Student: _____ **Date:** _____	**Instructor:** Krystin Manguba-Glover **Course:** ACMAT 117: Manguba-Glover Fall 2024	**Assignment:** Midterm 1 Practice Problems - Version 1 (ONE of 3 is REQUIRED)

1. Find the mean of the set of data. Round to the nearest tenth.

   12, 13, 15, 1, 16, 5, 7, 6, 7

   ○ **A.** 9.1

   ○ **B.** 9.2

   ○ **C.** 9.0

   ○ **D.** 10.8

2. Find the median of the set of data.

   6, 7, 14, 26, 33, 36, 46

   ○ **A.** 14

   ○ **B.** 25

   ○ **C.** 33

   ○ **D.** 26

3. Find the median of the set of data.

   9, 9, 24, 12, 28, 45, 33, 33

   ○ **A.** 24.5

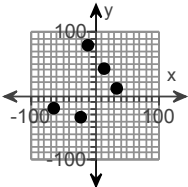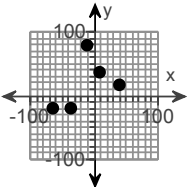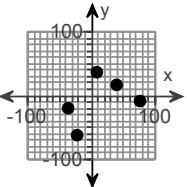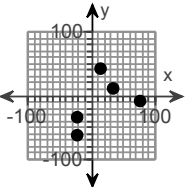   ○ **B.** 24

   ○ **C.** 26

   ○ **D.** 28

4. Find the domain and range of the relation.

   $\{(11, -2), (5,3), (10,6), (10,4)\}$

   ○ **A.** D = {5, 10, 11, 10}; R = {3, 6, −2, 4}

   ○ **B.** D = {3, 6, −2, 4}; R = {5, 10, 11}

   ○ **C.** D = {5, 10, 11}; R = {3, 6, −2, 4}

   ○ **D.** D = {5, 10, 11, −10}; R = {3, 6, −2, 4}

5. Plot the relation in the xy-plane.

   $\{(10,35), (-35, -20), (40,15), (-64, -20), (-10,78)\}$

   ○ **A.**   ○ **B.**   ○ **C.**   ○ **D.**

6. Find the distance in the xy-plane between the two points. Round an approximate result to the nearest hundredth.

   (6,0) and (0,8)

   ○ **A.** 20.00
   ○ **B.** 10.00
   ○ **C.** 2.00
   ○ **D.** 3.16

7. Find the midpoint of the line segment joining the two points.

   (3,2) and (2,9)

   ○ **A.** (5,11)
   ○ **B.** $(1, -7)$
   ○ **C.** $\left(\dfrac{5}{2}, \dfrac{11}{2} \right)$
   ○ **D.** $\left(\dfrac{1}{2}, -\dfrac{7}{2} \right)$

8. Find the center and radius of the circle.

   $x^2 + y^2 = 41$

   ○ **A.** Center: (1,1), radius: $\sqrt{41}$
   ○ **B.** Center: (0,0), radius: $\sqrt{41}$
   ○ **C.** Center: (0,0), radius: 82
   ○ **D.** Center: (1,1), radius: 82

9. Find the center and radius of the circle.
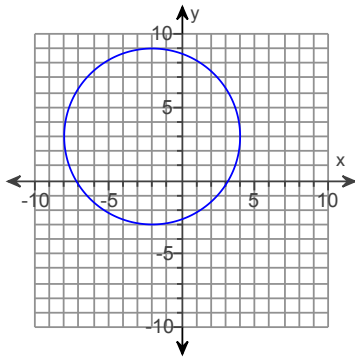
   $2x^2 + 2y^2 = 4$

   ○ **A.** Center: (2,2), radius: $\sqrt{2}$
   ○ **B.** Center: (0,0), radius: 4
   ○ **C.** Center: (0,0), radius: 2
   ○ **D.** Center: (0,0), radius: $\sqrt{2}$

10. Find the center and radius of the circle.

    $x^2 + y^2 = -18x - 45$

    ○ **A.** $(-9,0)$, r = 36
    ○ **B.** (9,0), r = 36
    ○ **C.** (9,0), r = 6
    ○ **D.** $(-9,0)$, r = 6

11. Use the graph to find the standard equation of the circle.

- **A.** $(x - 2)^2 + (y + 3)^2 = 6$
- **B.** $(x + 2)^2 + (y - 3)^2 = 36$
- **C.** $(x - 2)^2 + (y + 3)^2 = 36$
- **D.** $(x + 2)^2 + (y - 3)^2 = 6$

