1. Which of the following equations has the same solution as $5x + 8 = x - 9$?
   - A) $4x = -1$
   - B) $4x = 17$
   - C) $6x = -17$
   - D) $6x = 17$
   - E) $4x = -17$

2. Simplify. $(-2x^4)^3(-2x^2)^2$
   - A) $8x^{11}$
   - B) $8x^{16}$
   - C) $-32x^{16}$
   - D) $32x^{16}$
   - E) $-32x^{11}$

3. If $f(x) = \sqrt{7-x}$, then which of the following sets is the domain of this function?
   - A) $x \leq 7$
   - B) $x \neq 7$
   - C) $x \geq 0$
   - D) $x \neq 0$
   - E) $x \geq 7$

4. One of the factors of $3x^2 + 8x - 35$ is
   - A) $3x - 7$
   - B) $3x + 7$
   - C) $x - 35$
   - D) $3x + 5$
   - E) $x - 5$

5. One solution of $3x^2 + 7x - 6 = 0$ is
   - A) $\frac{-2}{3}$
   - B) $\frac{3}{2}$
   - C) $3$
   - D) $-6$
   - E) $\frac{2}{3}$

6. Solve $\frac{1}{x-1} - \frac{2}{7} = 3$ for $x$.
   - A) $\frac{26}{23}$
   - B) $-\frac{12}{23}$
   - C) $\frac{23}{26}$
   - D) $\frac{30}{23}$
   - E) $\frac{23}{30}$
7. Expand and simplify. \((3x - 6y)^2\)

- A) \(9x^2 - 36xy - 36y^2\)
- B) \(9x^2 + 36y^2\)
- C) \(9x^2 - 36xy + 36y^2\)
- D) \(9x^2 - 18xy + 36y^2\)
- E) \(9x^2 - 36y^2\)

8. The line parallel to \(2x + y = 5\) and passing through \((5, 4)\) has equation

- A) \(y = 2x - 6\)
- B) \(y = -2x + 14\)
- C) \(y = 2x - 3\)
- D) \(y = -2x + 13\)
- E) \(y = -2x - 6\)

9. Simplify. \(\frac{x^2 - x - 30}{x^2 - 12x + 36}\)

- A) \(\frac{x + 6}{x - 6}\)
- B) \(\frac{x + 5}{x - 6}\)
- C) \(\frac{x - 30}{x - 6}\)
- D) \(\frac{x + 30}{x - 6}\)
- E) \(\frac{x - 5}{x - 6}\)

10. The vertices of a triangle consist of the three points where the parabola \(y = 7 - x^2\) intersects the coordinate axes as shown. What is the area of this triangle?

- A) \(14\sqrt{7}\)
- B) \(\frac{7\sqrt{7}}{2}\)
- C) 98
- D) \(7\sqrt{7}\)
- E) 49

11. Simplify. \((-3x^{-5})^2(2x^3)^{-2}\)

- A) \(-\frac{6}{x^{10}}\)
- B) \(\frac{9}{4x^{16}}\)
- C) \(\frac{9}{4x^{12}}\)
- D) \(-\frac{9}{4x^{16}}\)
- E) \(-\frac{6}{x^{12}}\)
12. Which of the following is an equation of the line whose graph is shown below?

☐ A) \( y = -2 + \frac{2}{5} x \)  ☐ B) \( y = \frac{2}{5} x \)  ☐ C) \( y = 5 + \frac{5}{2} x \)

☐ D) \( y = 5 + \frac{2}{5} x \)  ☐ E) \( y = -2 + \frac{5}{2} x \)

13. If \( x \) and \( y \) satisfy both \( 9x + 2y = 8 \) and \( 7x + 2y = 4 \), then \( y = ? \).

☐ A) 9  ☐ B) 2  ☐ C) 18

☐ D) -5  ☐ E) -10

14. Solve \(-7x < x + 7\) and express the solution in interval notation.

☐ A) \((\frac{-7}{6}, \infty)\)  ☐ B) \((\frac{-7}{8}, \infty)\)  ☐ C) \((-\infty, \frac{-7}{8})\)

☐ D) \((\frac{-8}{7}, \infty)\)  ☐ E) \((-\infty, \frac{-6}{7})\)

15. If the hypotenuse of a right triangle has length 9 feet and one of the other sides has length 2 feet, what is the length of the remaining side, in feet?

