

Algebra II Concepts Review

Multiple Choice

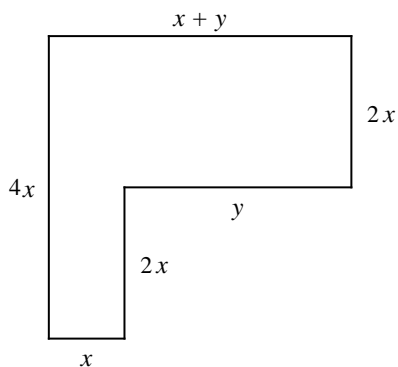
Identify the choice that best completes the statement or answers the question. **MUST SHOW WORK FOR PROBLEMS THAT REQUIRE WORK! Absolutely NO CALCULATOR (other than #s 35, 36, 68-70)**

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

1. $-2x^2 - 5x + 3$; $x = 4$
a. -34 b. -25 c. -49 d. -52
2. $-2x^3 + 2x^2 - x - 3$; $x = 2$
a. -10 b. -13 c. 19 d. -9

Simplify by combining like terms.

3. $2(-3y - 6) - 8y$
a. $-14y - 12$ b. $-26y$ c. $14y - 6$ d. $14y - 12$
4. $\frac{x}{2} + \frac{x^2}{3} - \frac{x}{5} - \frac{x^2}{4}$
a. $-x^2 - \frac{x}{3}$ b. $\frac{x^2}{12} + \frac{3x}{10}$ c. $\frac{2x}{3} + \frac{4x}{7}$ d. $\frac{x}{3} - 1$
5. Find the perimeter of the figure. Simplify the answer.



- a. $9x + 2y$ b. $10x + y$ c. $10x + 2y$ d. $9x + 3y$

Simplify.

6. $20^{\frac{1}{2}} \cdot 20^{\frac{1}{2}}$
a. 1 b. $\sqrt{20}$ c. $\frac{1}{20^4}$ d. 20
7. $5^{\frac{1}{3}} \cdot 25^{\frac{1}{3}}$
a. $\sqrt[3]{5}$ b. 5 c. 25 d. $\sqrt{5}$

8. $8^{\frac{2}{3}}$
- a. 512 b. 4 c. 64 d. $\sqrt[3]{8^2}$

Determine whether the function is linear or quadratic. Identify the quadratic, linear, and constant terms.

9. $y = (x + 4)(6x + 3) - 6x^2$
- a. quadratic function
quadratic term: $-6x^2$
linear term: $27x$
constant term: 12
- b. linear function
linear term: $27x$
constant term: 12
- c. linear function
linear term: $22x$
constant term: 24
- d. quadratic function
quadratic term: $6x^2$
linear term: $22x$
constant term: 24
10. $f(x) = (3x - 5)(3x + 6)$
- a. linear function
linear term: $3x$
constant term: -30
- b. quadratic function
quadratic term: $9x^2$
linear term: $3x$
constant term: -30
- c. linear function
linear term: $9x^2$
constant term: -30
- d. quadratic function
quadratic term: $-15x^2$
linear term: $3x$
constant term: -30
11. Classify $-3x^5 - 2x^3$ by degree and by number of terms.
- a. quintic binomial c. quintic trinomial
b. quartic binomial d. quartic trinomial
12. Classify $-2x^5 + 6x^4 - x^2 + 8$ by degree and by number of terms.
- a. cubic binomial c. quintic polynomial of 4 terms
b. quartic polynomial of 4 terms d. quadratic binomial
13. Zach wrote the formula $w(w - 1)(4w + 3)$ for the volume of a rectangular prism he is designing, with width w , which is always has a positive value greater than 1. Find the product and then classify this polynomial by degree and by number of terms.
- a. $4w^5 - w^4 - 3w^3$; quintic trinomial
b. $4w^4 - w^3 - 3w^2$; quartic trinomial
c. $4w^3 - w^2 - 3w$; cubic trinomial
d. $12w^2$; quadratic monomial
14. Write the polynomial $\frac{6x^2 - 9x^3 + 3}{3}$ in standard form.
- a. $-3x^3 + 2x^2 + 1$ c. $-3x^3 + 2x^2$
b. $2x^2 - 3x^3 + 1$ d. $2x^2 - 3x^3$

15. Write $2x^2(-3x^2 + 3x^3)$ in standard form. Then classify it by degree and number of terms.
- a. $6x^5 - 9x^4$; quartic binomial
 b. $-x + 5x^4$; quintic binomial
 c. $6x^5 - 6x^4$; quintic binomial
 d. $-x^5 - 6x^4$; quintic trinomial
16. Write the expression $(x + 2)(x + 4)$ as a polynomial in standard form.
- a. $x^2 - 2x + 2$
 b. $x^2 + 6x + 8$
 c. $x^2 - 2x + 8$
 d. $x^2 + 2x + 6$

Use Pascal's Triangle to expand the binomial.

17. $(s - 4v)^5$
- a. $s^5 - 20s^4v + 160s^3v^2 - 640s^2v^3 + 1280sv^4 - 1024v^5$
 b. $s^5 - 5s^4v + 10s^3v^2 - 10s^2v^3 + 5sv^4 - v^5$
 c. $s^5 - 20s^4 + 160s^3 - 640s^2 + 1280s - 1024$
 d. $s^5 + 80s^4v - 640s^3v^2 + 2560s^2v^3 - 5120sv^4 + 4096v^5$

Factor the expression.

18. $x^3 + 8$
- a. $(x - 2)(x^2 - 2x + 4)$
 b. $(x + 2)(x^2 - 2x + 4)$
 c. $(x + 2)(x^2 + 2x + 8)$
 d. $(x - 2)(x^2 + 2x + 4)$
19. Write $2x^3 + 0x^2 - 50x$ in factored form.
- a. $2x(x - 5)(x + 5)$
 b. $5x(x + 2)(x - 5)$
 c. $-5x(x + 5)(x + 2)$
 d. $2x(x + 5)(x + 5)$
20. Divide $3x^3 - 2x^2 + 2x - 2$ by $x - 4$.
- a. $3x^2 + 10x + 42$
 b. $3x^2 - 14x - 38$, R -170
 c. $3x^2 - 14x - 38$
 d. $3x^2 + 10x + 42$, R 166
21. Determine which binomial is *not* a factor of $4x^4 - 21x^3 - 46x^2 + 219x + 180$.
- a. $x + 4$
 b. $x + 3$
 c. $x - 5$
 d. $4x + 3$
22. Determine which binomial is a factor of $-2x^3 - 8x^2 + 13x + 15$.
- a. $x - 5$
 b. $x + 15$
 c. $x + 13$
 d. $x + 5$

Solve the equation.

23. $5y + 3 = -(y + 5)$
- a. $\frac{1}{3}$
 b. 3
 c. $-\frac{1}{3}$
 d. $-\frac{3}{4}$
24. $|3x + 1| = 5$
- a. $x = 2$ or $x = 1\frac{1}{3}$
 b. $x = 1\frac{1}{3}$ or $x = -2$
 c. $x = 2$ or $x = -2$
 d. $x = 2$ or $x = 4$

25. $2|3x + 5| + 1 = 9$
- a. $x = \frac{1}{2}$ or $x = -\frac{1}{3}$
- b. $x = -\frac{1}{3}$ or $x = -3$
- c. $x = \frac{1}{2}$ or $x = -2\frac{1}{2}$
- d. $x = \frac{1}{2}$ or $x = -3$

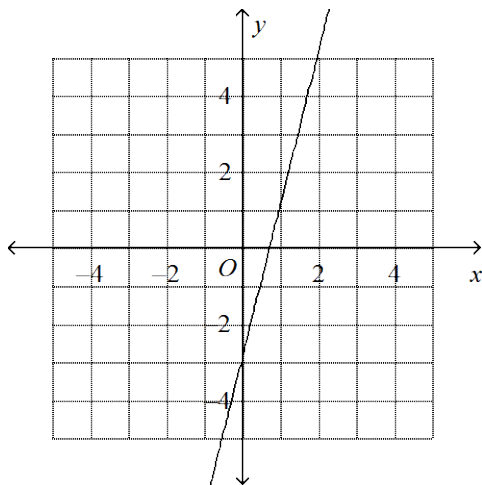
Solve the equation or formula for the indicated variable.