12. Find the standard equation of the circle that satisfies the conditions.

Center $(-5, 0)$, radius 2

- **A.** $x^2 + (y + 5)^2 = 2$
- **B.** $(x - 5)^2 + y^2 = 4$
- **C.** $x^2 + (y - 5)^2 = 2$
- **D.** $(x + 5)^2 + y^2 = 4$

13. Find $g(a - 1)$ when $g(x) = 4x - 5$.

- **A.** $4a + 1$
- **B.** $4a - 9$
- **C.** $4a - 5$
- **D.** $\frac{1}{4}a - 5$

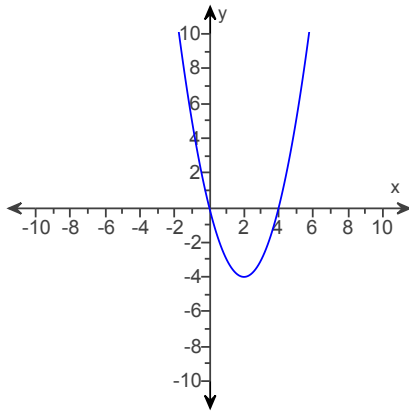14. Find $f(t - 2)$ when $f(x) = \sqrt{3x + 4}$.

- **A.** $\sqrt{-2t - 2}$
- **B.** $\sqrt{3t - 2}$
- **C.** $\sqrt{3t + 16}$
- **D.** $\sqrt{3t + 4}$

15. Specify the domain of the function.

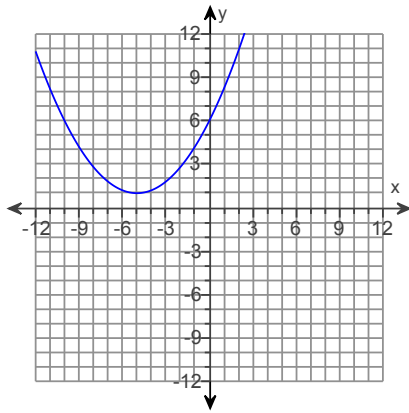$$f(x) = \frac{\sqrt{x + 9}}{(x + 2)(x - 8)}$$

- **A.** $x > 0$
- **B.** All real numbers
- **C.** $x \neq -9, x \neq -2, x \neq 8$
- **D.** $x \geq -9, x \neq -2, x \neq 8$
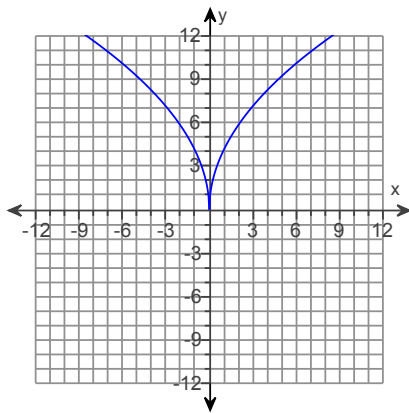
16. Find the domain and the range for the function.

- ○ **A.** D: {x < 0 or x > 0}, R: {y < 0 or y > 0}
- ○ **B.** D: {x < 0}, R: {y < 0}
- ○ **C.** D: All real numbers, R: {y ≥ − 4}
- ○ **D.** D: {x > 0}, R: {y ≤ 8}

17. Is the relation is a function?

- ○ Not a function
- ○ Function

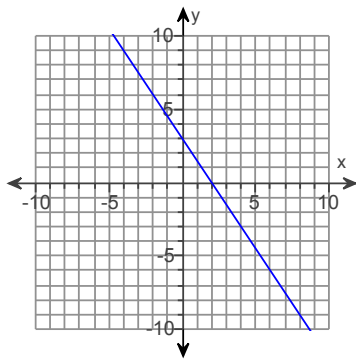18. Is the relation is a function?

