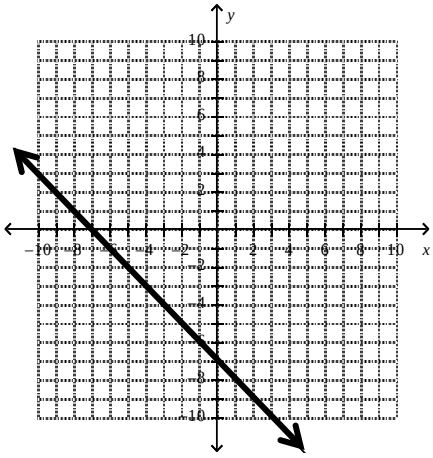
43. Which graph represents

$-7x + 7y = -49$?

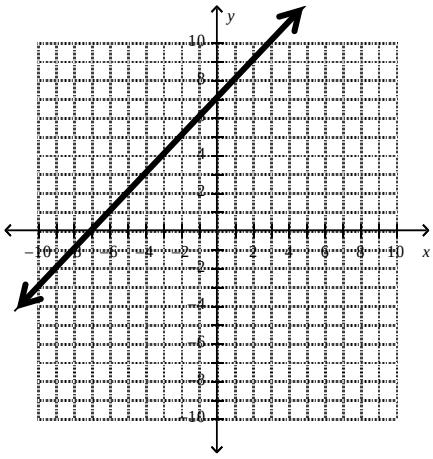
a.



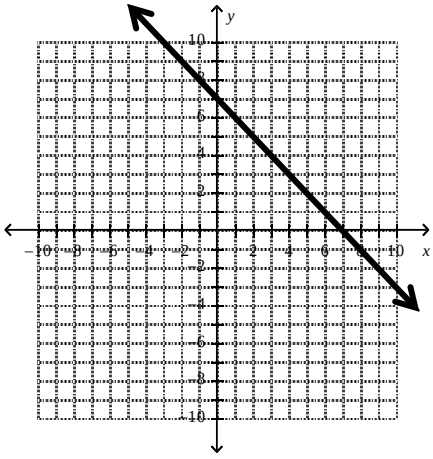
b.



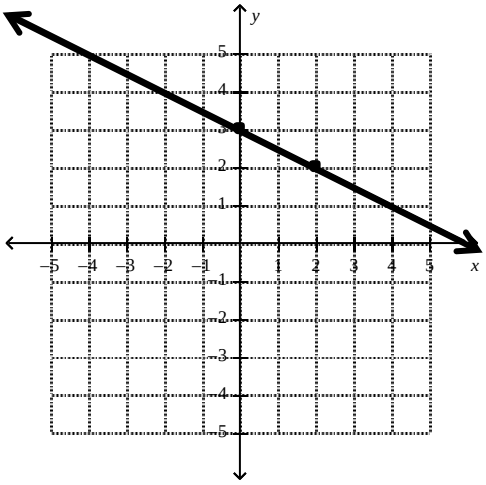
c.



d.



44. Which equation represents the graph shown?



a. $y = \frac{1}{2}x + 3$

b. $y = -\frac{1}{2}x + 3$

c. $y = 2x + 3$

d. $y = -2x + 3$

45. What is the equation of a line with the following?

slope of 5

y-intercept of (0, 8)