26. $S = 5r^4t$, for t
- a. $t = r^4 - 5S$
- b. $t = \frac{625r}{S}$
- c. $t = \frac{S}{5} - r$
- d. $t = \frac{S}{5r^4}$
27. $T = \frac{2U}{E}$, for U
- a. $U = \frac{T - E}{2}$
- b. $U = T + \frac{E}{2}$
- c. $U = 2T - E$
- d. $U = \frac{TE}{2}$
28. For $f(x) = -2x + 5$, find $f(3)$.
- a. -1
- b. -11
- c. 13
- d. 11
29. Suppose $f(x) = 4x - 2$ and $g(x) = -2x + 1$.
Find the value of $\frac{f(-3)}{g(-5)}$.
- a. -2
- b. $-3\frac{1}{7}$
- c. 2
- d. $-1\frac{3}{11}$

Find the slope of the line.

30. $-5x - 4y = 11$
- a. $-\frac{4}{5}$
- b. $\frac{4}{5}$
- c. $-\frac{5}{4}$
- d. $\frac{5}{4}$

31.



- a. 4
- b. 0
- c. -4
- d. 1

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

32.

x	y
3	21
12	84
48	336
192	1344

- a. yes; $k = 7$; $y = 7x$
- b. yes; $k = 4$; $y = 4x$
- c. yes; $k = 3$; $y = 3x$
- d. no

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

33. $6y = -3x$

- a. yes; $-\frac{1}{2}$
- b. yes; -2
- c. yes; -3
- d. no

Find the value of y for a given value of x , if y varies directly with x .

34. If $y = 12$ when $x = -36$, what is y when $x = -90$?

- a. 30
- b. -30
- c. -270
- d. 270

35. A manufacturer determines that the number of drills it can sell is given by the formula $D = -3p^2 + 174p - 325$, where p is the price of the drills in dollars.

- a. At what price will the manufacturer sell the maximum number of drills?
 - b. What is the maximum number of drills that can be sold?
- a. \$87; 7,894 drills
 - b. \$29; 2,198 drills
 - c. \$58; 325 drills
 - d. \$31; 2,205 drills

36. Dalco Manufacturing estimates that its weekly profit, P , in hundreds of dollars, can be approximated by the formula $P = -5x^2 + 10x + 9$, where x is the number of units produced per week, in thousands.

- a. How many units should the company produce per week to earn the maximum profit?
- b. Find the maximum weekly profit.

- a. 2,000 units; \$1000
- b. 1,000 units; \$900
- c. 1,000 units; \$1400
- d. 5,000 units; \$6600

37. Find the missing value to complete the square.

$x^2 + 8x + \underline{\quad}$

- a. 8
- b. 256
- c. 64
- d. 16

Solve the quadratic equation by using the quadratic formula

38. $x^2 + 16x + 74 = 0$

a. $256 \pm i\sqrt{10}$

c. $-8 \pm i\sqrt{10}$

b. $8 \pm i\sqrt{54}$

d. $-16 \pm 3\sqrt{6}$

Use the Quadratic Formula to solve the equation.

39. $-5x^2 + 5x + 3 = 0$

a. $\frac{1}{2} \pm \frac{\sqrt{42}}{2}$

c. $1 \pm \frac{\sqrt{85}}{5}$

b. $\frac{1}{2} \pm \frac{\sqrt{85}}{10}$

d. $2 \pm \frac{\sqrt{170}}{10}$

40. $2x^2 - 5x + 10 = 0$

a. $\frac{5}{2} \pm \frac{i\sqrt{55}}{2}$

c. $\frac{5}{4} \pm \frac{\sqrt{55}}{4}$

b. $\frac{5}{4} \pm \frac{i\sqrt{55}}{4}$

d. $\frac{4}{5} \pm \frac{i\sqrt{110}}{4}$

41. Solve $125x^3 + 343 = 0$. Find all complex roots.

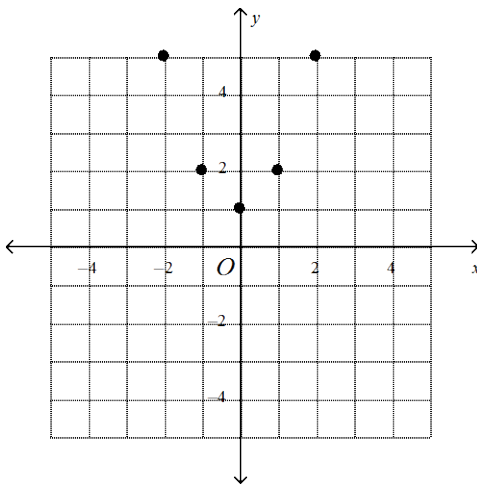
a. $\frac{7}{5}, \frac{35 \pm 35i\sqrt{3}}{50}$

c. $\frac{7}{5}, \frac{35 \pm 35\sqrt{3}}{50}$

b. no solution

d. $-\frac{7}{5}, \frac{7}{5}$

42. Write the ordered pairs for the relation. Find the domain and range.



a. $\{(-2, 5), (-1, 2), (0, 1), (1, 2), (2, 5)\}$; domain: $\{-2, -1, 0, 1, 2\}$; range: $\{1, 2, 5\}$

b. $\{(5, -2), (2, -1), (1, 0), (2, 1), (5, 2)\}$; domain: $\{-2, -1, 0, 1, 2\}$; range: $\{1, 2, 5\}$

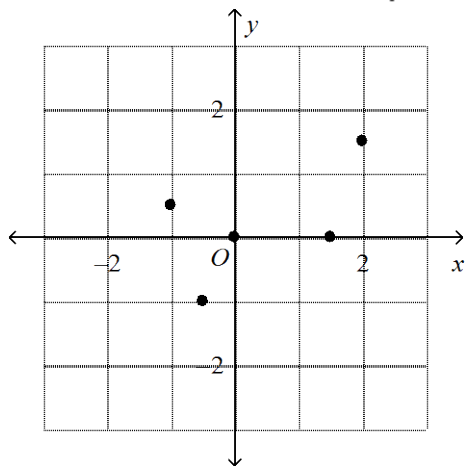
c. $\{(-2, 5), (-1, 2), (0, 1), (1, 2), (2, 5)\}$; domain: $\{1, 2, 5\}$; range: $\{-2, -1, 0, 1, 2\}$

d. $\{(5, -2), (2, -1), (1, 0), (2, 1), (5, 2)\}$; domain: $\{1, 2, 5\}$; range: $\{-2, -1, 0, 1, 2\}$

43. Graph the relation. Find the domain and range.

$$\left\{ \left(-1, \frac{1}{2}\right), \left(-\frac{1}{2}, -1\right), \left(\frac{3}{2}, 0\right), \left(2, \frac{3}{2}\right) \right\}$$

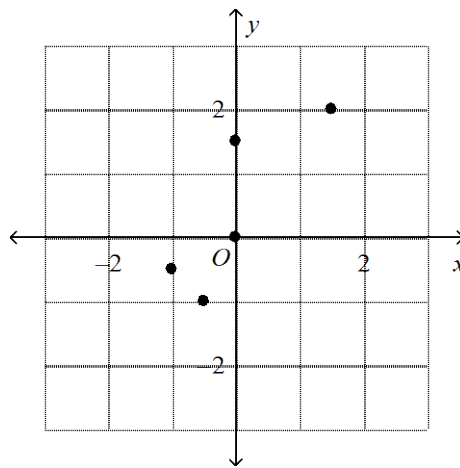
a.