- ○ Function
- ○ Not a function

19. Find the slope of the line that goes through the pair of points.
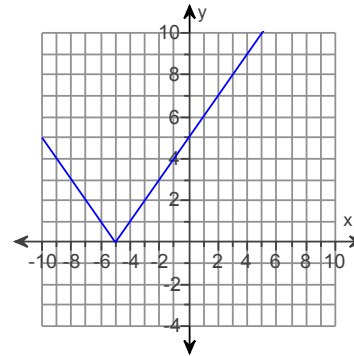
(− 5, − 8) and (3,7)

- ○ **A.** $\dfrac{15}{8}$

- ○ **B.** $-\dfrac{15}{8}$

- ○ **C.** 1
- ○ **D.** Undefined

20. Write the equation of the line whose graph is shown.

- ○ **A.** $y = 2x + 3$
- ○ **B.** $y = -\dfrac{3}{2}x + 3$
- ○ **C.** $y = -\dfrac{2}{3}x + 2$
- ○ **D.** $y = -2x + 3$

21. Use the graph of f to determine the intervals where f is increasing and where f is decreasing.

- ○ **A.** increasing: $(-\infty,\infty)$; decreasing: never
- ○ **B.** increasing: $(-5,\infty)$; decreasing: $(-\infty,-5)$
- ○ **C.** increasing: $(-\infty,0)$; decreasing: $(0,\infty)$
- ○ **D.** increasing: $(-\infty,-5)$; decreasing: $(-5,\infty)$

22. Use the graph of f to determine the intervals where f is increasing and where f is decreasing.
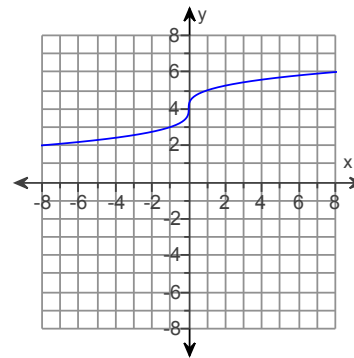
- ○ **A.** increasing: $(0,\infty)$; decreasing: $(-\infty,0)$
- ○ **B.** increasing: never; decreasing: $(-\infty,\infty)$
- ○ **C.** increasing: $(-\infty,0)$; decreasing: $(0,\infty)$
- ○ **D.** increasing: $(-\infty,\infty)$; decreasing: never

23. Compute the average rate of change of f from x_1 to x_2. Round your answer to two decimal places when appropriate. Interpret your result graphically.

    $f(x) = -2x + 3$, $x_1 = -6$ and $x_2 = -3$

    ○ **A.** 1; the slope of the line passing through $(-6, f(-6))$ and $(-3, f(-3))$ is 1.

    ○ **B.** -3; the slope of the line passing through $(-6, f(-6))$ and $(-3, f(-3))$ is -3.

    ○ **C.** 2; the slope of the line passing through $(-6, f(-6))$ and $(-3, f(-3))$ is 2.

    ○ **D.** -2; the slope of the line passing through $(-6, f(-6))$ and $(-3, f(-3))$ is -2.

24. Complete the following for the given f(x).
    (i) Find $f(x + h)$.
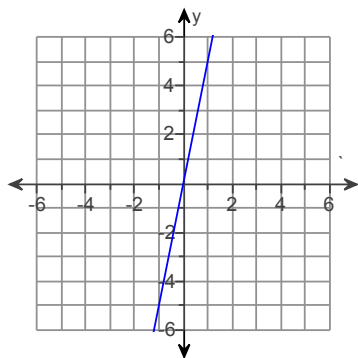   (ii) Find the difference quotient of f and simplify.

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

    ○ **A.** (i) $x^2 + 2xh + h^2 + 2x + 2h$
             (ii) $2x + h + 2$

    ○ **B.** (i) $x^2 + 2xh + h^2 + 2x + 2h$
             (ii) $2xh + h + 2x$

    ○ **C.** (i) $x^2 + h^2 + 2x + 2h$
             (ii) $h + 2$

    ○ **D.** (i) $x^2 + 2xh + h^2 + 2x + h$
             (ii) $2x + h + 1$

25. Find a point-slope form for the equation of the line satisfying the conditions.

    Slope -8, passing through $(-7, -4)$

    ○ **A.** $y = -8(x - 7) + 4$

    ○ **B.** $y + 4 = 8x + 7$

    ○ **C.** $y = -8(x + 7) - 4$

    ○ **D.** $y = 8(x - 7) + 4$
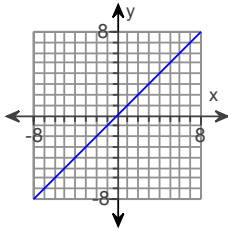
26. Write an equation in slope-intercept form for the line shown.

