PRECAL MATH 11 - FINAL REVIEW PRACTICE QUESTIONS

Multiple Choice
Identify the choice that best completes the statement or answers the question.

1. Determine t_{11} of this arithmetic sequence: $-20, -35, -50, -65, ...$
   A. $t_{11} = -80$ C. $t_{11} = -15$
   B. $t_{11} = -170$ D. $t_{11} = -20$

2. The general term of an arithmetic sequence is: $t_n = -17 + (-4)(n-1)$
   Determine the first 4 terms of the sequence.
   A. $-21, -25, -29, -33$ C. $-17, -25, -33, -41$
   B. $-17, -4, -25, -29$ D. $-17, -21, -25, -29$

3. Determine the sum of the first 23 terms of this arithmetic series: $9 + 5 + 1 - 3 - 7 - 11 - 15 - 19 - ...$
   A. $S_{23} = -344$ C. $S_{23} = -8176.5$
   B. $S_{23} = -908.5$ D. $S_{23} = -805$

4. Which sequence could be geometric?
   A. $4, 12, 20, 28, ...$ C. $8, 39, 70, 101, ...$
   B. $-4, -16, -64, -256, ...$ D. $-4, -3.1, -2.2, -1.3, ...$

5. Determine the 8th term of this geometric sequence: $7, 21, 63, 189, ...$
   A. $45\,927$ C. $21\,870$
   B. $19\,683$ D. $15\,309$

6. Determine the sum of the first 5 terms of this geometric series: $18 + 6 + 2 + ...$
   A. 27 C. 45
   B. 36 D. 26.89

7. Determine the common ratio of this infinite geometric series: $-5 + 2 - \dfrac{4}{5} + \dfrac{8}{25} - ...$

   Does the series have a finite sum?
   A. $r = -0.4$, so the sum is finite.   C. $r = -3.57$, so the sum is not finite.
   B. $r = -\dfrac{4}{5}$, so the sum is finite.   D. $r = -\dfrac{2}{5}$, so the sum is finite.

8. Evaluate: $\sqrt{\left(-9 - (-17)\right)^2}$
   A. 26 B. 2.83 C. 8 D. 64

9. Evaluate: $\left| 3 + (-\dfrac{1}{3}) \right| - \left| (-3) - (1\dfrac{2}{5}) \right|$

   A. $1\dfrac{11}{15}$ B. $-4\dfrac{2}{3}$ C. $5\dfrac{1}{3}$ D. $-1\dfrac{11}{15}$

10. Write this entire radical as a mixed radical: $\sqrt[3]{-\dfrac{54}{125}}$

   A. $-2\sqrt[3]{\dfrac{3}{5}}$ B. $\sqrt[3]{-\dfrac{6}{5}}$ C. $-\dfrac{5\sqrt[3]{2}}{3}$ D. $-\dfrac{3\sqrt[3]{2}}{5}$

11. Write this radical in simplest form: $\sqrt{63a^9b^8}$
    Then state the values of the variables, a and b, for which the radical is defined.
    A. $3a^4b^4\sqrt{7a}$; $a \in \mathbb{R}$, $b \geq 0$
    B. $3ab\sqrt{7a^4b^4}$; $a \geq 0$, $b \in \mathbb{R}$
    C. $3ab\sqrt{7a^4b^4}$; $a \in \mathbb{R}$, $b \geq 0$
    D. $3a^4b^4\sqrt{7a}$; $a \geq 0$, $b \in \mathbb{R}$

12. Simplify by adding or subtracting like terms: $\sqrt{729} - \sqrt[3]{8} - \sqrt{81} + \sqrt[3]{512}$
    A. $18 - 6\sqrt[3]{2}$
    B. $6 - 18\sqrt{3}$
    C. $18\sqrt{3} - 6\sqrt[3]{2}$
    D. 24

13. Expand and simplify this expression: $\sqrt{3}\left(\sqrt{2} + 4\right)$
    A. $3\sqrt{2} + 4\sqrt{3}$
    B. $2\sqrt{3} + \sqrt{12}$
    C. $\sqrt{6} + \sqrt{12}$
    D. $\sqrt{6} + 4\sqrt{3}$