$$\text{domain: } \left\{ -1, -\frac{1}{2}, \frac{3}{2}, 2 \right\}$$

$$\text{range: } \left\{ -1, 0, \frac{1}{2}, \frac{3}{2} \right\}$$

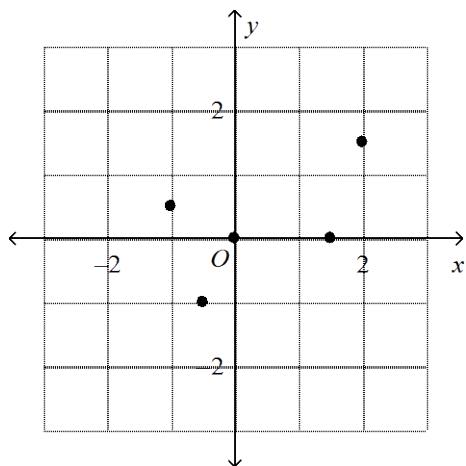
c.



$$\text{domain: } \left\{ -1, -\frac{1}{2}, 2, \frac{3}{2} \right\}$$

$$\text{range: } \left\{ -1, 0, \frac{1}{2}, \frac{3}{2} \right\}$$

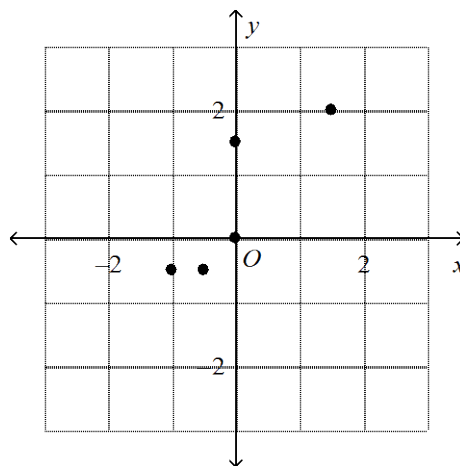
b.



$$\text{domain: } \left\{ -1, 0, \frac{1}{2}, \frac{3}{2} \right\}$$

$$\text{range: } \left\{ -1, -\frac{1}{2}, 2, \frac{3}{2} \right\}$$

d.

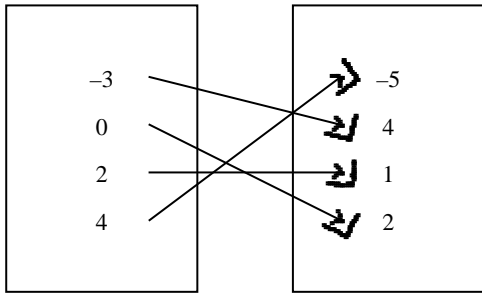


$$\text{domain: } \left\{ -1, 0, \frac{1}{2}, \frac{3}{2} \right\}$$

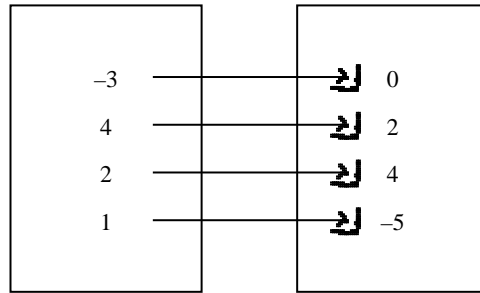
$$\text{range: } \left\{ -1, -\frac{1}{2}, 2, \frac{3}{2} \right\}$$

44. Make a mapping diagram for the relation.
 $\{(-3, 4), (0, 2), (2, 1), (4, -5)\}$

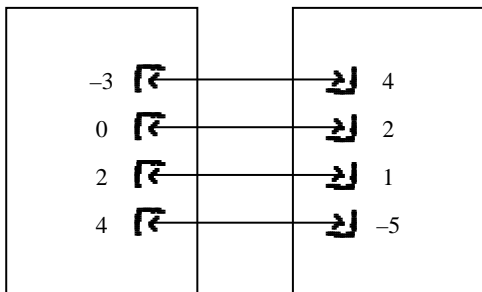
a.



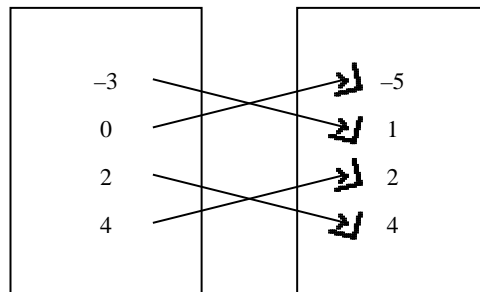
c.



b.

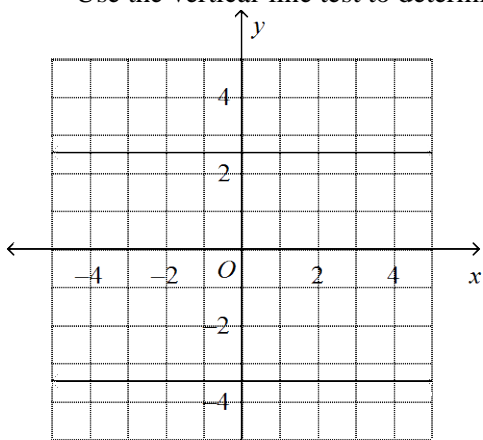


d.

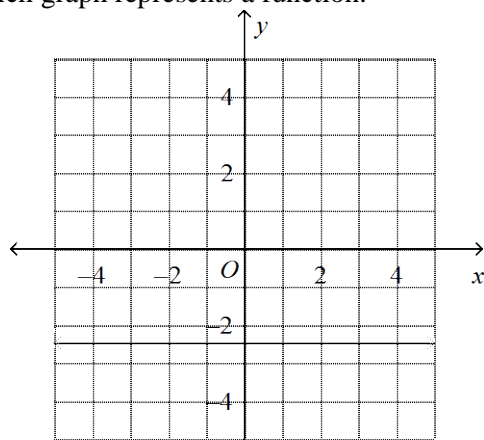


45. Use the vertical-line test to determine which graph represents a function.

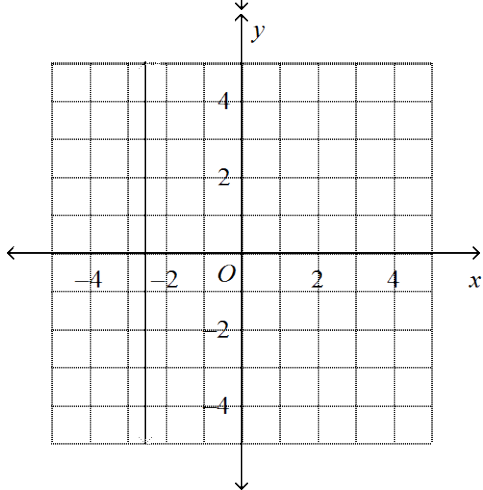
a.



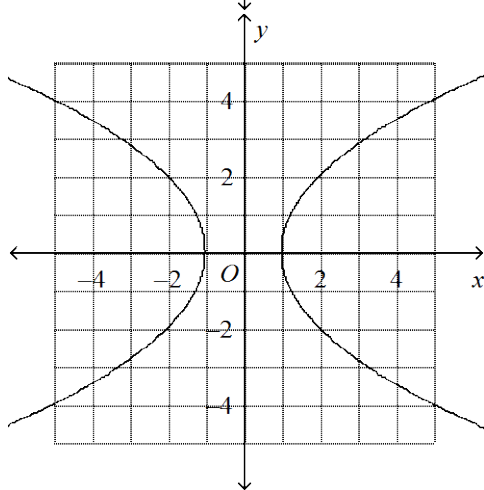
c.



b.

