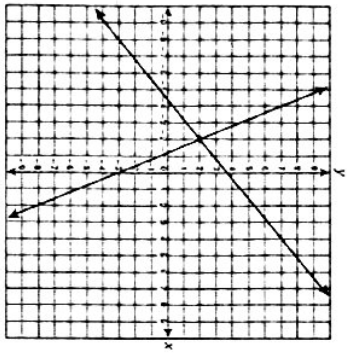


1. What is the apparent solution to the system of equations graphed below?



- A.  $(-2, -2)$
- B.  $(-2, 2)$
- C.  $(2, -2)$
- D. no solution

2. Which of the following best describes the graph of this system of equations?

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

- A. two identical lines
- B. two parallel lines
- C. two lines intersecting in only one point
- D. two lines intersecting in only two points

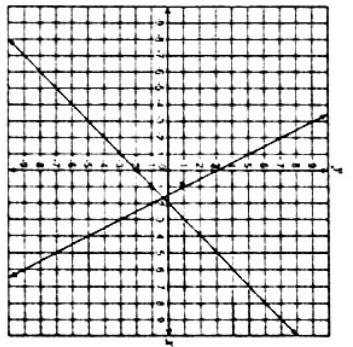
3. Members of a senior class held a car wash to raise funds for their senior prom. They charged \$3 to wash a car and \$5 to wash a pick-up truck or a sport utility vehicle. If they earned a total of \$275 by washing a total of 75 vehicles, how many cars did they wash?

- A. 25
- B. 34
- C. 45
- D. 50

$$\begin{array}{r} 3c + 5T = 275 \\ -3(c + T = 75) \\ \hline 3c + 5T = 275 \\ -3c - 3T = -225 \\ \hline 2T = 50 \\ T = 25 \end{array}$$

Name: \_\_\_\_\_

4.



Which system of linear inequalities is represented by this graph?

- A.  $\begin{cases} x + y \geq 2 \\ y \geq x + 2 \end{cases}$
- B.  $\begin{cases} y \geq 2x + 3 \\ y \leq x + 2 \end{cases}$
- C.  $\begin{cases} 2x + y \geq 3 \\ x + y \leq 2 \end{cases}$
- D.  $\begin{cases} 2x + y \geq 3 \\ x + y \geq 2 \end{cases}$

5. What is the solution to the following system of equations?

$$\begin{cases} 2x - 3y = 4 \\ 4x + y = -6 \end{cases}$$

- A.  $(5, -2)$
- B.  $(-2, 5)$
- C.  $(-1, -2)$
- D.  $(-2, -1)$

$$\begin{array}{r} -2(2x - 3y = 4) \\ -4x + 6y = -8 \\ 4x + y = -6 \\ \hline 7y = -14 \\ y = -2 \end{array}$$

$$\begin{aligned} y &< 2x + 2 \\ y &< -x + 2 \end{aligned}$$

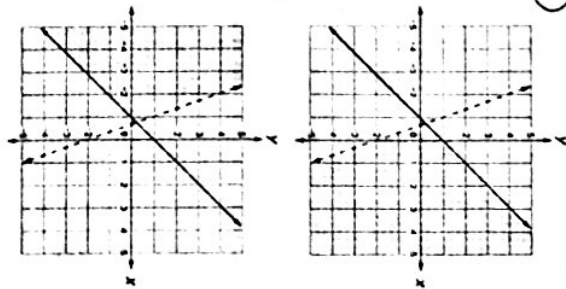
A system of inequalities is shown.  $2x - y > -2$   $x + y < 2$   
Which quadrant or quadrants contain(s) possible solutions to this system of inequalities?

- A. Quadrant I
- B. Quadrants I and II
- C. Quadrants II and III
- D. Quadrants I, II, III, and IV

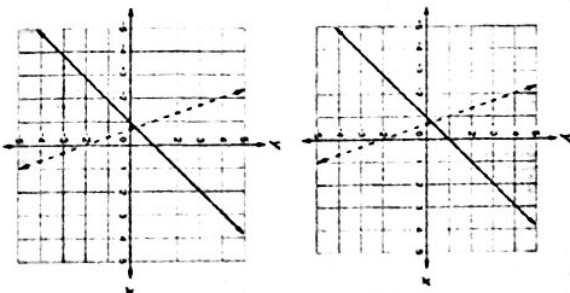
7. Use the system of inequalities to answer the question.

$$\begin{cases} y \leq x + 1 \\ y > -3x - 2 \end{cases}$$

Which graph shows the solution to this system of inequalities?



D.



8. The computer lab offers classes after school. In addition to an hourly rate,  $h$ , a registration fee,  $f$ , is charged. The equations below model the cost for a 2-hour and a 3-hour class.

$$2h + f = 65$$

$$3h + f = 90$$

What amount is charged for the registration fee?

