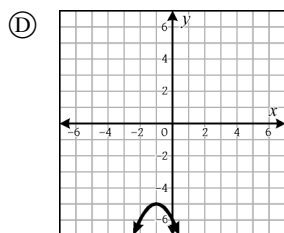vnns8wth
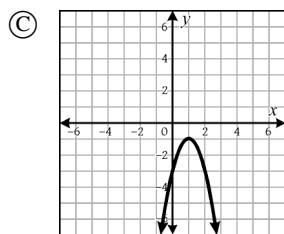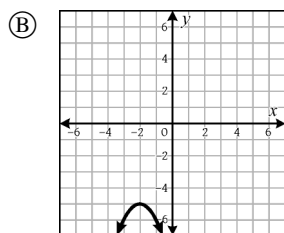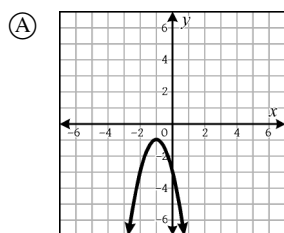
Name: _____   **Date:** _____

Show ALL work on a separate sheet of paper for full credit

1. Solve: $\sqrt{6x + 1} = 5$

    Ⓐ 4   Ⓑ 18   Ⓒ 24   Ⓓ 25

2. Given the expression: $A = P + Prt$; for P.

    Ⓐ $A + Art$ Ⓑ $A - Prt$

    Ⓒ $\dfrac{A}{1 + rt}$ Ⓓ $\dfrac{1 + rt}{A}$

3. Which of the following represents the graph of $f(t) = -2t^2 + 4t - 3$?

    Ⓐ

    Ⓑ

    Ⓒ

    Ⓓ

4. Translate into an equation.

    A couple has a 400 acre farm that they want to leave to their future grandchildren. They decide to give each grandchild 12% of the land remaining when the child is born. Let y be the amount of land remaining after x grandchildren are born.

    Ⓐ $x = 400(1 - 0.12)^y$ Ⓑ $y = x(1 - 0.12)^{400}$

    Ⓒ $y = 400(1 - 0.12)^x$ Ⓓ $y = 400(1 + 0.12)^x$

5. The area of a particular right triangle is given by the formula $s(s + 2) = 255$, where s is the length of the smallest side in centimeters. What is the length of the smallest side?

    Ⓐ 10 cm   Ⓑ 14 cm   Ⓒ 15 cm   Ⓓ 16 cm

6. Jack deposits $400 into an account that earns 7% interest compounded yearly. The amount in his account, A, is given by the equation

    $$A = 400(1 + 0.07)^t$$

    where t is the number of years the money has remained in the account. How much to the nearest dollar will Jack have at the end of the fifth year?

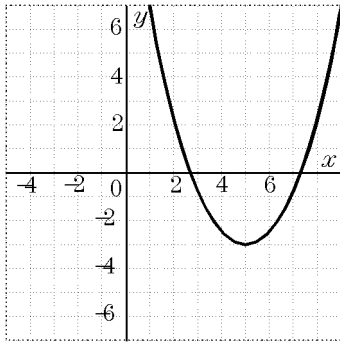   Ⓐ $457   Ⓑ $492   Ⓒ $561   Ⓓ $596

7. In a particular triangle, the second side measures 5 less than twice the first side (x), and the third side measures 3 more than the second side. In terms of x, what is the perimeter?

    Ⓐ $5x + 7$ Ⓑ $4x - 2$ Ⓒ $5x - 7$ Ⓓ $3x - 7$

8. Solve the system: $y = -x^2 + 1$
                               $y = 2x + 1$
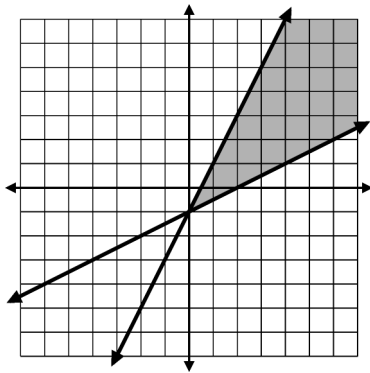
    Ⓐ $(-2, -5), (0, 1)$ Ⓑ $(0, 1), (-1, 0)$