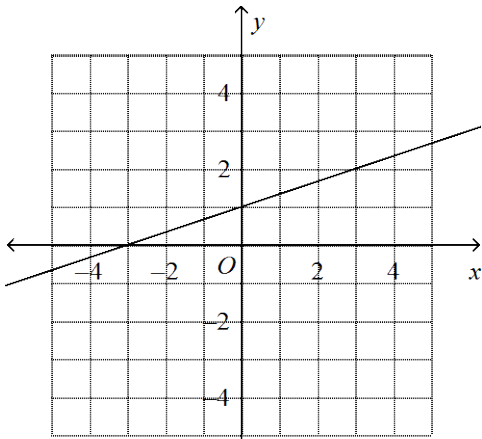


d.

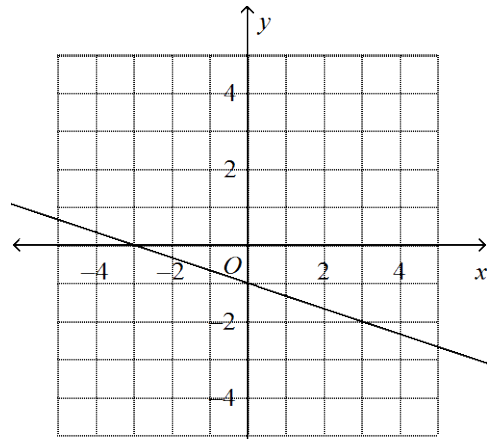


46. Graph the equation $y = -\frac{1}{3}x + 1$.

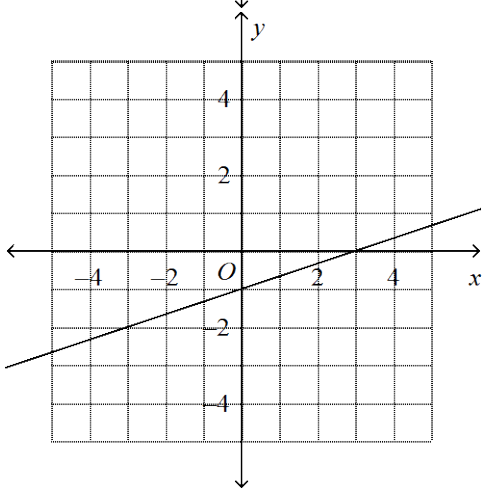
a.



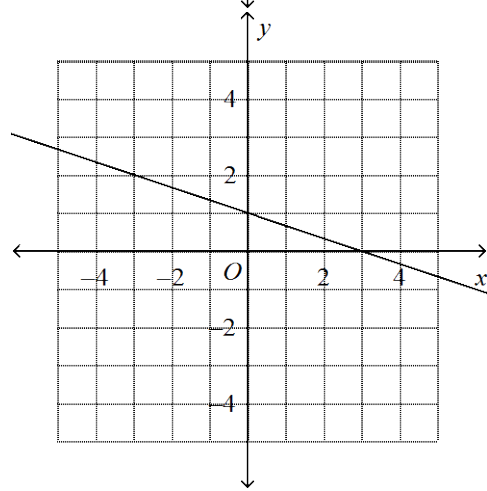
c.



b.

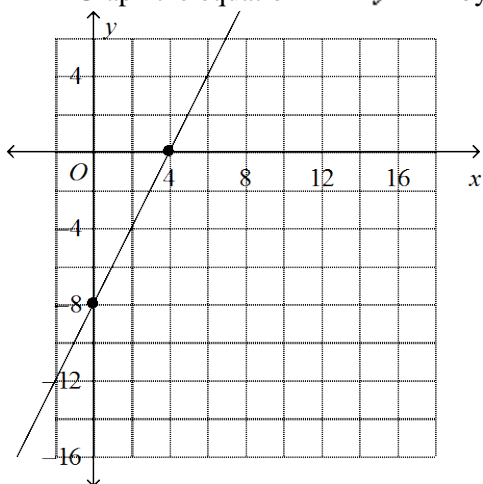


d.

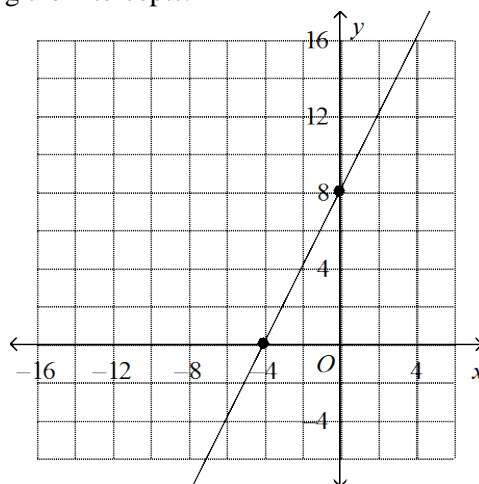


47. Graph the equation $2x + y = 8$ by finding the intercepts.

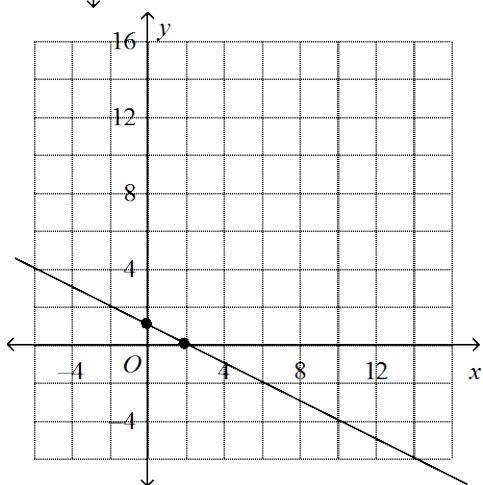
a.



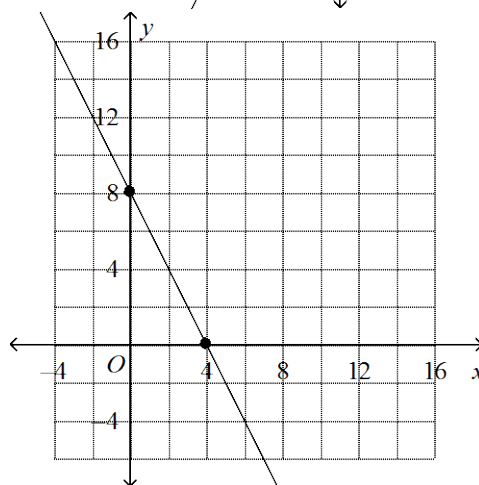
c.



b.

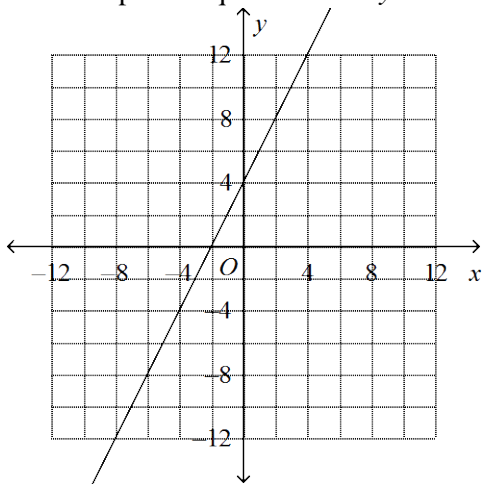


d.