a. $y = -8x - 5$
b. $y = 8x + 5$
c. $y = -5x - 8$
d. $y = 5x + 8$

46. A line has a slope of – 3 and passes through the point (1, 4). What is the equation of this line?

a. $y = -3x + 13$
b. $y = -3x - 13$
c. $y = -3x + 7$
d. $y = -3x - 7$

47. A line passes through the points (1, –5) and (–3, 7). What is the equation of this line?

a. $y = 3x + 8$

b. $y = \frac{1}{3}x + \frac{8}{3}$

c. $y = \frac{1}{3}x + \frac{16}{3}$

d. $y = -3x - 2$

48. Identify the correct form of the Quadratic Formula.

A) $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

B) $x = \dfrac{-b \pm \sqrt{b^2 + 4ac}}{2a}$

C) $x = \dfrac{-b \pm \sqrt{b^2 - 2ac}}{4a}$

D) $x = \dfrac{b \pm \sqrt{b^2 - 2ac}}{4a}$

49. Identify a, b, and c for the following equation:

$$\mathbf{7x + 2x^2 = -8}$$

A) a = 7, b = 2, c = –8

B) a = 7, b = 2, c = 8

C) a = 2, b = 7, c = 8

D) a = $2x^2$, b = $7x$, c = 8

50. Identify the correct substitution into the Quadratic Formula for:

$$\mathbf{x^2 - x + 42 = 0}$$

A) $x = \dfrac{1 \pm \sqrt{(-1)^2 + 4(1)(42)}}{2(1)}$

B) $x = \dfrac{1 \pm \sqrt{(-1)^2 - 4(1)(42)}}{2(1)}$

C) $x = \dfrac{-1 \pm \sqrt{(-1)^2 - 4(1)(42)}}{2(1)}$

D) $x = \dfrac{-1 \pm \sqrt{(-1)^2 + 4(1)(42)}}{2(1)}$

51. Simplify: $\mathbf{x = \dfrac{5 \pm \sqrt{(-5)^2 - 4(3)(-3)}}{2(3)}}$

A) $x = \dfrac{5 \pm \sqrt{11}}{6}$

B) $x = \dfrac{5 \pm \sqrt{61}}{6}$

C) $x = \dfrac{5 \pm \sqrt{-11}}{6}$

D) $x = \dfrac{5 \pm \sqrt{-61}}{6}$

52. If $\mathbf{x = \dfrac{8 \pm 12}{4}}$, then

A) $x = 5$, $x = 11$
B) $x = -10$, $x = 14$
C) $x = -5$, $x = 5$
D) $x = -1$, $x = 5$

53. Use the Discriminant ($b^2 - 4ac$) to determine how many times the graph of $\mathbf{y = 2x^2 + 6x - 3}$ crosses the x-axis.

A) 0
B) 1
C) 2
D) 3

54. Solve: $\mathbf{(x - 7)(x + 6) = 0}$

A) $x = 7$, $x = -6$
B) $x = -7$, $x = 6$
C) $x = -7$, $x = -6$
D) $x = 7$, $x = 6$

55. Solve: $\mathbf{3x^2 - 11x + 6 = 0}$

A) $x = -\frac{2}{3}, x = -3$

B) $x = \frac{2}{3}, x = -3$

C) $x = -\frac{2}{3}, x = 3$

D) $x = \frac{2}{3}, x = 3$

56. Solve: $\mathbf{(x - 6)^2 = 81}$

A) $x = 15$
B) $x = 15, x = -15$
C) $x = 15, x = -3$
D) $x = 87, x = 75$

57. What number should be added in order to complete the square?

$$\mathbf{x^2 + 8x + \_\_\_\_\_}$$

A) 4
B) 8
C) 16
D) 64

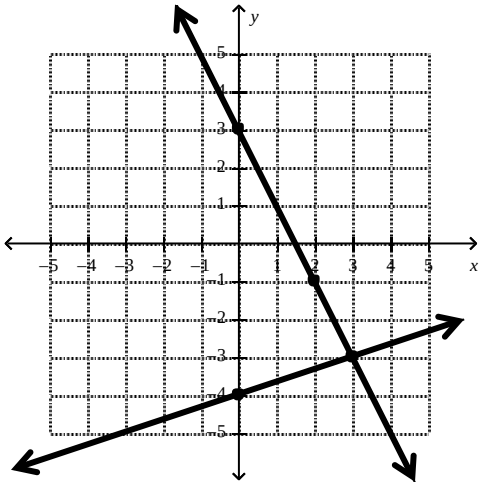
58. Solve the following system of equations.
$\mathbf{3x + 2y = 7}$
$\mathbf{y = -3x + 11}$