    Ⓒ $(0, 1), (2, -3)$ Ⓓ $(0, 1), (-2, -3)$

9. In the diagram, is the vertex a maximum or minimum point? What are the coordinates of the vertex?

Ⓐ minimum; $(5, 3)$ Ⓑ minimum; $(-3, 5)$

Ⓒ maximum; $(5, -3)$ Ⓓ minimum; $(5, -3)$

10. The graph represents which system of inequalities?

Ⓐ $y \leq \frac{1}{2}x - 1$
    $y \geq 2x - 1$

Ⓑ $y \geq \frac{1}{2}x - 1$
    $y \leq 2x - 1$

Ⓒ $y \geq \frac{1}{2}x - 1$
    $y \geq 2x - 1$

Ⓓ $y \leq \frac{1}{2}x + 1$
    $y \geq 2x + 1$

11. On January 1, 1971, Arthur Clarke deposited $20 in a bank that paid 5% interest compounded annually. How much money did he have in that account on January 1, 2001?

Ⓐ $86.44   Ⓑ $180.00

Ⓒ $224.86   Ⓓ $536.87

12. Solve for x: $\log_2 x = 5$

Ⓐ $\frac{5}{2}$ Ⓑ 10   Ⓒ 25   Ⓓ 32

13. The population of Whoville has grown from 1200 in 1982 as defined by the formula

$$P = 1200(1.1)^t$$

where P is the total population and t is the number of years that have passed. What was the population of Whoville in 1990?

Ⓐ 2830   Ⓑ 2572   Ⓒ 2340   Ⓓ 2100

14. Solve: $\sqrt{2x + 3} = x$

Ⓐ -3 only   Ⓑ -1 only

Ⓒ 3 and -1 Ⓓ 3 only

15. Use the graphing calculator to find the solution(s) of $x^2 - 3x = x - 7$ to the nearest tenth.

Ⓐ $\{-5.3, 1.3\}$ Ⓑ $\{5.3\}$

Ⓒ $\{-1.3\}$ Ⓓ no real solutions

16. Solve: $x^2 + 4x = 12$

Ⓐ 6, 2   Ⓑ -4, 3

Ⓒ -6, 2   Ⓓ -12, 1

17. Which of the following equations could be used to solve this problem?

> The product of two consecutive integers is 420.

Ⓐ $n(n - 1) = 420$ Ⓑ $n + (n - 1) = 420$

Ⓒ $n + (n - 2) = 420$ Ⓓ $2n - 1 = 420$

18. If $y = 10^x$, then:

Ⓐ $y = \log_x 10$ Ⓑ $y = \log_{10} x$

Ⓒ $x = \log_{10} y$ Ⓓ $x = \log_y 10$

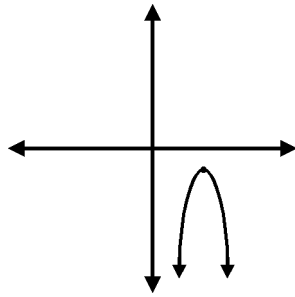19. Find the value of the discriminant of the quadratic equation $3x^2 + 2x + 1 = 0$.

Ⓐ -8 Ⓑ 16 Ⓒ 8 Ⓓ -16

20. Evaluate: $(-64)^{\frac{2}{3}}$

Ⓐ -16 Ⓑ -4 Ⓒ 16 Ⓓ 32

21. How many solutions are shown by the graph of the quadratic function?

Ⓐ zero

Ⓑ one

Ⓒ two

Ⓓ three

22. When Patricia and Carlos tried to solve the following system of equations, Patricia said there were two real solutions and Carlos said there were no real solutions. Who is correct and why?

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

Ⓐ Carlos, the system has no real solution

Ⓑ Patricia, two real solutions at $(-2, 0)$ and $(4, 2)$

Ⓒ Patricia, two real solutions at $(2, 0)$ and $(3, 2)$

Ⓓ Neither, one real solution at $(\frac{3}{4}, 0)$

23. Solve: $\dfrac{6}{x-2} - \dfrac{3}{x} = 1$

Ⓐ $-1, 6$ Ⓑ $-6, 1$ Ⓒ $-1, 5$ Ⓓ $-3, 2$

24. Solve: $x^2 - 7x + 12 = 0$

Ⓐ $-1, -6$ Ⓑ $2, 6$

Ⓒ $3, 4$ Ⓓ $-3, -4$
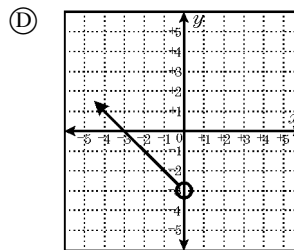
25. What is the range of the function