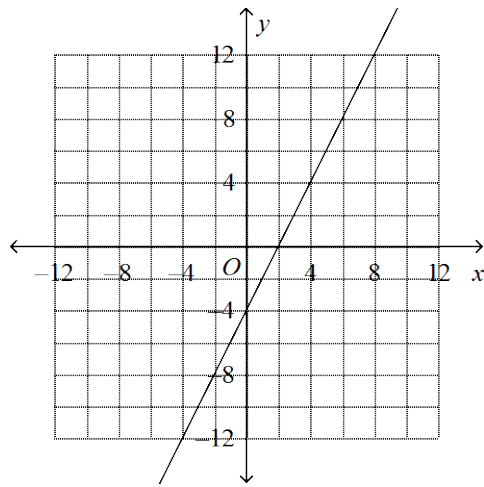


48. Graph the equation $4x - 2y = 8$.

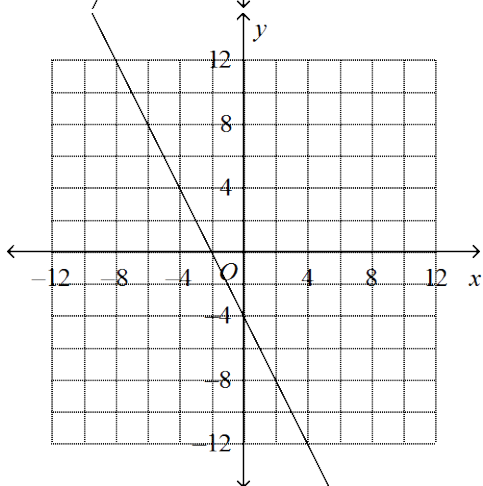
a.



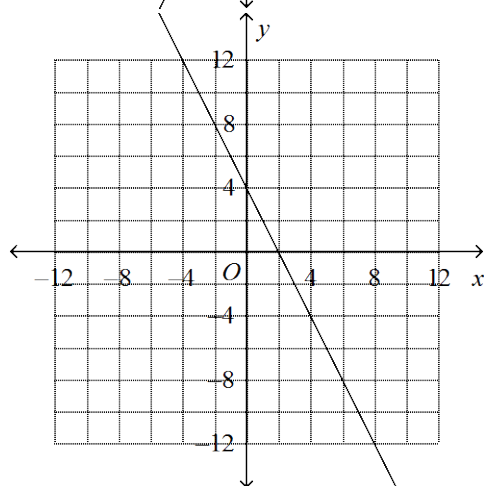
c.



b.

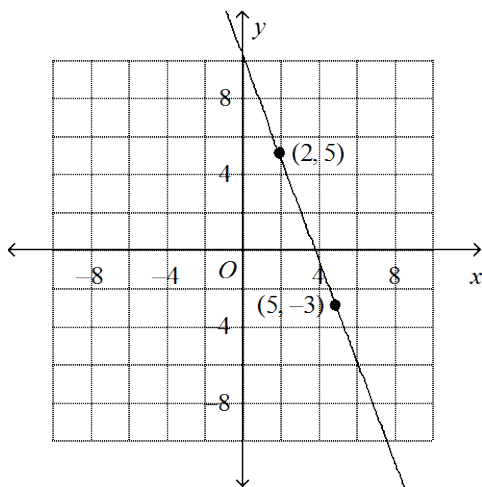


d.



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

49.



a. $-\frac{3}{8}$

b. $\frac{8}{3}$

c. $-\frac{8}{3}$

d. $\frac{3}{8}$

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

50. slope = 1; $(-1, 3)$

a. $x + y = 4$

b. $-x + y = 4$

c. $-x - y = 4$

d. $-x + y = -4$

51. slope = $\frac{-5}{3}$; $(-3, -2)$

a. $\frac{5}{3}x - y = -7$

c. $\frac{5}{3}x + y = 7$

b. $\frac{5}{3}x + y = -7$

d. $-\frac{5}{3}x + y = -7$

Find an equation for the line:

52. through $(-7, 7)$ and parallel to $y = 2x - 3$.

a. $y = -\frac{1}{2}x + \frac{7}{2}$

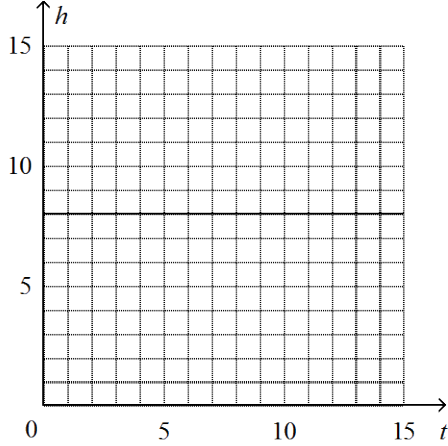
b. $y = 2x + 21$

c. $y = -2x - 7$

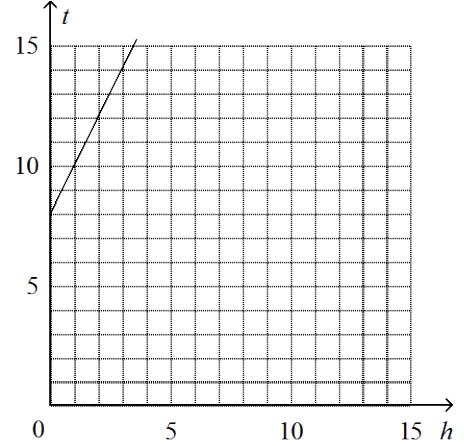
d. $y = \frac{1}{2}x + \frac{21}{2}$

53. A new candle is 8 inches tall and burns at a rate of 2 inches per hour.
- Write an equation that models the height h after t hours.
 - Sketch the graph of the equation.

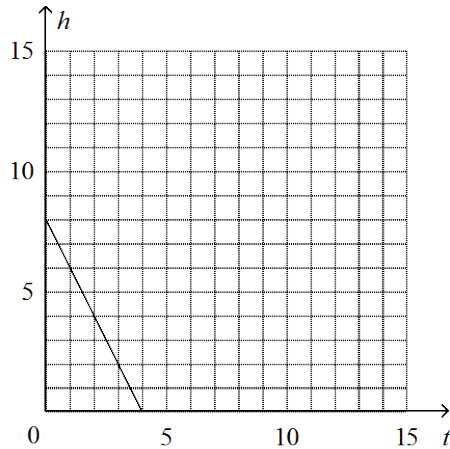
a. $h = 8t + 2$



c. $t = 8h - 2$

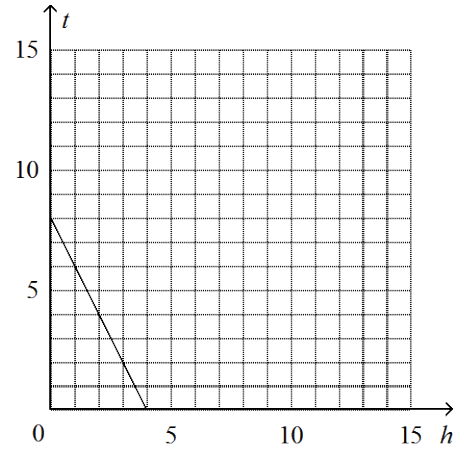


b.



$h = -2t + 8$

d. $t = -2h + 8$



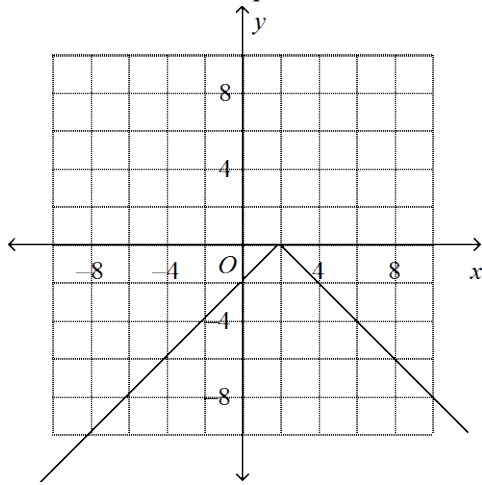
54. Compare the graphs of the pair of functions. Describe how the graph of the second function relates to the graph of the first function.

$y = -2|x|$ and $y = -2|x| - 3$

- The second function is the graph of $y = -2|x|$ moved to the right 3 units.
- The second function is the graph of $y = -2|x|$ moved up 3 units.
- The second function is the graph of $y = -2|x|$ moved to the left 3 units.
- The second function is the graph of $y = -2|x|$ moved down 3 units.