14. Simplify this expression: $\dfrac{2\sqrt{3} + 9\sqrt{7}}{\sqrt{2} - 8}$
    A. $\dfrac{-2\sqrt{3} - 18\sqrt{42} - 72\sqrt{7}}{-6}$
    B. $\dfrac{-2\sqrt{6} - 9\sqrt{14} - 16\sqrt{3} - 72\sqrt{7}}{62}$
    C. $\dfrac{-2\sqrt{3} - 18\sqrt{42} - 72\sqrt{7}}{62}$
    D. $\dfrac{-2\sqrt{6} - 9\sqrt{14} - 16\sqrt{3} - 72\sqrt{7}}{-6}$

15. Solve this equation: $-4\sqrt{x} - 43 = -10\sqrt{x} - 7$
    A. $x = 12$
    B. $x = 36$
    C. $x = 6$
    D. $x = 25$

16. Factor: $25m^2 - 40m + 16$
    A. $(5m - 16)(5m - 1)$
    B. $(5m - 4)(5m + 4)$
    C. $(5m + 4)^2$
    D. $(5m - 4)^2$

17. Factor this polynomial expression: $2(3x - 2)^2 + 9(3x - 2) - 5$
    A. $3(x + 1)(6x - 5)$
    B. $2(3x - 2)(x + 5)$
    C. $2(3x + 2)(x - 5)$
    D. $3(x - 1)(6x + 5)$

18. Solve by factoring: $x^2 + 4x - 21 = 0$
    A. $x = -7$ or $x = 3$
    B. $x = -7$ or $x = -3$
    C. $x = 7$ or $x = -3$
    D. $x = 7$ or $x = 3$

19. Solve this equation: $(x - 1)^2 - 7 = 24$
    A. $x = 1 \pm \sqrt{17}$
    B. $x = 1 \pm \sqrt{31}$
    C. $x = -1 \pm \sqrt{31}$
    D. $x = -1 \pm \sqrt{17}$

20. Solve $x^2 + 8x + 13 = 0$ by completing the square.
    A. $x = -4 \pm \sqrt{3}$
    B. $x = 4 \pm \sqrt{19}$
    C. $x = 64 \pm \sqrt{3}$
    D. $x = -8 \pm \sqrt{19}$

21. Solve this quadratic equation: $4x^2 + 5x - 9 = 0$
Give the solution to 2 decimal places.

   A. $x = 1.63$ or   **B.** $x = 1.00$ or   **C.** $x = 2.25$ or   **D.** $x = 2.00$ or
         $x = -1.63$ $x = -2.25$ $x = -1.00$ $x = -4.50$

22. Calculate the value of the discriminant for this equation: $-3x^2 + 6x - 2 = 0$

   A. -9 **B.** 15 **C.** 0 **D.** 12

23. Identify the y-intercept of the graph of this quadratic function: $y = x^2 + 2x + 39$

   A. 37 **B.** 0 **C.** 39 **D.** 4

24. Use graphing technology to approximate the solution of this equation: $2x^2 - 3x - 4 = 0$
Write the roots to 1 decimal place.

   A. approximately $x = 2.4$ and $x = -0.9$.   **C.** approximately $x = 0.9$ and $x = -2.4$.
   B. approximately $x = 1.6$ and $x = -1.6$.   **D.** approximately $x = 4.7$ and $x = -1.7$.

25. Determine an equation of this graph of a quadratic function.
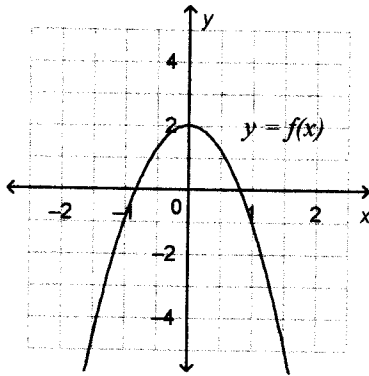
   A. $y = -\dfrac{1}{3}x^2 + 2$ **B.** $y = -3x^2 + 2$ **C.** $y = 3x^2$ **D.** $y = \dfrac{1}{3}x^2 - 2$

26. Determine the equation of the axis of symmetry and the coordinates of the vertex of the parabola with equation $y = 4x^2 + 5x - 1$.