$$f(x) = 2x + 3$$
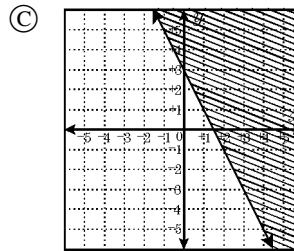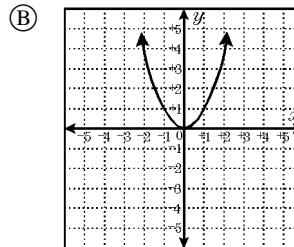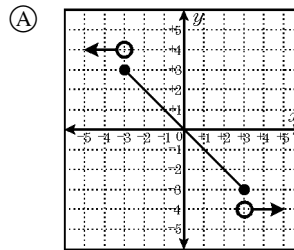
when the domain is $\{-3, -1, 1\}$?

Ⓐ $\{0, 2, 4\}$ Ⓑ $\{3, -1, -5\}$

Ⓒ $\{-3, 1, 5\}$ Ⓓ $\{3, 1, 5\}$
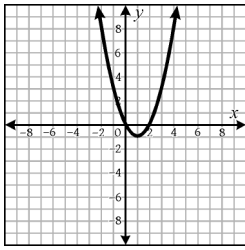
26. Simplify: $(4x^2 - 3x + 8) - (3x^2 - 5)$

Ⓐ $x^2 - 3x - 3$ Ⓑ $x^2 - 3x + 3$

Ⓒ $x^2 - 3x + 13$ Ⓓ $7x^2 - 3x + 13$

27. Which of the following graphs is *not* a function?

Ⓐ

Ⓑ

Ⓒ

Ⓓ

28. State the vertex and x-intercept(s) of the given graph.

Ⓐ vertex: $(1, -1)$ x-intercept(s): 1

Ⓑ vertex: $(-1, -1)$ x-intercept(s): 0

Ⓒ vertex: $(1, -1)$ x-intercept(s): 0, 2

Ⓓ vertex: $(0, -1)$ x-intercept(s): 2

29. What are the approximate roots of this equation?

$$x^2 - 6x + 4 = 0$$

Ⓐ $\{-6.6, 0.6\}$ Ⓑ $\{-5.24, -0.76\}$

Ⓒ $\{0.8, 5.2\}$ Ⓓ $\{3, 5\}$

30. This equation represents what type of function?

$$y = 4^{x+1}$$

Ⓐ linear   Ⓑ quadratic

Ⓒ exponential   Ⓓ cubic

31. Evaluate: $9^{\frac{3}{2}}$

Ⓐ $\sqrt{27}$ Ⓑ 27   Ⓒ 81   Ⓓ 243

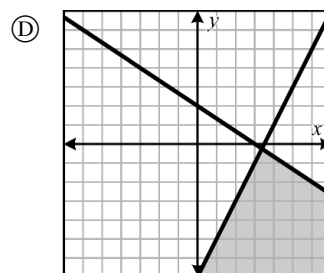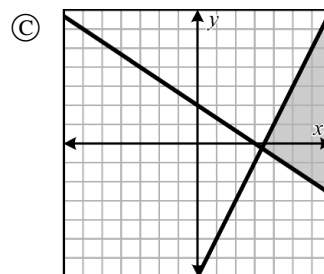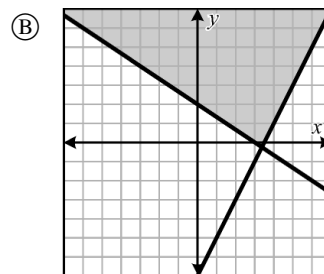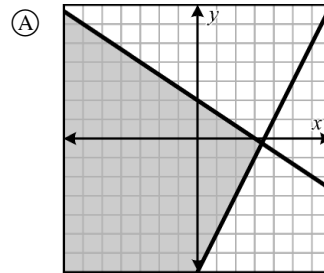32. Given the function $y = 3x^2 + 2x - 1$ and the domain of $\{-2, -1, 0\}$, what is the specified range?