    ○ **A.** $y = \dfrac{x}{5}$

    ○ **B.** $y = -5x$
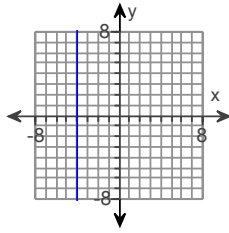
    ○ **C.** $y = -\dfrac{x}{5}$

    ○ **D.** $y = 5x$

27. Match the equation to its graph.

x = 4

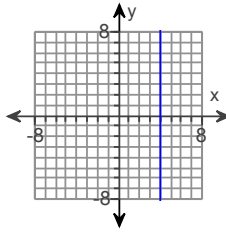○ **A.**   ○ **B.**   ○ **C.**   ○ **D.**

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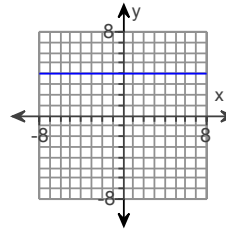
28. Write the slope-intercept form of the equation for the line satisfying the following conditions.

Y-intercept: − 7 and x-intercept: 8

○ **A.** $y = -\dfrac{8}{7}x + 8$

○ **B.** $y = \dfrac{8}{7}x + 8$

○ **C.** $y = -\dfrac{7}{8}x - 7$

○ **D.** $y = \dfrac{7}{8}x - 7$

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29. Write the equation in slope-intercept form of the line through the given point with the given slope.

(5,0); slope: 10

○ **A.** y = − 5x + 10
○ **B.** y = 5x + 10
○ **C.** y = 10x − 50
○ **D.** y = − 10x + 5

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30. Determine the x- and y-intercepts on the graph of the equation.

y = 11(x + 1) − 4

○ **A.** x-intercept is $-\dfrac{7}{11}$; y-intercept is 7

○ **B.** x-intercept is $-\dfrac{15}{11}$; y-intercept is − 7

○ **C.** x-intercept is $\dfrac{7}{11}$; y-intercept is 7

○ **D.** x-intercept is 7; y-intercept is 15

31. Determine the equation of the line described. Put the answer in the slope-intercept form, if possible.

Through $(-2, -7)$, perpendicular to $6x + 5y = 23$

- **A.** $y = \dfrac{6}{5}x + \dfrac{6}{5}$

- **B.** $y = \dfrac{5}{6}x - \dfrac{16}{3}$

- **C.** $y = -\dfrac{2}{5}x - \dfrac{23}{5}$

- **D.** $y = -\dfrac{5}{6}x + \dfrac{16}{3}$

32. Find an equation of the line satisfying the following conditions. If possible, write the equation in slope-intercept form.

Vertical, passing through $(2, -9)$

- **A.** $y = 2$
- **B.** $y = -9$
- **C.** $x = 2$
- **D.** $x = -9$

33. Solve the equation symbolically.

$29t - 17 = 5t + 4$

- **A.** $-\dfrac{34}{9}$

- **B.** $-\dfrac{34}{13}$

- **C.** $-\dfrac{7}{8}$

- **D.** $\dfrac{7}{8}$

34. Solve the equation symbolically.

$\dfrac{1}{4}p - \dfrac{3}{8}p = 2$

- **A.** -16
- **B.** 14
- **C.** -14
- **D.** 16

35. Classify the equation as a contradiction, an identity, or a conditional equation.

   $2(3f + 21) = 6f + 42$

   ⚪ **A.** Identity

   ⚪ **B.** Conditional

   ⚪ **C.** Contradiction

36. A store is discounting all regularly priced items by 10%. (i) Find a function f that computes the sale price of an item having a regular price of x. (ii) If an item normally costs $171.47, what is its sale price? Round to the nearest cent.