   A. $x = \dfrac{5}{8}$; vertex: $\left(\dfrac{5}{8}, \dfrac{59}{16}\right)$ **C.** $x = -\dfrac{5}{8}$; vertex: $\left(-\dfrac{5}{8}, -\dfrac{91}{16}\right)$

   B. $x = -\dfrac{5}{8}$; vertex: $\left(-\dfrac{5}{8}, -\dfrac{41}{16}\right)$ **D.** $x = \dfrac{5}{8}$; vertex: $\left(\dfrac{5}{8}, \dfrac{37}{8}\right)$

27. Write this equation in standard form: $y = -3x^2 + 12x - 16$

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

28. A quadratic function has zeros -3 and 8. What is the equation of the axis of symmetry of its graph?

   A. $x = 2.5$ **B.** $x = -5.5$ **C.** $x = -2.5$ **D.** $x = 5.5$

29. Determine the x-intercepts of the graph of this quadratic function: $y = 3x^2 + 10x - 48$

   A. $\dfrac{8}{3}$ and 6 **B.** $-\dfrac{8}{3}$ and 6 **C.** $-\dfrac{8}{3}$ and -6 **D.** $\dfrac{8}{3}$ and -6

30. Solve the quadratic inequality: $2x^2 + x - 28 > 0$
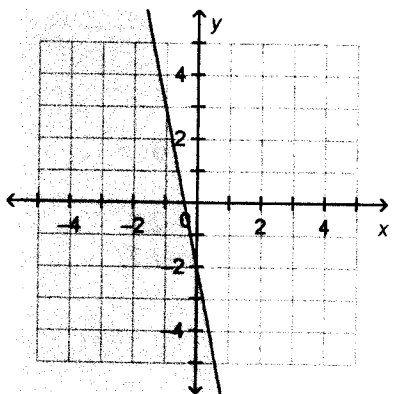
A. $x < -\dfrac{7}{2}$ or $x > 4$, $x \in \mathbb{R}$

C. $x < -4$ or $x > \dfrac{7}{2}$, $x \in \mathbb{R}$

B. $-4 < x < \dfrac{7}{2}$, $x \in \mathbb{R}$

D. $-\dfrac{7}{2} < x < 4$, $x \in \mathbb{R}$

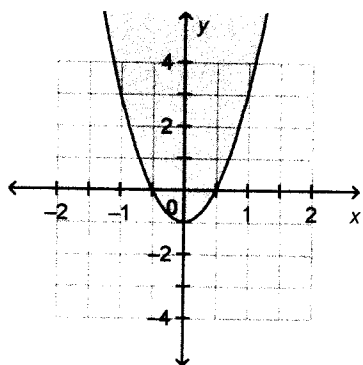31. Write an inequality to describe this graph.

A. $y < -5x + 2$ B. $y > -5x - 2$ C. $y \geq -5x + 2$ D. $y \leq -5x - 2$

32. Write an inequality to describe this graph.

A. $y < 4x^2 + 1$ B. $y \leq 4x^2 - 1$ C. $y > 4x^2 + 1$ D. $y \geq 4x^2 - 1$

33. Use a graphing calculator to graph this system of equations.
Write the coordinates of the point of intersection.
$y = 5x^2 + 17$
$10x - y = -12$

A. $(1, 22)$ B. $(-1, 2)$ C. $(12, -1)$ D. $(-1, 12)$

34. Two numbers are related:
The sum of twice the square of the first number plus the second number is 9.
The difference between twice the first number and the second number is 15.
Which system of equations represents this relationship?