Ⓐ $\{7, 0, -1\}$ Ⓑ $\{31, 0, -1\}$

Ⓒ $\{31, -12, 4\}$ Ⓓ $\{-33, -12, 4\}$

33. Which of the following is a quadratic function?

Ⓐ $f(x) = -x^4 + x + 11$ Ⓑ $f(x) = 5x^2 - 8$

Ⓒ $f(x) = x^3 - 7x + 12$ Ⓓ $f(x) = 47 - x$

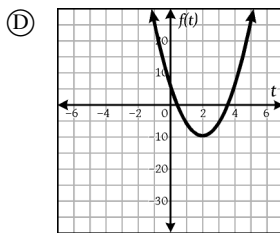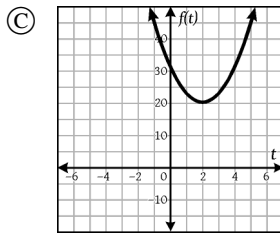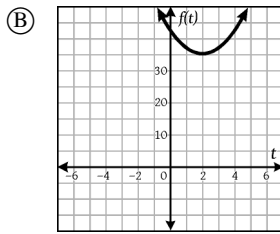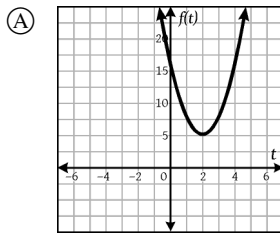34. Which graph shows the solution to the following system of inequalities?

$$3y + 2x \geq 6$$
$$2x - y \leq 7$$

Ⓐ

Ⓑ

Ⓒ

Ⓓ

35. Simplify: $\log_3 3$
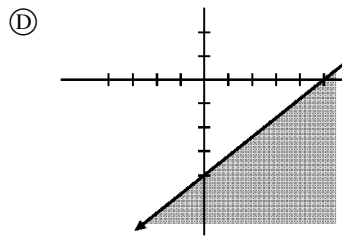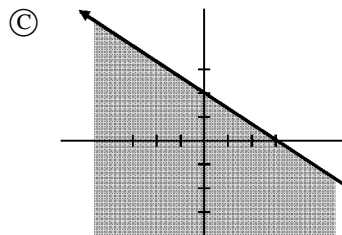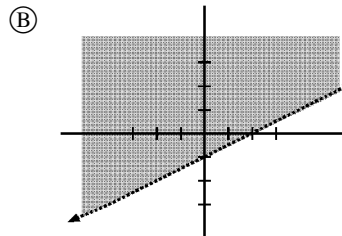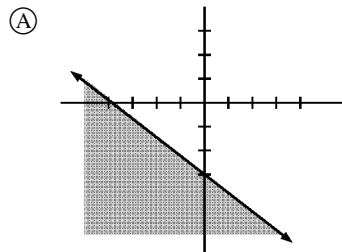
Ⓐ 1   Ⓑ 0   Ⓒ 3   Ⓓ 27

36. Which of the following represents the graph of $f(t) = 3t^2 - 12t + 17$?

Ⓐ

Ⓑ

Ⓒ

Ⓓ

37. Cole kicked a football. The equation $h = -16t^2 + 60t$ describes the height of the ball t minutes after it was kicked. Approximately how many seconds went by before the ball hit the ground?

Ⓐ 2.6 seconds   Ⓑ 3.2 seconds

Ⓒ 3.5 seconds   Ⓓ 3.8 seconds

38. Which graph represents the solution of the inequality $y \le -\frac{2}{3}x + 2$?

Ⓐ

Ⓑ

Ⓒ

Ⓓ

39. Solve: $\dfrac{5x - 1}{4x - 2} = \dfrac{5x + 6}{4x + 2}$

Ⓐ -2 Ⓑ $-\frac{7}{10}$ Ⓒ $\frac{4}{5}$ Ⓓ $\frac{5}{4}$

40. Simplify: $(3x^2 - 5x + 9) + (7x^2 + 8x - 15)$

Ⓐ $10x^2 + 3x - 6$ Ⓑ $10x^2 + 3x + 6$

Ⓒ $10x^2 - 3x + 6$ Ⓓ $10x^2 - 13x - 24$
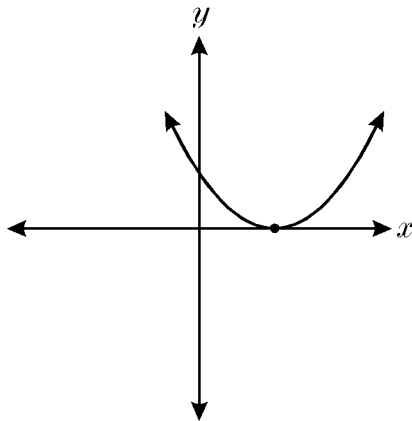
41. Given the expression: $A = 2\ell w + 2wh + 2\ell h$; for ℓ.