   ⚪ **A.** $f(x) = x - 0.1x$; $154.32

   ⚪ **B.** $f(x) = x - 10$; $161.47

   ⚪ **C.** $f(x) = 0.1x$; $17.15

   ⚪ **D.** $f(x) = x - 0.1$; $171.37

37. Solve the inequality symbolically. Express the solution set in interval notation.

   $-8a + 11 \leq -9a + 2$

   ⚪ **A.** $(-\infty, -9]$

   ⚪ **B.** $[-9, \infty)$

   ⚪ **C.** $(-\infty, -8)$

   ⚪ **D.** $(-8, \infty)$

38. Solve the inequality symbolically. Express the solution set in interval notation.

   $-6(3y - 3) < -24y - 36$

   ⚪ **A.** $(-\infty, -9)$

   ⚪ **B.** $(-9, \infty)$

   ⚪ **C.** $(-\infty, -24)$

   ⚪ **D.** $(-24, \infty)$

39. Solve the inequality symbolically. Express the solution set in interval notation.

   $-7 \leq 7 - 5x \leq 15$

   ⚪ **A.** $(\frac{14}{5}, -\frac{8}{5})$

   ⚪ **B.** $[\frac{14}{5}, -\frac{8}{5}]$

   ⚪ **C.** $[-\frac{8}{5}, \frac{14}{5}]$

   ⚪ **D.** $(-\frac{8}{5}, \frac{14}{5})$

40. Solve the inequality graphically. Express the solution in set-builder notation.

$-6(4x - 3) < -30x - 30$

○ **A.** $\{x \mid x < -8\}$

○ **B.** $\{x \mid x > -8\}$

○ **C.** $\{x \mid x > -30\}$

○ **D.** $\{x \mid x < -30\}$

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41. Marty's Tee Shirt & Jacket Company is to produce a new line of jackets with an embroidery of a Great Pyrenees dog on the front. There are fixed costs of $590 to set up for production, and variable costs of $32 per jacket. Write an equation that can be used to determine the total cost, C(x), encountered by Marty's Company in producing x jackets.
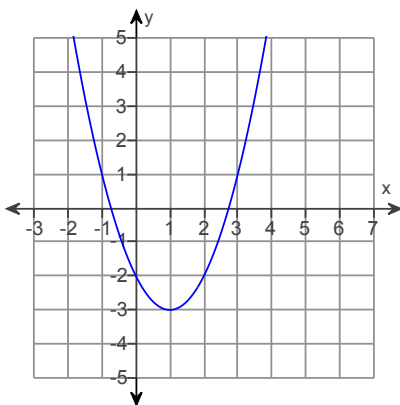
○ **A.** $C(x) = 590 + 32x$

○ **B.** $C(x) = 590x + 32$

○ **C.** $C(x) = 590 - 32x$

○ **D.** $C(x) = (590 + 32)x$

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42. Use the graph of f to determine the intervals where f is increasing and where f is decreasing.
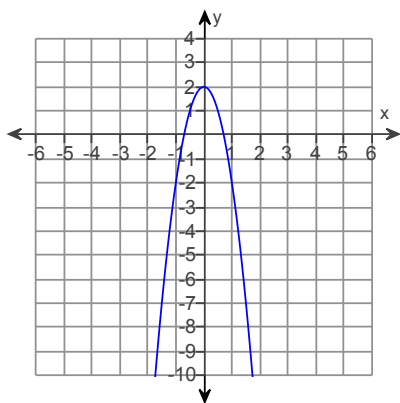
○ **A.** incr: all x

○ **B.** decr: all x

○ **C.** incr: $x \le 0$; decr: $x \ge 0$

○ **D.** incr: $x \ge 0$; decr: $x \le 0$

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43. Use the given graph of the quadratic function f to write its formula as $f(x) = a(x - h)^2 + k$.

○ **A.** $f(x) = (x - 1)^2 - 3$

○ **B.** $f(x) = (x - 1)^2 + 3$

○ **C.** $f(x) = (x + 1)^2 - 3$

○ **D.** $f(x) = -(x - 1)^2 - 3$

44. Determine the vertex of the graph of f.

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

    ○ **A.** $(-2, 0)$
    ○ **B.** $(0, -2)$
    ○ **C.** $(0, 2)$
    ○ **D.** $(2, 0)$

45. Determine the vertex of the graph of f.

    $f(x) = 4x^2 - 32x + 61$

    ○ **A.** $(-3, 4)$
    ○ **B.** $(3, -4)$
    ○ **C.** $(-4, 3)$
    ○ **D.** $(4, -3)$

46. Write the equation as $f(x) = a(x - h)^2 + k$. Identify the vertex.

    $f(x) = x^2 + 5x + 2$

    ○ **A.** $f(x) = \left(x + \dfrac{5}{2}\right)^2 - \dfrac{17}{4}; \left(\dfrac{5}{2}, -\dfrac{17}{4}\right)$

    ○ **B.** $f(x) = (x + 5)^2 - 23; (5, 23)$

    ○ **C.** $f(x) = \left(x + \dfrac{5}{2}\right)^2 - \dfrac{17}{4}; \left(-\dfrac{5}{2}, -\dfrac{17}{4}\right)$