A. $(2x + y)^2 = 9$
$2(x - y) = 15$

B. $2x^2 + y = 9$
$2x - y = 15$

C. $2x + y^2 = 9$
$x - 2y = 15$

D. $2x^2 + y^2 = 9$
$x - 2y = 15$

35. Point P(2, 6) is on the terminal arm of an angle θ in standard position. Determine the exact value of $\sin \theta$.

A. $\dfrac{\sqrt{40}}{6}$, or $\dfrac{\sqrt{10}}{3}$

B. $\dfrac{8}{\sqrt{40}}$, or $\dfrac{4}{\sqrt{10}}$

C. $\dfrac{6}{\sqrt{40}}$, or $\dfrac{3}{\sqrt{10}}$

D. $\dfrac{2}{\sqrt{40}}$, or $\dfrac{1}{\sqrt{10}}$

4

36. Point P(7, 9) is on the terminal arm of an angle θ in standard position. Determine the measure of θ to the nearest degree.

    A. $\theta = 63°$ **B.** $\theta = 52°$ **C.** $\theta = 33°$ **D.** $\theta = 38°$

37. Determine the reference angle for the angle 290° in standard position.

    A. 290°   **B.** 20°   **C.** 110°   **D.** 70°

38. Angle θ is in standard position and its terminal arm lies in Quadrant 4. The sine of its reference angle is $\frac{4}{6}$. Determine the exact value of $\cos \theta$.
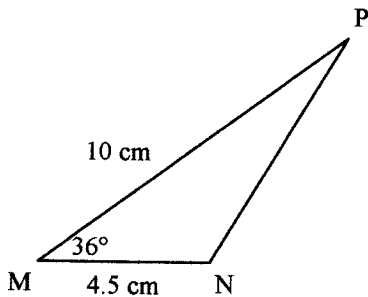
    A. $\dfrac{\sqrt{20}}{6}$ **B.** $\dfrac{6}{\sqrt{20}}$ **C.** $\dfrac{4}{\sqrt{20}}$ **D.** $\dfrac{\sqrt{20}}{4}$

39. In $\triangle ABC$, AB = 6 cm, BC = 7 cm, and $\angle A = 47°$, how many triangles can be drawn?

    A. 2   **B.** 1   **C.** 0   **D.** 1 isosceles triangle

40. In $\triangle PMN$, determine the length of PN to the nearest tenth of a centimetre.

    A. 9.2 cm   **B.** 47.4 cm   **C.** 13.9 cm   **D.** 6.9 cm

41. Determine the non-permissible values for this rational expression:

$$\frac{-9x + 3}{6x^2 + 10x - 4}$$

    A. $x = -\dfrac{1}{3}$ and $x = 2$ **B.** $x = \dfrac{1}{3}$ and $x = -2$ **C.** $x = -2$ **D.** $x = 2$

42. Simplify this expression:

$$\frac{8(b - 2)}{9} \cdot \frac{7}{6(b - 2)}$$

    A. $\dfrac{28}{27}, b \neq 2$ **B.** $\dfrac{28}{27}$ **C.** $\dfrac{28(b - 2)}{27(b - 2)}, b \neq 2$ **D.** $\dfrac{28(b - 2)^2}{27}$

43. Simplify.

$$\frac{3 - 2y}{2y^3} - \frac{3 - y}{6y^2}$$

    A. $\dfrac{-3y}{6y^3}, y \neq 0$ **B.** $\dfrac{y^2 - 9y + 9}{6y^3}, y \neq 0$ **C.** $\dfrac{y^2 - 3y + 3}{2y^3}, y \neq 0$ **D.** $\dfrac{-y}{6y^3}, y \neq 0$

44. Simplify.

$$\frac{r+6}{r-2}+\frac{4}{2-r}$$

A. $\dfrac{r+10}{(r-2)^2}, r \neq 2$

C. $\dfrac{r+2}{(r-2)^2}, r \neq 2$

B. $\dfrac{r+2}{r-2}, r \neq 2$

D. $\dfrac{r+10}{r-2}, r \neq 2$

45. Solve.

$$\frac{25}{w-6}=\frac{w-6}{w}$$

A. $w = 1$ or $w = 36$

C. $w = -1$ or $w = 36$

B. $w = 1$ or $w = -36$

D. no solution

46. Which absolute value function has these characteristics?

The graph of the absolute value function has x-intercept $\dfrac{2}{7}$ and y-intercept 2.