55.

Write an equation for the horizontal translation of $y = -|x|$.



a. $y = |x + 2|$

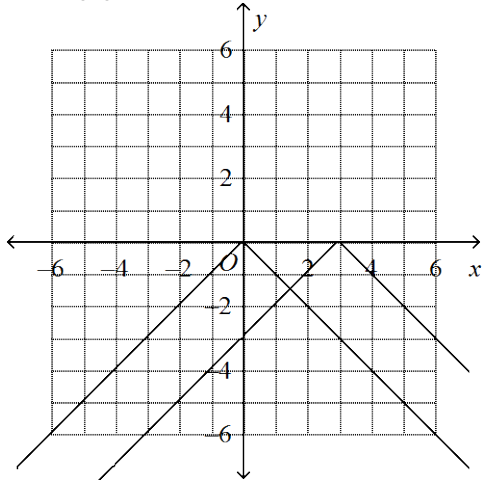
b. $y = -|x - 2|$

c. $y = |x - 2|$

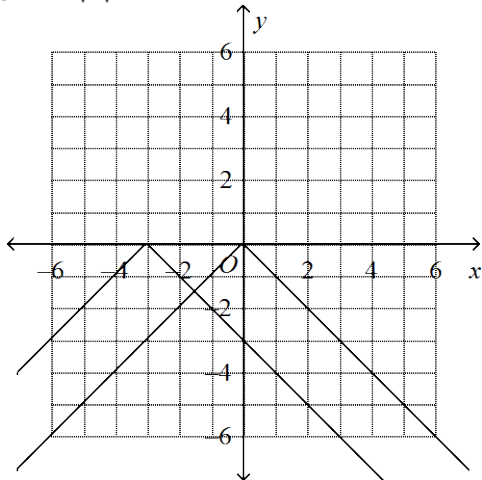
d. $y = -|x + 2|$

56. The equation $y = |x - 3|$ describes a function that is translated from a parent function.
- Write the equation of the parent function.
 - Find the number of units and the direction of translation.
 - Sketch the graphs of the two functions.

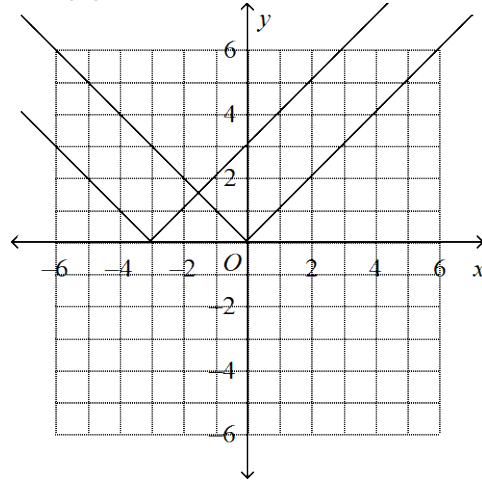
a. $y = -|x|$; 3 units right;



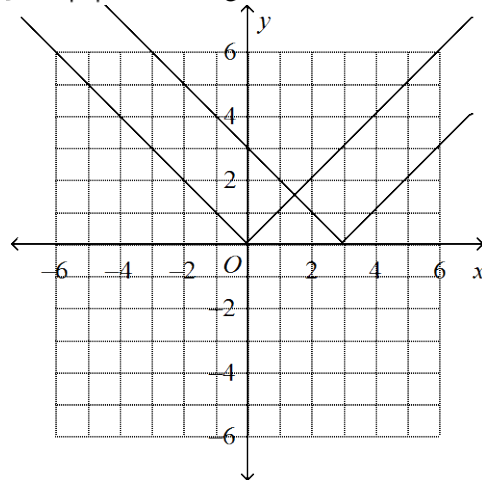
b. $y = -|x|$; 3 units left;



c. $y = |x|$; 3 units left;



d. $y = |x|$; 3 units right;



57. Write the equation that is the translation of $y = |x|$ left 10 units and down 5 units.

a. $y = |x - 10| - 5$

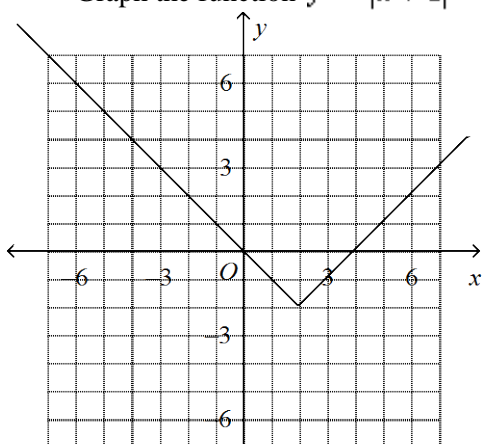
b. $y = |x + 5| - 10$

c. $y = |x - 5| - 10$

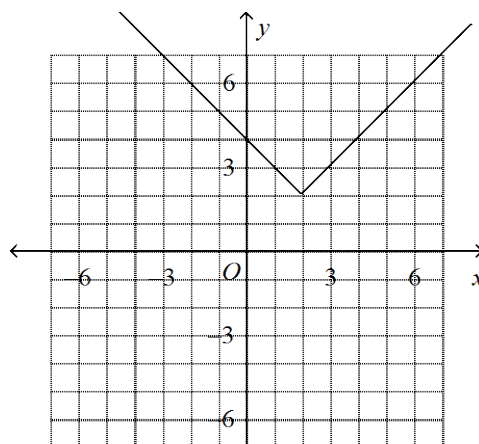
d. $y = |x + 10| - 5$

58. Graph the function $y = |x + 2| - 2$.

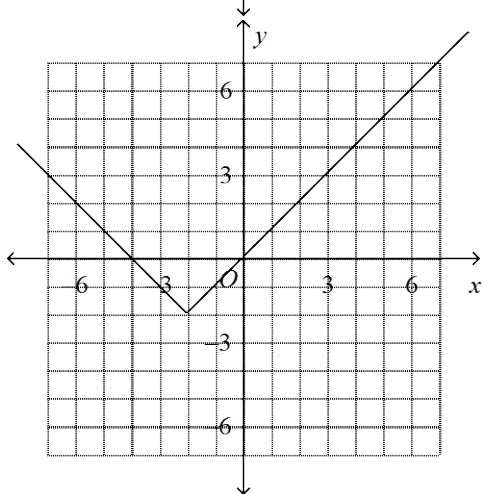
a.



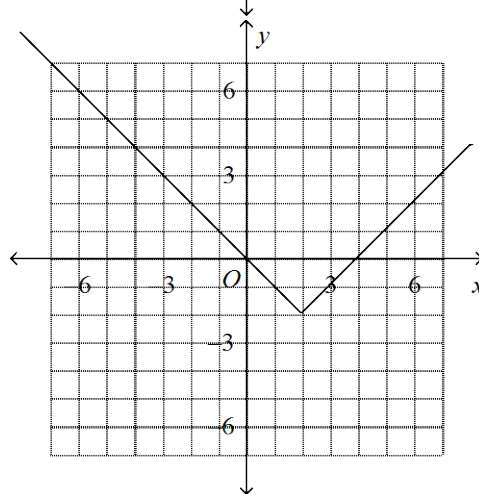
c.



b.

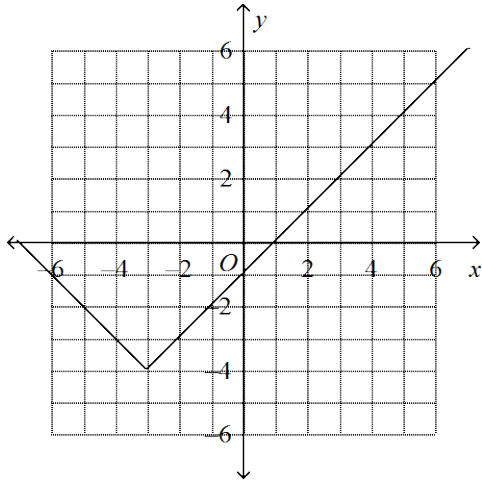


d.