    ○ **D.** $f(x) = (x + 5)^2 - 23; (-5, 23)$

47. Solve the quadratic equation.

    $x^2 + 6x + 9 = 13$

    ○ **A.** 10
    ○ **B.** $3 \pm \sqrt{13}$
    ○ **C.** $-3 \pm \sqrt{13}$
    ○ **D.** No real solutions

48. Solve by completing the square.

    $a^2 - 10a + 21 = 0$

    ○ **A.** $7, 3$
    ○ **B.** $\sqrt{21}, -\sqrt{21}$
    ○ **C.** $18, 3$
    ○ **D.** $-7, -3$

49. Solve by completing the square.

$x^2 = 5 - 8x$

○ **A.** $-4 \pm \sqrt{21}$

○ **B.** $4 + \sqrt{21}$

○ **C.** $-1 \pm \sqrt{21}$

○ **D.** $-4 \pm 2\sqrt{21}$

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50. Solve the quadratic equation. Check the answers.

$x^2 + x - 1 = 5$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

○ **A.** The solution(s) is/are x = [   ] .
(Simplify your answer. Type an integer or a fraction. Use a comma to separate answers as needed.)
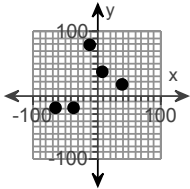
○ **B.** There are no real solutions.

1. A. 9.1

2. D. 26

3. C. 26

4. C. D = {5, 10, 11}; R = {3, 6, − 2, 4}

5.

B.

6. B. 10.00

7. C. $\left(\dfrac{5}{2}, \dfrac{11}{2} \right)$

8. B. Center: (0,0), radius: $\sqrt{41}$

9. D. Center: (0,0), radius: $\sqrt{2}$

10. D. (− 9,0), r = 6

11. B. $(x + 2)^2 + (y − 3)^2 = 36$

12. D. $(x + 5)^2 + y^2 = 4$

13. B. 4a − 9

14. B. $\sqrt{3t − 2}$

15. D. x ≥ − 9, x ≠ − 2, x ≠ 8

16. C. D: All real numbers, R: {y ≥ − 4}

17. Function

18. Function

19. A. $\dfrac{15}{8}$

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20. B. $y = -\dfrac{3}{2}x + 3$

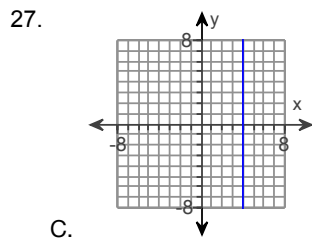21. B. increasing: $(-5, \infty)$; decreasing: $(-\infty, -5)$

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22. D. increasing: $(-\infty, \infty)$; decreasing: never

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23. D. -2; the slope of the line passing through $(-6, f(-6))$ and $(-3, f(-3))$ is -2.

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24. A. (i) $x^2 + 2xh + h^2 + 2x + 2h$ (ii) $2x + h + 2$

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25. C. $y = -8(x + 7) - 4$

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26. D. $y = 5x$

27.

C.

---

28. D. $y = \dfrac{7}{8}x - 7$

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29. C. $y = 10x - 50$

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30. A. x-intercept is $-\dfrac{7}{11}$; y-intercept is 7

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31. B. $y = \dfrac{5}{6}x - \dfrac{16}{3}$

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32. C. $x = 2$

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33. D. $\dfrac{7}{8}$

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34. A. -16

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35. A. Identity

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36. A. $f(x) = x - 0.1x$; $154.32

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37. A. $(-\infty, -9]$

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38. A. $(-\infty, -9)$

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39. C. $[-\dfrac{8}{5}, \dfrac{14}{5}]$

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40. A. $\{x \mid x < -8\}$

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41. A. $C(x) = 590 + 32x$

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42. C. incr: $x \le 0$; decr: $x \ge 0$

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43. A. $f(x) = (x-1)^2 - 3$

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44. C. (0,2)

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45. D. $(4, -3)$

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46. C. $f(x) = \left(x + \dfrac{5}{2}\right)^2 - \dfrac{17}{4}$; $\left(-\dfrac{5}{2}, -\dfrac{17}{4}\right)$

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47. C. $-3 \pm \sqrt{13}$

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48. A. 7, 3

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49. A. $-4 \pm \sqrt{21}$

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50. A. The solution(s) is/are x = $\boxed{-3,2}$.

(Simplify your answer. Type an integer or a fraction. Use a comma to separate answers as needed.)