The domain of the function is $x \in \mathbb{R}$ and the range is $y \geq 0$.

A. $y = |7x^2 - 2|$

C. $y = |7x - 2|$

B. $y = |-2x + 7|$

D. $y = |-2x^2 - 2|$

47. Solve this equation: $|2x + 16| = 10$

A. $x = -3$ and $x = -13$

C. $x = 10$ and $x = -10$

B. $x = -3$ and $x = 10$

D. $x = -13$ and $x = -10$

48. How many solutions does the equation $y = |2x^2 - 2|$ have when $y = 1$?
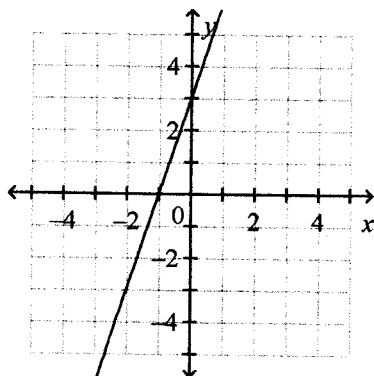
A. 6   **B.** 4   **C.** 5   **D.** 3

49. This is the graph of a linear function. What is the equation of the vertical asymptote of the graph of its reciprocal function?

A. $y = -1$ **B.** $x = 3$ **C.** $y = 3$ **D.** $x = -1$

50. What are the domain and range of the reciprocal function $y = \dfrac{1}{-4x}$?

A. domain: $x \in \mathbb{R}, x \neq 0$
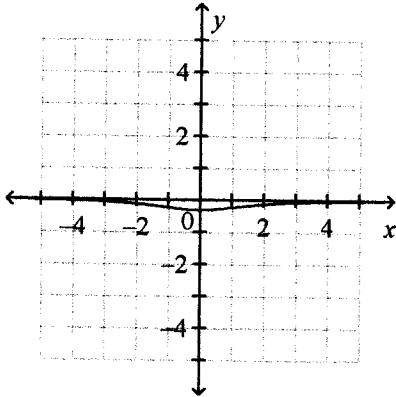range $y \in \mathbb{R}, y \neq 0$

C. domain: $x \in \mathbb{R}, x \neq \dfrac{1}{-4}$
range $y \in \mathbb{R}, y \neq 0$

B. domain: $x \in \mathbb{R}, x \neq \dfrac{1}{-4}$
range $y \in \mathbb{R}, y \neq 4$

D. domain: $x \in \mathbb{R}, x \neq 4$
range $y \in \mathbb{R}, y \neq 4$

51. Which function is represented by the graph below?

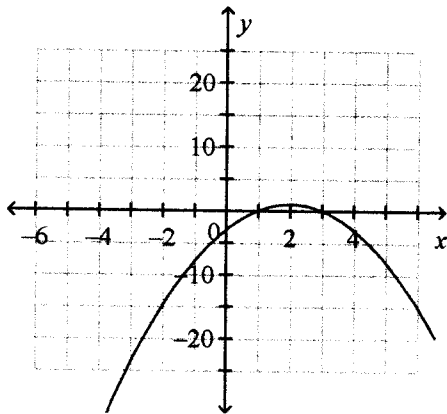i) $y = -x^2 - 3$ ii) $y = -x^2 + 3$ iii) $y = \dfrac{1}{-x^2 - 3}$ iv) $y = \dfrac{1}{-x^2 + 3}$

A. iv   **B.** ii   **C.** i   **D.** iii

52. Identify the vertical asymptotes of the graph of the reciprocal of the quadratic function $y = -x^2 - 3x - 5$.
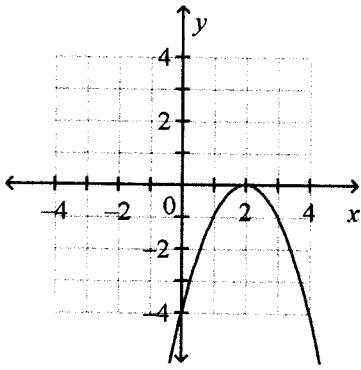   **A.** $x = -3$ and $x = -5$ **C.** $y = -3$ and $y = -5$
   B. $x = -1.5$ **D.** no vertical asymptotes