A) (6, – 3)
B) (6, – 7)
C) (5, – 4)
D) no solution

59. Solve the following system of equations:
$\mathbf{3x - 4y = -24}$
$\mathbf{x + y = -1}$

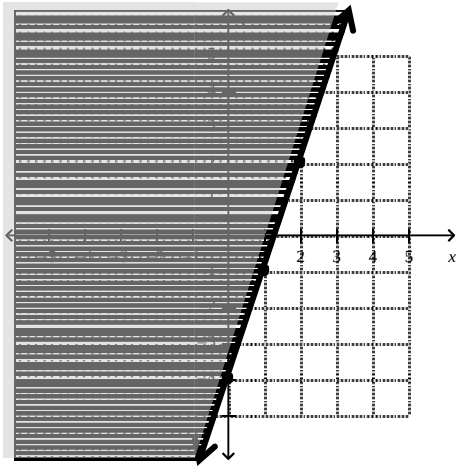
A) (–4, 3)
B) (3, 4)
C) no solution
D) infinitely many solutions

60. What is the solution to the system of equations shown in the graph?



A) (3, 3)
B) (– 3, 3)
C) (3, – 3)
D) (– 3, – 3)

61. Which inequality is represented by the graph below?



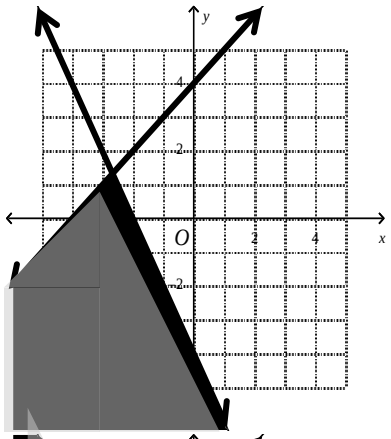
A) $y < 3x - 4$
B) $y \leq 3x - 4$
C) $y \geq 3x - 4$
D) $y > 3x - 4$

62. Which of the following shaded regions is the solution to the system of the inequalities below?

$y \leq x + 4$

$y \leq -2x - 4$

A)



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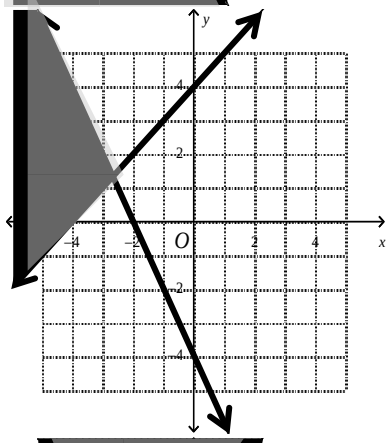
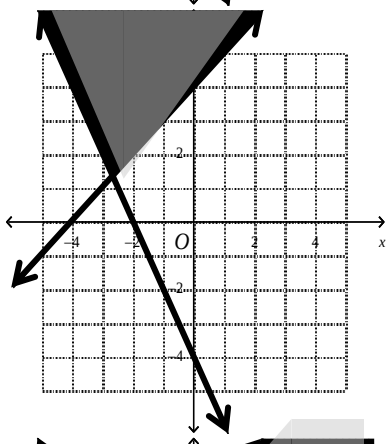
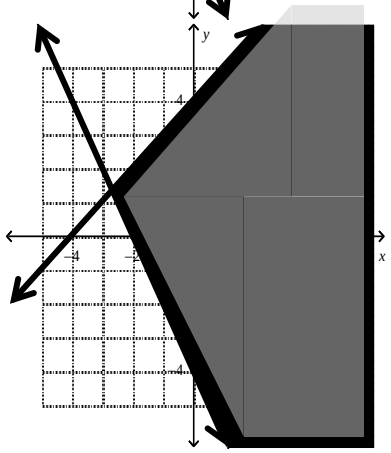


C)



D)