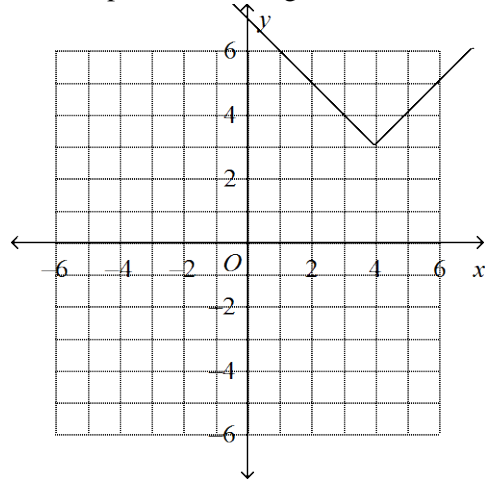


59. Describe the relationship between the graph of $y = |x + 3| - 4$ in terms of a vertical and a horizontal translation of the graph of $y = |x|$. Then graph $y = |x + 3| - 4$.

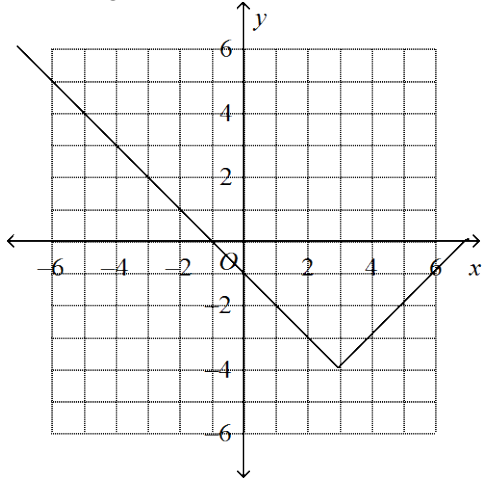
a. 3 units left and 4 units down;



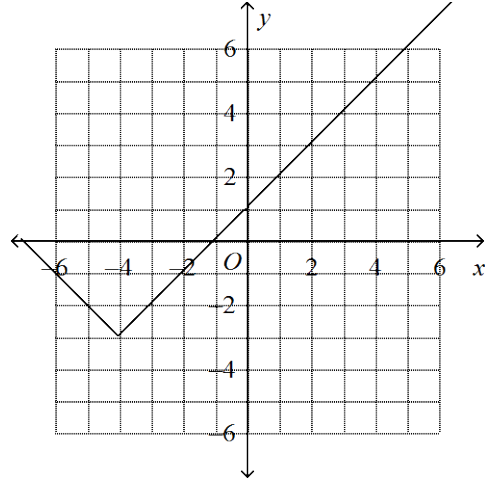
c. 3 units up and 4 units right;



b. 3 units right and 4 units down;

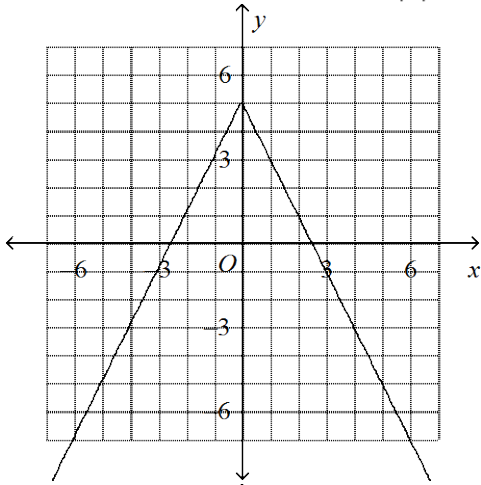


d. 3 units down and 4 units left;

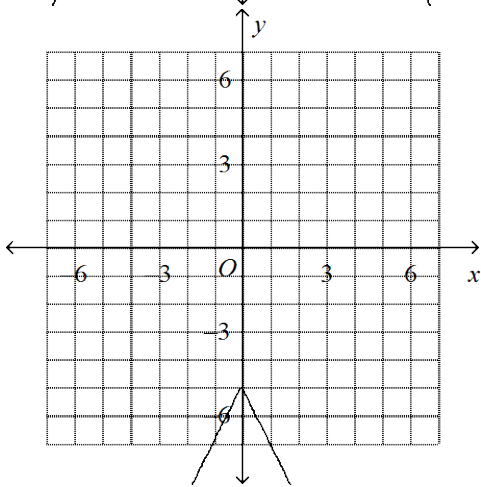


60. Graph the function $y = -2|x| + 5$.

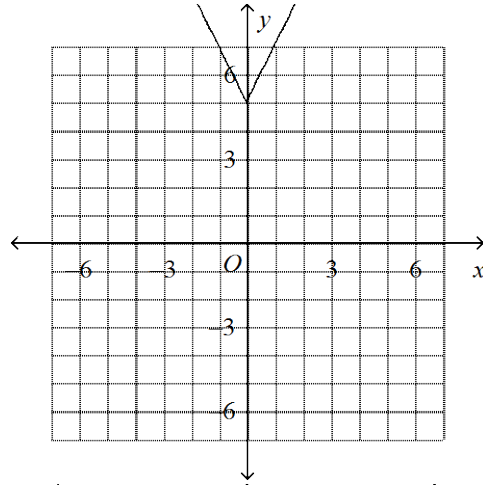
a.



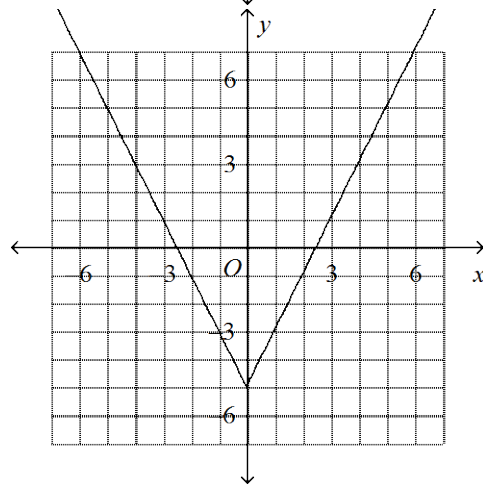
b.



c.

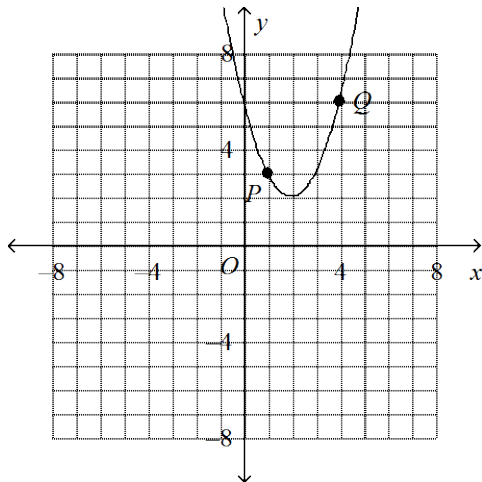


d.