53. This is a graph of $y = -(x + 2)^2 + 1$. Identify the vertical asymptotes of the graph of the reciprocal function.
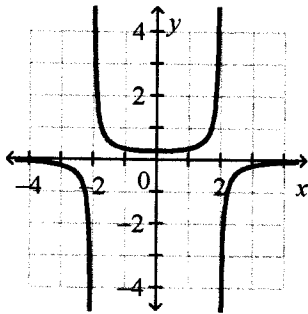

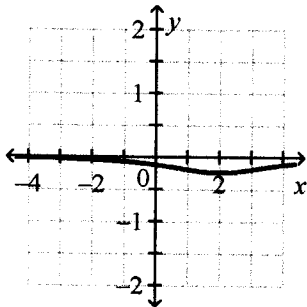**A.** $y = 1$ and $y = -1$ **B.** $x = 1$ and $y = -1$ **C.** $x = 3$ and $x = 1$ **D.** no vertical asymptotes

7

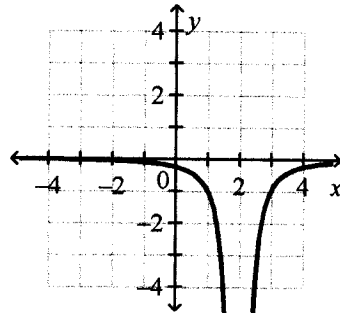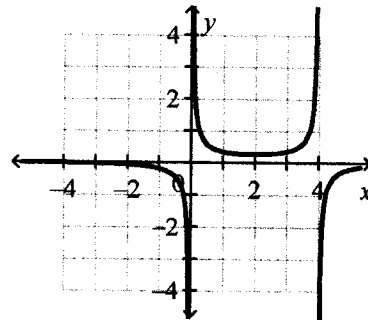**54.** Here is the graph of $y = f(x)$. Which graph below is that of its reciprocal function?

A.

C.

B.

D.