63. Simplify: $(7w^2 - 5w + 4) - (2w^2 + 2w - 3)$

A) $5w^2 - 7w + 7$
B) $5w^2 - 3w + 1$
C) $5w^2 + 7w - 7$
D) $5w^2 + 3w - 1$

64. Simplify $\frac{8x^4}{24x^9}$

A) $\frac{1}{3x^5}$
B) $3x^5$
C) $\frac{x^5}{3}$
D) $\frac{3}{x^5}$

65. Simplify $(3xy^4)^3$

A) $3xy^7$
B) $3xy^{12}$
C) $27x^3y^7$
D) $27x^3y^{12}$

66. Simplify 8^{-2}

A) -16
B) 64
C) $\frac{1}{16}$
D) $\frac{1}{64}$

67. Simplify 12^0

A) 0
B) 1
C) 12
D) $\frac{1}{12}$

68. Simplify $\mathbf{2w^{-7}}$

A) $\frac{1}{2w^7}$

B) $\frac{1}{128w^7}$

C) $\frac{2}{w^7}$

D) $-14w^7$

69. Simplify: $\mathbf{(2x-7)(2x-3)}$

A) $4x^2 - 20x + 21$
B) $4x^2 - 20x - 21$
C) $4x^2 - 8x + 21$
D) $4x^2 + 20x + 21$

70. Simplify: $\mathbf{(a+1)^2}$

A) $a^2 + 1$
B) $a^2 + 2$
C) $a^2 + 2a + 1$
D) $2a + 2$

71. Factor completely: $\mathbf{25x^2 - 9}$

A) $25(x^2 - 9)$
B) $(5x + 3)(5x - 3)$
C) $25(x + 3)(x - 3)$
D) $(5x - 3)^2$

72. One of the factors of $\mathbf{x^2 - 12x + 32}$ is:

A) $x - 16$
B) $x + 4$
C) $x + 8$
D) $x - 8$

73. Factor completely: $\mathbf{45x^2 + 60x + 20}$

A) $5(3x - 2)^2$
B) $5(3x + 2)^2$
C) $5(3x + 2)(3x - 2)$
D) $(5x + 4)(9x + 5)$

74. Find the x-intercepts of the function:
$\mathbf{y = 2x^2 - x - 10}$

A) $(2, 0)$ and $\left(-\frac{5}{2}, 0\right)$

B) $(0, -2)$ and $\left(0, -\frac{5}{2}\right)$

C) $(-2, 0)$ and $\left(\frac{5}{2}, 0\right)$

D) The function has no x-intercepts

75. Find the y-intercept of the function:
$\mathbf{y = 2x^2 - 6x - 8}$

A) $(8, 0)$
B) $(-1, 0)$
C) $(0, 8)$
D) $(0, -8)$

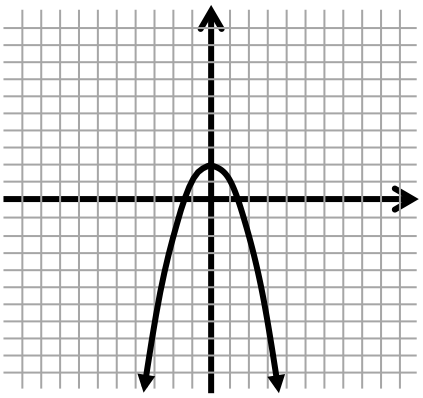
76. Find the coordinates of the vertex of:
$\mathbf{y = x^2 + 2x - 5}$

A) $(-1, -6)$
B) $(-1, -2)$
C) $(1, -2)$
D) $(1, -8)$

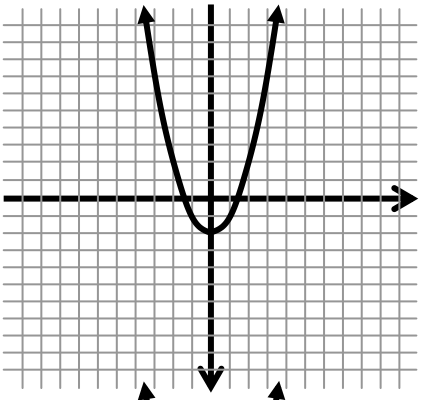
77. Which graph represents the following equation?

$$y = x^2 - 2$$

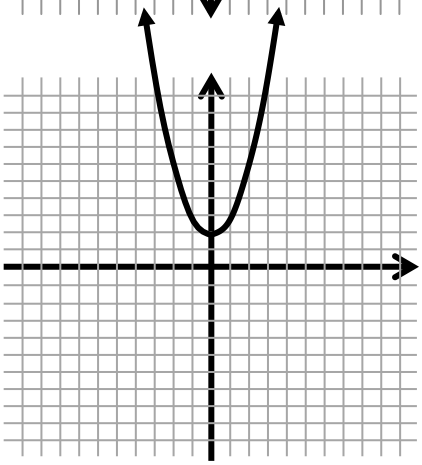
A)