- A. \$15 B. \$25 C. \$30 D. \$40

9. If 4 notebooks and 3 packages of pens cost \$7.43 and 5 notebooks and 2 packages of pens cost \$7.03, what is the cost of 1 notebook?

- A. \$0.89 B. \$0.79 C. \$1.29 D. \$1.09

10. What is the value of  $x$  in the solution to the following system of equations?

$$x + y = 5$$

$$2x + 6y = 22$$

- A.  $x = 4$  B.  $x = 3$  C.  $x = 2$  D.  $x = 1$

11. What is the value of  $x$  in the solution of the system of equations below?

$$8x - y = 20$$

$$y = 3x$$

$$x = 4$$

12. What are the solutions for the quadratic equation  $x^2 + 6x = 16$ ?

$$x^2 + 6x - 16 = 0$$

$$x^2 + 8x + 2x - 16 = 0$$

$$x(x+8) + 2(x-8) = 0$$

$$x(x+8) + 2(x-8) = 0$$

- A.  $-2, -8$  B.  $-2, 8$   
C.  $2, -8$  D.  $2, 8$

13. Which expression shows the complete factorization of  $12x^2 - 147x$ ?

- A.  $(3x - 7)(4x + 2)$  B.  $(4x - 21)(3x + 7)$   
C.  $12x(x - 7)(x + 7)$  D.  $3(2x - 7)(2x + 7)$

14. Which of the following is one of the factors of the expression below?

$$4x^2 - 25$$

- A.  $(4x - 5)$  B.  $(2x + 1)$   
C.  $(4x - 1)$  D.  $(2x - 5)$

15. What is the factored form of the expression below?

$$x^2 - 16$$

- A.  $(x - 4)(x + 4)$  B.  $(x - 8)(x + 8)$   
C.  $(x - 4)(x - 4)$  D.  $(x - 8)(x - 8)$

16. Solve the equation below.

$$x(x + 4) = 0$$

- A.  $x = 0, x = -4$  B.  $x = 0, x = 4$   
C.  $x = -4$  D.  $x = 4$

17. Which of these shows the following expression factored completely?

$$6x^2 + 15x - 36$$

$$3(2x^2 + 5x - 12)$$

$$3(2x - 3)(x + 4)$$

- A.  $(2x - 3)(x + 4)$  B.  $(6x + 9)(x - 4)$   
C.  $3(2x - 3)(x + 4)$  D.  $3(2x + 3)(x - 4)$

18. Which of these is a prime factor of  $m^3 - 18m + 10$ ?

- A.  $m - 5$  B.  $m + 5$   
C.  $m^2 + 6$  D.  $m^2 - 18m + 30$

19. Which of these is a factor of the polynomial below?

$$9m^2 - 12m + 4$$

- A.  $3m - 2$  B.  $3m + 2$   
C.  $3m - 1$  D.  $3m - 4$

20. A kangaroo in a single hop can reach a maximum height of 9 feet. The equation below can be used to determine  $h$ , the height in feet of the kangaroo's leap from the ground after  $t$  seconds.

$$h = -16t^2 + 24t$$

- How many seconds would it take for the kangaroo to reach its maximum height from the ground?

- A. 0.25 second B. 0.75 second  
C. 1.50 seconds D. 1.75 seconds

21. Which of the following expressions shows the factors of  $6x^3 - 18x^2 - 240x$ ?

- A.  $6x(x^2 - 3x + 40)$  B.  $6x(x - 4)(x + 5)$   
C.  $6x(x - 8)(x + 5)$  D.  $6x(x + 8)(x - 5)$

22. Which is one of the solutions to the equation  $2x^2 - x - 4 = 0$ ?

- A.  $\frac{1}{4} - \sqrt{33}$  B.  $-\frac{1}{4} + \sqrt{33}$   
C.  $\frac{1 + \sqrt{33}}{4}$  D.  $\frac{-1 - \sqrt{33}}{4}$

23. Solve:  $x^2 + 4x + 9 = 0$

- A.  $(-2 + \sqrt{5}, -2 - \sqrt{5})$  B.  $(-2 + \sqrt{13}, -2 - \sqrt{13})$   
C.  $(-2 + \sqrt{13}, -2 - \sqrt{13})$  D.  $(-2 + \sqrt{5}, -2 - \sqrt{5})$