   (A) $\dfrac{A - wh}{w + h}$ (B) $\dfrac{A}{2} - \dfrac{hw}{w + h}$

   (C) $\dfrac{Awh}{w + h}$ (D) $\dfrac{A - 2wh}{2w + 2h}$

42. Five less than twice a number x is greater then the number itself. Which of the following inequalities best represents this information?

   (A) $3x > 5$ (B) $5 - 2x > x$

   (C) $2x - 5 > x$ (D) $5 < 2x + x$

43. How many solutions are shown by the graph of the quadratic function?

   (A) zero   (B) one   (C) two   (D) three

44. Solve: $(10y - 15)(5y + 12) = 0$

   (A) $\left\{\frac{3}{2}, -\frac{12}{5}\right\}$ (B) $\left\{0, \frac{12}{5}\right\}$

   (C) $\left\{-\frac{2}{3}, \frac{5}{12}\right\}$ (D) $\left\{-\frac{3}{2}, \frac{12}{5}\right\}$

45. Simplify: $(2x - 3)(5x + 1)$

   (A) $7x^2 - 2$ (B) $10x^2 + 2x - 3$

   (C) $10x^2 - 13x - 3$ (D) $10x^2 - 15x - 3$

46. Evaluate: $\log_3\left(\frac{1}{243}\right)$

   (A) -5 (B) -3 (C) 27 (D) 5

47. What is the range of the function

$$f(x) = |x + 2|$$

when the domain is $\{-2, -1, 0\}$?

   (A) $\{0, 1, 2\}$ (B) $\{0, -1, -2\}$

   (C) $\{4, 3, 2\}$ (D) $\{0, 3, 2\}$

48. Multiply: $(3x + 2)(9x^2 - 6x + 4)$

   (A) $27x^3 + 8$

   (B) $27x^3 - 36x^2 + 54x + 8$

   (C) $27x^3 + 36x^2 + 54x + 8$

   (D) $27x^3 - 36x^2 - 54x + 8$

49. $64^{\frac{3}{4}}$ is equivalent to _____ .

   (A) $\sqrt[3]{64^4}$ (B) $\sqrt[4]{64^3}$

   (C) $\frac{1}{4}(64)^3$ (D) $3(\sqrt[4]{64})$
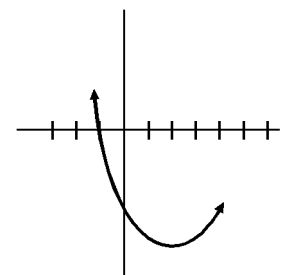
50. Write $\sqrt[5]{7^2}$ in exponential form.

   (A) $2^{5/7}$ (B) $7^{2/5}$ (C) 7^{10} (D) 5^{49}

51. The sum of a number and its square is 56. Find the number(s).

   (A) -7, 8   (B) -8, 7   (C) 7   (D) $\sqrt{56}$

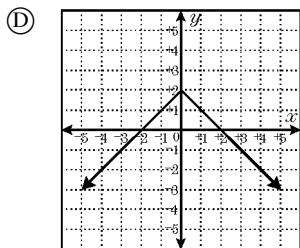52. The graph of $y = x^2 - 4x - 5$ is a parabola. (A portion of the graph is shown.) The x-intercepts of this parabola are -1 and _____ .
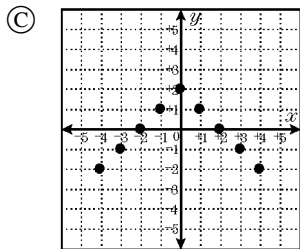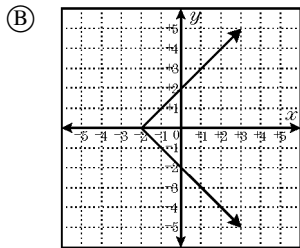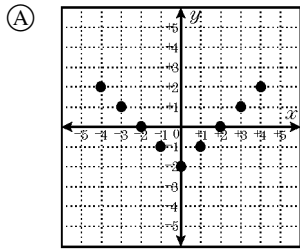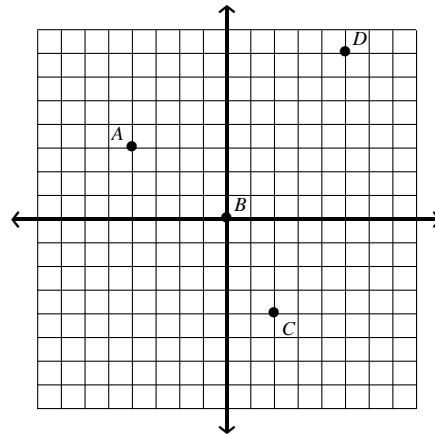
   (A) 4   (B) $4\frac{1}{2}$