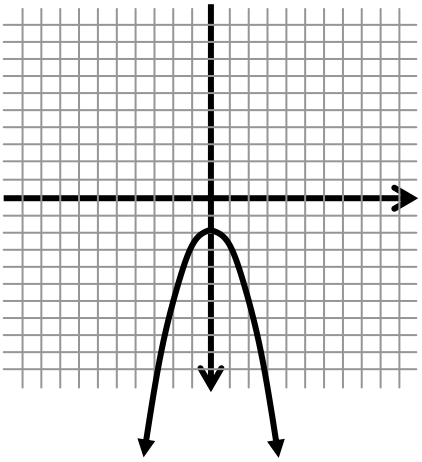
B)



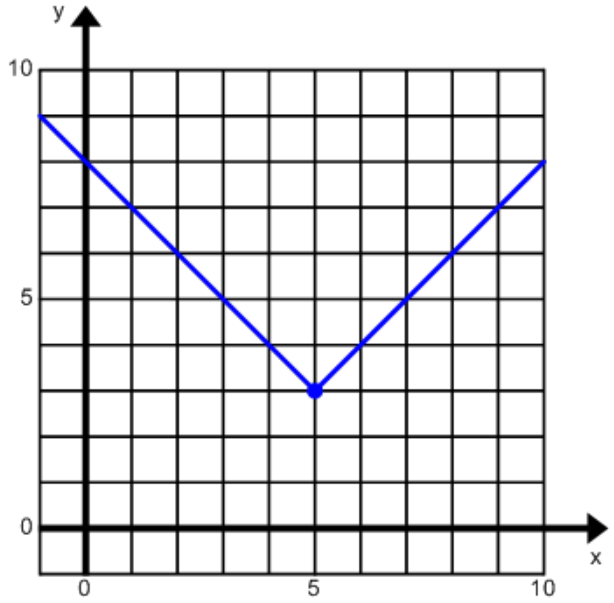
C)



D)



Use the graph below to answer #79-80.



78. Identify the parent function of the graph:

A) $f(x) = x$

B) $f(x) = |x|$

C) $f(x) = x^2$

D) $f(x) = \sqrt{x}$

79. Describe the transformation of the graph:

A) shift left 5 & up 3

B) shift right 5 & down 3

C) shift right 5 & up 3

D) shift left 5 & down 3

80. Name the parent function of:

$$f(x) = x^2 + 8$$

A) linear function

B) exponential function

C) square root function

D) quadratic function

81. Describe the transformation of:

$$f(x) = x^2 + 8$$

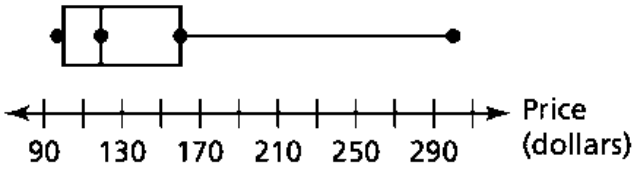
A) shift up 8

B) shift down 8

C) shift right 8

D) shift left 8

Use the box and whisker plot below to answer #83-84.



82. Estimate the range of the data:

A) 90

B) 100

C) 220

D) 310

83. Estimate the value of Q1:

A) 90

B) 100

C) 160

D) 310

Use the data below to answer #84-86.