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

61.



a. $(2, 2), x = 2$

$P'(3, 3), Q'(0, 6)$

b. $(2, 2), x = 2$

$P'(1, 3), Q'(3, -1)$

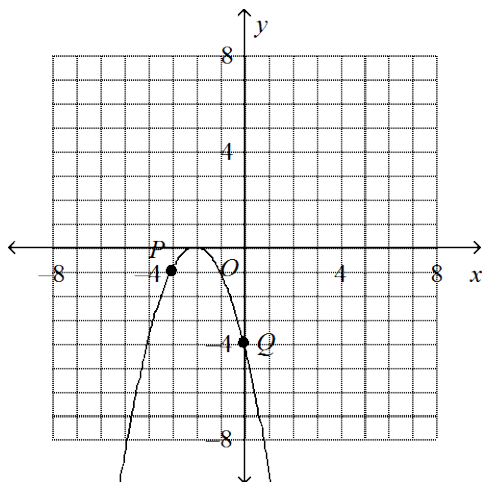
c. $(2, 2), x = 2$

$P'(3, 3), Q'(0, 6)$

d. $(2, 2), x = 2$

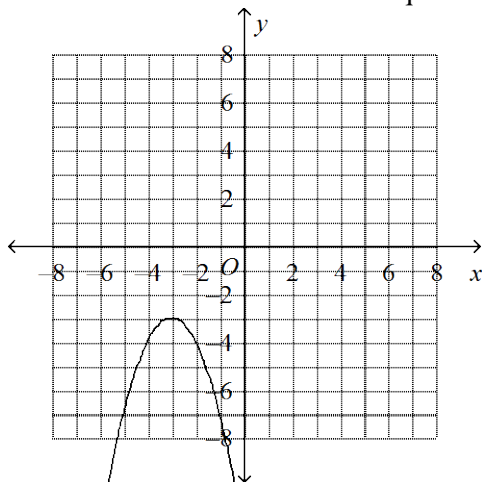
$P'(1, 3), Q'(3, -1)$

62.



- a. $(0, -2), x = 0;$
 $P'(-3, -1), Q'(0, -4)$
- b. $(0, -2), x = 0;$
 $P'(-1, -1), Q'(-4, -4)$
- c. $(-2, 0), x = -2;$
 $P'(-3, -1), Q'(0, -4)$
- d. $(-2, 0), x = -2;$
 $P'(-1, -1), Q'(-4, -4)$

63. Use the vertex form to write the equation of the parabola.



- a. $y = -(x - 3)^2 + 3$
- b. $y = (x + 3)^2 - 3$
- c. $y = -(x - 3)^2 - 3$
- d. $y = -(x + 3)^2 - 3$

64. Use a graphing calculator to determine which type of model best fits the values in the table.

x	-6	-2	0	2	6
y	1050	38	0	-46	-1122

- a. quadratic model
- b. linear model
- c. cubic model
- d. none of these

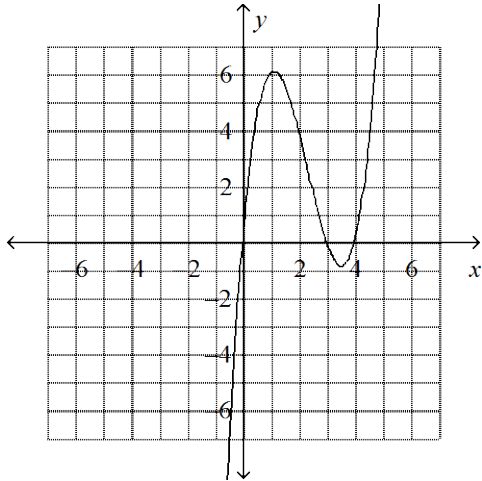
65. Use a graphing calculator to find a polynomial function to model the data.

x	1	2	3	4	5	6	7	8	9	10
$f(x)$	12	4	5	13	9	16	19	16	24	43

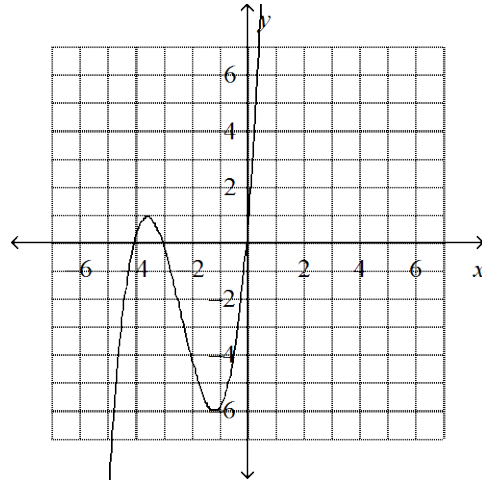
- a. $f(x) = 0.8x^4 - 1.73x^3 + 12.67x^2 - 34.68x + 35.58$
- b. $f(x) = 0.08x^3 - 1.73x^2 + 12.67x + 35.58$
- c. $f(x) = 0.08x^4 + 1.73x^3 - 12.67x^2 + 34.68x - 35.58$
- d. $f(x) = 0.08x^4 - 1.73x^3 + 12.67x^2 - 34.68x + 35.58$

66. Find the zeros of $y = x(x - 3)(x - 4)$. Then graph the equation.

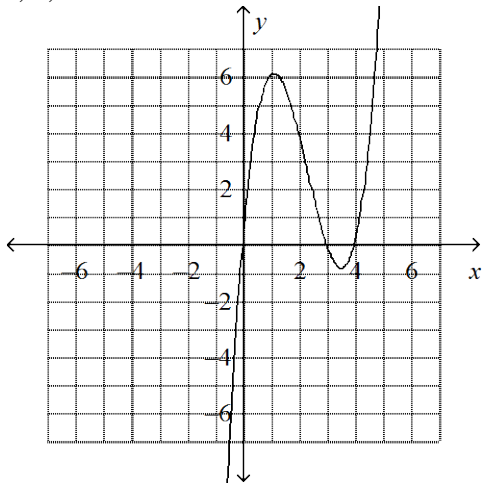
- a. 0, 3, 4



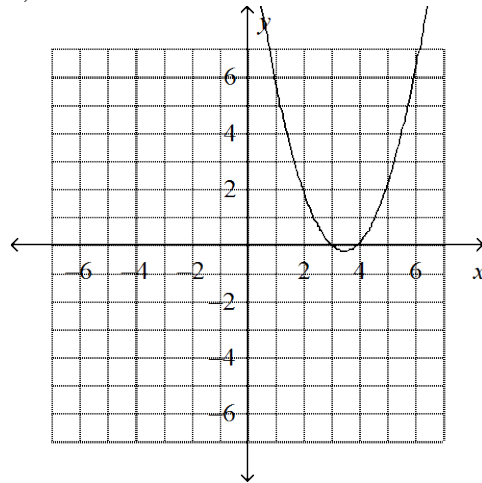
- c. 0, -3, -4



- b. 3, 4, -3



- d. 3, 4



67. Find the zeros of $f(x) = (x - 2)^5(x + 4)^4$ and state the multiplicity.

- a. 5, multiplicity 2; 4, multiplicity -4
- b. 5, multiplicity 2; -4, multiplicity 4
- c. 2, multiplicity 5; 4, multiplicity -4
- d. 2, multiplicity 5; -4, multiplicity 4

Solve the equation by graphing.

68. $x^2 + 5x + 27 = 0$

a. $x = 27$

b. $x = 25$

c. $x = 22$

d. no solution

69. $x^3 + 10x^2 - 16x = 0$

a. 0, -1.4, 11.4

b. 0, 1.4, -11.4

c. no solution

d. 1.4, -11.4

70. $6x = 9 + x^2$

a. 3

b. -3

c. -3, 3

d. no solution

**Algebra II A Final Exam
Answer Section**

MULTIPLE CHOICE

1. C
2. B
3. A
4. B
5. C
6. D
7. B
8. B
9. B
10. B
11. A
12. C
13. C
14. A
15. C
16. B
17. A
18. B
19. A
20. D
21. A
22. D
23. C
24. B
25. B
26. D
27. D
28. A
29. D
30. C
31. A
32. A
33. A
34. A
35. B
36. C
37. D
38. C
39. B
40. B
41. A

42. A
43. A
44. A
45. C
46. D
47. D
48. C
49. C
50. B
51. B
52. B
53. D
54. D
55. B
56. D
57. D
58. B
59. A
60. A
61. C
62. D
63. D
64. C
65. D
66. A
67. D
68. D
69. B
70. A