24. Which choice shows the solutions to the equation  $8x^2 + 3x - 7 = 0$ ?

- A.  $\frac{-3 \pm \sqrt{213}}{16}$  B.  $\frac{3 \pm \sqrt{213}}{16}$   
C.  $\frac{-3 \pm \sqrt{213}}{16}$  D.  $\frac{3 \pm \sqrt{213}}{16}$

$$x = \frac{-3 \pm \sqrt{3 - 4(8)(7)}}{2(8)}$$

25. The expression  $4^6$  is equivalent to

- A. 1 B. 4 C. -1 D. -4

26. What is the value of  $(5^3)^2$ ?

- A. -125 B. 125 C. -151 D. 151

27. Express in simplest form in terms of  $i$ :  $\sqrt{-128}$

$$= 8i\sqrt{2}$$

28. If  $(-2, 7)$  is the maximum point on the graph of  $y = -2x^2 - 4x + k$ , then  $k$  equals

- A. 11 B. 7 C. 2 D. 15

$$y = -2x^2 - 4x + 7$$

$$y = -2(x^2 + 2x) + 7$$

$$y = -2(x^2 + 2x + 1) + 7$$

$$y = -2(x + 1)^2 + 7$$

$$(4N + 3E = 2.43) \times 2$$

$$8N + 6E = 4.86$$

$$-15N + 6E = 2.109$$

$$-7N = -6.23$$

$$N = 0.89$$

$$-2x - 2y = -10$$

$$2x + 6y = 22$$

$$4y = 12$$

$$y = 3$$

$$4y = 12$$

$$y = 3$$

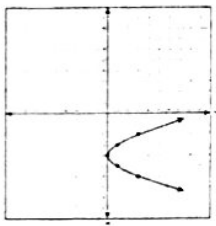
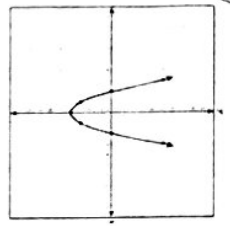
$$y = 3$$

$$y = -2x^2 - 4x + 7$$

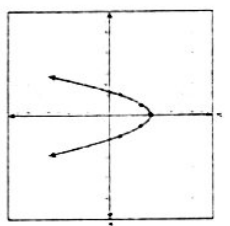
$$y = -2x^2 - 8x - 1$$

29. Which of the following represents the graph of the equation below?  
 $y = x^2 - 4$

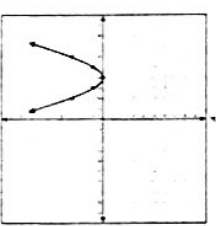
A



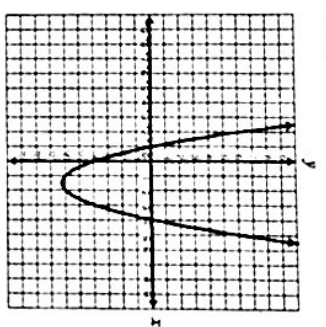
B



D



30. The graph of the equation  $y = x^2 - 3x - 4$  is shown below.



For what value or values of  $x$  is  $y = 0$ ?

A.  $x = -1$  only

C

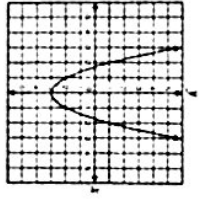
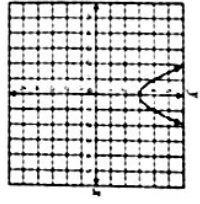
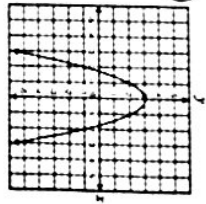
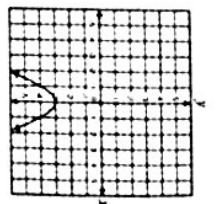
$x = -1$  and  $x = 4$

B.  $x = -4$  only

D.  $x = 1$  and  $x = -4$

31. Which best represents the graph of  $y = -x^2$ ?

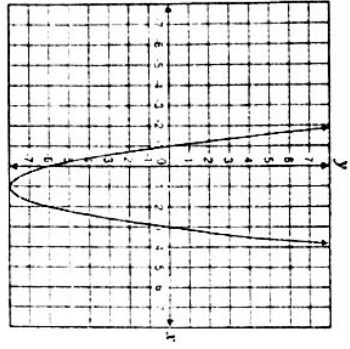
B



32. Which quadratic function, when graphed, has x-intercepts of 4 and -3?

- A.  $y = (x - 3)(x + 4)$
- B.  $y = (x + 3)(2x - 8)$
- C.  $y = (3x - 1)(4x + 1)$
- D.  $y = (3x + 1)(8x - 2)$

33. What are the real roots of the function in the graph?



- A. 3
- C. -1 and 3
- B. -6
- D. -6, -1, and 3

34. Jenny is solving the equation  $x^2 - 8x = 9$  by completing the square. What number should be added to both sides of the equation to complete the square?