PRECAL MATH 11 - FINAL REVIEW PRACTICE QUESTIONS
Answer Section

MULTIPLE CHOICE

    1. ANS: B   DIF: Easy   REF: 1.1 Arithmetic Sequences

    2. ANS: D   DIF: Easy   REF: 1.1 Arithmetic Sequences

    3. ANS: D   DIF: Easy   REF: 1.2 Arithmetic Series

    4. ANS: B   DIF: Easy   REF: 1.3 Geometric Sequences

    5. ANS: D   DIF: Easy   REF: 1.3 Geometric Sequences

    6. ANS: D   DIF: Easy   REF: 1.4 Geometric Series

    7. ANS: D   DIF: Easy   REF: 1.6 Infinite Geometric Series

    8. ANS: C   DIF: Moderate   REF: 2.1 Absolute Value of a Real Number

    9. ANS: D   DIF: Moderate   REF: 2.1 Absolute Value of a Real Number

    10. ANS: D   DIF: Moderate   REF: 2.2 Simplifying Radical Expressions

    11. ANS: D   DIF: Difficult   REF: 2.2 Simplifying Radical Expressions

    12. ANS: D   DIF: Moderate   REF: 2.3 Adding and Subtracting Radical Expressions

    13. ANS: D   DIF: Easy   REF: 2.4 Multiplying and Dividing Radical Expressions

    14. ANS: B   DIF: Moderate   REF: 2.4 Multiplying and Dividing Radical Expressions

    15. ANS: B   DIF: Moderate   REF: 2.5 Solving Radical Equations

    16. ANS: D   DIF: Easy   REF: 3.1 Factoring Polynomial Expressions

    17. ANS: A   DIF: Moderate   REF: 3.1 Factoring Polynomial Expressions

    18. ANS: A   DIF: Easy   REF: 3.2 Solving Quadratic Equations by Factoring

    19. ANS: B   DIF: Easy   REF: 3.3 Using Square Roots to Solve Quadratic Equations

    20. ANS: A   DIF: Moderate   REF: 3.3 Using Square Roots to Solve Quadratic Equations

    21. ANS: B   DIF: Moderate   REF: 3.4 Developing and Applying the Quadratic Formula

    22. ANS: D   DIF: Easy   REF: 3.5 Interpreting the Discriminant

    23. ANS: C   DIF: Easy   REF: 4.1 Properties of a Quadratic Function

    24. ANS: A   DIF: Easy   REF: 4.2 Solving a Quadratic Equation Graphically

    25. ANS: B   DIF: Moderate
    REF: 4.4 Analyzing Quadratic Functions of the Form $y = a(x - p)^2 + q$

    26. ANS: B   DIF: Moderate
    REF: 4.5 Equivalent Forms of the Equation of a Quadratic Function

    27. ANS: C   DIF: Moderate
    REF: 4.5 Equivalent Forms of the Equation of a Quadratic Function

    28. ANS: A   DIF: Easy
    REF: 4.6 Analyzing Quadratic Functions of the Form $y = ax^2 + bx + c$

    29. ANS: D   DIF: Easy
    REF: 4.6 Analyzing Quadratic Functions of the Form $y = ax^2 + bx + c$

    30. ANS: C   DIF: Moderate   REF: 5.1 Solving Quadratic Inequalities in One Variable

    31. ANS: D   DIF: Moderate   REF: 5.2 Graphing Linear Inequalities in Two Variables

    32. ANS: D   DIF: Moderate   REF: 5.3 Graphing Quadratic Inequalities in Two Variables

    33. ANS: A   DIF: Easy   REF: 5.4 Solving Systems of Equations Graphically

    34. ANS: B   DIF: Easy   REF: 5.5 Solving Systems of Equations Algebraically

    35. ANS: C   DIF: Moderate   REF: 6.1 Angles in Standard Position in Quadrant 1

36. ANS: B   DIF: Easy   REF: 6.1 Angles in Standard Position in Quadrant 1
37. ANS: D   DIF: Easy   REF: 6.2 Angles in Standard Position in All Quadrants
38. ANS: A   DIF: Moderate   REF: 6.2 Angles in Standard Position in All Quadrants
39. ANS: B   DIF: Easy   REF: 6.4 The Sine Law
40. ANS: D   DIF: Moderate   REF: 6.5 The Cosine Law
41. ANS: B   DIF: Moderate   REF: 7.1 Equivalent Rational Expressions
42. ANS: A   DIF: Easy   REF: 7.2 Multiplying and Dividing Rational Expressions
43. ANS: B   DIF: Moderate
    REF: 7.3 Adding and Subtracting Rational Expressions with Monomial Denominators
44. ANS: B   DIF: Easy
    REF: 7.4 Adding and Subtracting Rational Expressions with Binomial and Trinomial Denominators
45. ANS: A   DIF: Moderate   REF: 7.5 Solving Rational Equations
46. ANS: C   DIF: Moderate   REF: 8.1 Absolute Value Functions
47. ANS: A   DIF: Easy   REF: 8.2 Solving Absolute Value Equations
48. ANS: B   DIF: Moderate   REF: 8.2 Solving Absolute Value Equations
49. ANS: D   DIF: Moderate   REF: 8.3 Graphing Reciprocals of Linear Functions
50. ANS: A   DIF: Moderate   REF: 8.3 Graphing Reciprocals of Linear Functions
51. ANS: D   DIF: Easy
    REF: 8.4 Using Technology to Graph Reciprocals of Quadratic Functions
52. ANS: D   DIF: Moderate   REF: 8.5 Graphing Reciprocals of Quadratic Functions
53. ANS: C   DIF: Easy   REF: 8.5 Graphing Reciprocals of Quadratic Functions
54. ANS: C   DIF: Moderate   REF: 8.5 Graphing Reciprocals of Quadratic Functions