   (C) 5   (D) $5\frac{1}{2}$

53. Which quadratic equation has only one root?

    Ⓐ $x^2 + 3x + 2 = 0$ Ⓑ $x^2 - 10x + 25 = 0$

    Ⓒ $x^2 + 8x - 20 = 0$ Ⓓ $x^2 - 10x + 9 = 0$

54. When x is a real number, which of the following is the graph of $y = -|x| + 2$?

Ⓐ

Ⓑ

Ⓒ

Ⓓ

55. What is a reasonable range for the relation graphed below?

    Ⓐ $[-4, 6]$ Ⓑ $[-4, 5]$

    Ⓒ $\{-4, 0, 2, 5\}$ Ⓓ $\{-4, 0, 3, 7\}$

56. What are the solutions of the equation $(x + 4)(x - 15) = 0$?

    Ⓐ $\{4, 15\}$ Ⓑ $\{4, -15\}$

    Ⓒ $\{-4, 15\}$ Ⓓ $\{-4, -15\}$

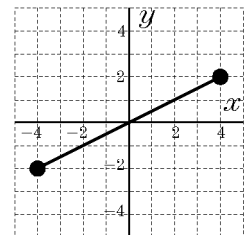57. $\dfrac{x^{2a}}{x^{2b}}$ is equivalent to which expression?

    Ⓐ x^{2b-2a} Ⓑ x^{2a-2b} Ⓒ x^{4ab} Ⓓ $x^{a/b}$

58. State the domain and range of the function $y = 2^x$

    Ⓐ $x \in \mathbb{R}$ and $y > 0$ Ⓑ $x \in \mathbb{R}$ and $y \in \mathbb{R}$

    Ⓒ $x > 0$ and $y \in \mathbb{R}$ Ⓓ $x > 0$ and $y > 0$

59. State the range of the function.

    Ⓐ $-4 \le y \le 4$

    Ⓑ $-2 \le y \le 2$
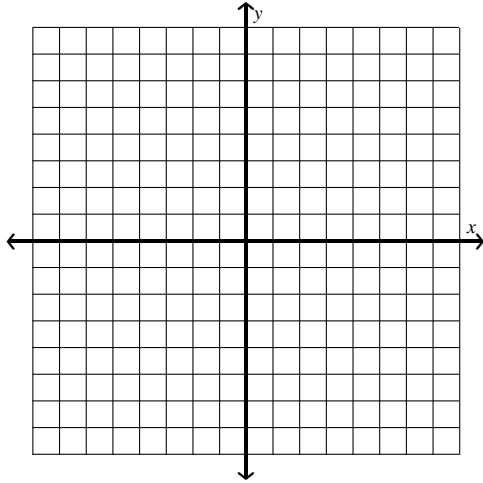
    Ⓒ $y \le 2$

    Ⓓ $\{-2, -1, 0, 1, 2\}$

60. $x^{2a} \cdot x^{2b}$ is equivalent to which expression?

    Ⓐ $x^{a/b}$ Ⓑ x^{4ab} Ⓒ x^{2a-2b} Ⓓ x^{2a+2b}

61. Solve the system graphically.

$$g(x) = x^2 + 4x + 4$$
$$h(x) = x + 2$$

    Ⓐ $(1, 1), (-2, 0)$ Ⓑ $(-1, 1), (-2, 0)$

    Ⓒ $(0, 2), (-1, 1)$ Ⓓ $(1, 3), (2, 4)$

62. State the domain and range of the function $y = |x| - 4$

    Ⓐ $x \in \mathbb{R}$ and $y \geq -4$ Ⓑ $x \in \mathbb{R}$ and $y \leq -4$

    Ⓒ $x \in \mathbb{R}$ and $y \geq 4$ Ⓓ $x \in \mathbb{R}$ and $y \leq 4$

63. Solve: $3x^2 = 48$

    Ⓐ $\{4, -4\}$ Ⓑ $\{0, 8\}$

    Ⓒ $\{0, -8\}$ Ⓓ $\{4, 16\}$

64. Solve: $\sqrt{2x} + 5 = 9$

    Ⓐ 8   Ⓑ 16   Ⓒ 22   Ⓓ Ø

65. Which of the following is the graph of the solution set of the system?

$$y \geq 3$$
$$y \leq x + 4$$

Ⓐ

Ⓑ

Ⓒ

Ⓓ