- A. 2
- B. 4
- C. 8
- D. 16

35. What is the nature of the roots of the equation  $5x^2 = 4x + 6$ ?

- A. two imaginary roots
  - B. one real, rational root
  - C. two real, irrational roots
  - D. two real, rational roots
- $5x^2 - 4x - 6 = 0$   
 $b^2 - 4ac = 16 - 4(5)(-6) = 136$

36. If  $(3 + 2i) + (2 + bi) = 5 - 4i$ , the value of  $b$  is

- A. -2
  - B. 2
  - C. -6
  - D. 6
- $2i + bi = -4i$

37. The expression  $(2 + 3i)^2$  is equal to

- A. -5
  - B. 13
  - C. -5 + 12i
  - D. 13 + 12i
- $-5 + 12i$

38. The expression  $\frac{3}{2 + 3i}$  is equivalent to

- A.  $\frac{-6 + 9i}{13}$
  - B.  $\frac{6 + 9i}{13}$
  - C.  $\frac{-6 - 9i}{13}$
  - D.  $\frac{6 - 9i}{13}$
- $\frac{3 \cdot 2 - 3i}{2 - 3i} = \frac{6 - 9i}{4 - 9i}$

39. What is the range (all possible y-values) of the function  $y = x^2 - 9$  if  $x$  is any real number?

- A. all real numbers except 3
- B. all real numbers except -3
- C. all real numbers greater than or equal to 9
- D. all real numbers greater than or equal to -9

40. Which of the following sentences is true about the graphs of  $y = 3(x - 5)^2 + 1$  and  $y = 3(x + 5)^2 + 1$ ?

- A. Their vertices are maximums.
- B. The graphs have the same shape with different vertices.
- C. The graphs have different shapes with different vertices.
- D. One graph has a vertex that is a maximum, while the other graph has a vertex that is a minimum.

41. Which ordered pair is the vertex of  $f(x) = x^2 + 6x + 5$ ?

- A. (-3, -4)
- B. (-2, -3)
- C. (-1, 0)
- D. (0, -5)

42. What is the vertex of the quadratic function  $y = -(x - 3)^2 + 4$ ?

- A. (5, 0)
- B. (0, -5)
- C. (3, 4)
- D. (-3, 4)

43. Which function has zeros at 2 and -5?

- A.  $y = x^2 + 3x + 10$
- B.  $y = x^2 - 3x + 10$
- C.  $y = x^2 + 3x - 10$
- D.  $y = x^2 - 3x - 10$

44. Which of the following describes the solutions of  $3x^2 + 9x = 7$ ?

- A. two rationals
  - B. two irrationals
  - C. two complex numbers
  - D. none of these
- $3x^2 + 9x - 7 = 0$   
 $b^2 - 4ac = 81 - 4(3)(-7) = 165$

45. Which of the following equations describes a parabola with vertex (-3, 2) and focus (-3, -10)?

- A.  $x^2 + 6x - 51 + 59 = 0$
  - B.  $x^2 + 6x + 51 - 41 = 0$
  - C.  $x^2 + 6x + 481 - 87 = 0$
  - D.  $x^2 - 6x + 31 - 33 = 0$
- $a = \frac{1}{4p}$   
 $a = -\frac{1}{4(-12)}$   
 $c = -\frac{1}{4e}$

46. The graph of the function  $f(x) = -2(x + 3)^2 - 4$  is a parabola with axis of symmetry and vertex:

- A.  $x = -3$ , (-3, -4)
- B.  $x = 2$ , (-3, -4)
- C.  $x = -3$ , (-3, -4)
- D.  $x = 3$ , (-4, -3)

47. The parabola  $y = x^2 + 6x + 4$  is shifted 6 units to the right and 4 units up. Where is the vertex now?

- A. (-9, -9)
- B. (3, -1)
- C. (6, 4)
- D. (-4, 1)

48. What is the value of the expression?

- A.  $8x^4 + 2$
  - B.  $8x^4 + 2$
  - C.  $32x^4 + 2$
  - D.  $32x^4 + 2$
- $\sqrt[4]{64x^4 + 2}$   
 $8x + 2$

49.  $8a^2 + c^2 = (2a + c)$

- A.  $(2a + c)(2a + c)(2a + c)$
- B.  $(2a + c)(8a^2 + 2ac + c^2)$
- C.  $(2a + c)(8a^2 + 4ac + c^2)$
- D.  $(2a + c)(8a^2 - 2ac + c^2)$

50. What is the greatest common factor of  $154x^3y^2 - 27x^4y^2 + 24x^2y^2$ ?

- A.  $3x^2y^2$
- B.  $2x^2y^2$
- C.  $2x^2y^2$
- D.  $2x^2y^2$