Students' Hourly Wages	
$8.15	$8.70
$8.50	$8.50
$9.00	$8.25
$14.50	$9.20

84. Identify the standard deviation:

A) 9.35

B) 2.11

C) 1.97

D) 8.60

85. Identify the outlier:

A) $8.15

B) $9.00

C) $9.20

D) $14.50

86. Identify the mean:

A) 9.35

B) 8.38

C) 8.60

D) 9.10

87. Determine the mean, median, and mode of the following data set: ***10, 7, 3, 3, 12***

A) Mean: 5, Median: 7, Mode: 3

B) Mean: 3, Median: 3, Mode: 7

C) Mean: 3, Median: 7, Mode: 5

D) Mean: 7, Median: 7, Mode: 3

88. Simplify completely: $\sqrt{\mathbf{196}}$

A) $\sqrt{14}$
B) 14
C) 16
D) 196

89. Simplify completely: $\sqrt{\mathbf{40w^6}}$

A) $10w^3\sqrt{2}$
B) $10\sqrt{2w^6}$
C) $2w^3\sqrt{10}$
D) $2\sqrt{10w^6}$

90. Simplify completely: $\sqrt{\mathbf{5}} \cdot \sqrt{\mathbf{15}}$

A) $\sqrt{3}$
B) $5\sqrt{3}$
C) $25\sqrt{3}$
D) 75

91. Simplify completely: $\left(\mathbf{5\sqrt{3}}\right)^{\mathbf{2}}$

A) 75
B) 225
C) 15
D) $25\sqrt{3}$

92. Simplify completely: $\sqrt{\frac{\mathbf{4}}{\mathbf{16}}}$

A) 2
B) 4
C) $\frac{1}{2}$
D) $\frac{1}{4}$

93. Simplify completely: $\sqrt{\frac{\mathbf{40}}{\mathbf{8}}}$

A) $\frac{\sqrt{40}}{8}$
B) $\sqrt{32}$
C) $\sqrt{5}$
D) 5

94. Simplify completely: $\frac{\mathbf{1}}{\sqrt{\mathbf{2}}}$

A) 2
B) $\frac{1}{2}$
C) $\sqrt{2}$
D) $\frac{\sqrt{2}}{2}$

95. Simplify completely: $\sqrt{\mathbf{18}} - \sqrt{\mathbf{2}}$

A) 4
B) $2\sqrt{2}$
C) $2\sqrt{5}$
D) 3

96. Simplify completely: $\mathbf{5\sqrt{2} - 2\sqrt{2}}$

A) $-10\sqrt{2}$
B) $3\sqrt{2}$
C) 3
D) 6

97. Simplify completely: $\sqrt{\mathbf{8^2 - 5^2}}$

A) 39
B) $\sqrt{39}$
C) 3
D) $\sqrt{3}$

98. Solve the quadratic equation:

$$9x^2 - 35 = 14$$

A) $x = 5, x = 4$
B) $x = -\frac{1}{2}, x = \frac{3}{4}$
C) $x = \frac{7}{3}, x = -\frac{7}{3}$
D) $x = 7, x = -7$

99. Solve the quadratic equation:

$$x^2 + 2x = 5$$

A) $x = 3.41, x = 0.59$
B) $x = 5, x = 3$
C) $x = -1, x = 10$
D) $x = 1.45, x = -3.45$

100. Solve the quadratic equation:

$$8x^2 + 8 = 6 - 9x$$

A) $x = -0.5, x = -4$
B) $x = -0.3, x = -0.8$
C) $x = 4.3, x = 0.7$
D) No real solutions

Answer Key: Algebra 1 - Sem2 PRACTICE Final Exam

1. D	21. B	41. B	61. C	81. A
2. B	22. C	42. D	62. A	82. C
3. C	23. B	43. A	63. A	83. B
4. B	24. D	44. B	64. A	84. C
5. C	25. B	45. D	65. D	85. D
6. C	26. C	46. C	66. D	86. A
7. B	27. A	47. D	67. B	87. D
8. D	28. D	48. A	68. C	88. B
9. B	29. B	49. C	69. A	89. C
10. D	30. D	50. B	70. C	90. B
11. A	31. C	51. B	71. B	91. A
12. C	32. C	52. D	72. D	92. C
13. A	33. A	53. C	73. B	93. C
14. B	34. C	54. A	74. C	94. D
15. C	35. D	55. D	75. D	95. B
16. B	36. A	56. C	76. A	96. B
17. A	37. B	57. C	77. B	97. B
18. B	38. B	58. C	78. B	98. C
19. C	39. B	59. A	79. C	99. D
20. A	40. C	60. C	80. D	100. B