☐ A) 7  ☐ B) \(\sqrt{11}\)  ☐ C) \(\sqrt{7}\)

☐ D) \(\sqrt{85}\)  ☐ E) \(\sqrt{77}\)

16. Solve \( R = \frac{4}{7} T + \frac{-36}{7} \) for \( T \).

☐ A) \(\frac{4}{7} R + 9\)  ☐ B) \(\frac{7}{4} R + \frac{63}{4}\)  ☐ C) \(\frac{4}{7} R + \frac{36}{7}\)

☐ D) \(\frac{7}{4} R - 9\)  ☐ E) \(\frac{7}{4} R + 9\)
17. Simplify. \( \frac{8x}{x^2 + 9x + 20} + \frac{6}{x + 4} \)

- A) \( \frac{8x + 6}{x^2 + 10x + 24} \)
- B) \( \frac{8x + 6}{x^2 + 9x + 20} \)
- C) \( \frac{14x}{x^2 + 9x + 20} \)
- D) \( \frac{14x + 30}{x^2 + 9x + 20} \)
- E) \( \frac{14x + 6}{x^2 + 9x + 20} \)

18. If \( x \) and \( y \) are positive numbers, then \( \sqrt{24x^{10}y^{-6}} \)

- A) \( \pm \frac{2x^5\sqrt[6]{6}}{y^3} \)
- B) \( \pm \frac{2x^5\sqrt[6]{6}}{y^3} \)
- C) \( -2x^5y^3\sqrt{6} \)
- D) \( \frac{2x^5\sqrt[6]{6}}{y^3} \)
- E) \( \frac{2x^8\sqrt[14]{6}}{y^4} \)

19. If \( f(x) = 2x + 9 \), and \( f(a) = 7 \), then \( a = ? \)

- A) 9
- B) 23
- C) -1
- D) 7
- E) 8

20. Find \( 12(x)^{2/3} \) when \( x = -8 \).

- A) 64
- B) 48
- C) -48
- D) 256
- E) -64

21. A rectangular field is enclosed by 320 feet of fencing. If the length of the field is 6 feet more than its width, what is its length, in feet?

- A) 80
- B) 83
- C) 77
- D) 157
- E) 163

22. Find \( \frac{(x - (1 - 4x))}{x} \) when \( x = -5 \).

- A) \( \frac{26}{5} \)
- B) -21
- C) 19
- D) \( \frac{-26}{5} \)
- E) \( \frac{-14}{5} \)
23. The surface area $S$ of a cylinder is $S = 2\pi r^2 + 2\pi rh$ where $r$ is the base radius and $h$ is the height. What is $h$, in inches, when $S$ is 175 square inches and $r$ is 6 inches?

- A) $\frac{175 - 864\pi}{12\pi}$
- B) $\frac{175 + 864\pi}{12\pi}$
- C) $\frac{175 + 72\pi}{12\pi}$
- D) $\frac{25}{12\pi}$
- E) $\frac{175 - 72\pi}{12\pi}$

24. A truck leaves an intersection going 42 miles per hour. Half an hour later, a car going 62 miles per hour follows the truck. If $x$ is the time, in hours, required for the car to catch the truck, then which of the following equations can be used to solve for $x$?

- A) $42x + 21 = 62x$
- B) $42x + \frac{1}{2} = 62x$
- C) $42x + 62 = 62x$
- D) $42x + 42 = 62x$
- E) $42x + 30 = 62x$

25. Subtract $x^3 - 5x^2 + 1$ from $x^2 - x - 4$.

- A) $-x^3 + 6x^2 - x - 3$
- B) $x^3 - 4x^2 + x + 5$
- C) $x^3 - 6x^2 + x + 5$
- D) $-x^3 + 6x^2 - x - 5$
- E) $-x^3 - 4x^2 - x - 5$
Standards Table

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Description of Standards

1. KYOTECA.01.3: Evaluate algebraic expressions at specified values of their variables using signed numbers, rational exponents, order of operations and parentheses.

2. KYOTECA.02.3: Add, subtract and multiply polynomials.

3. KYOTECA.03.3: Simplify algebraic expressions involving integer exponents.

4. KYOTECA.04.3: Simplify algebraic expressions involving square roots and cube roots.

5. KYOTECA.05.3: Factor a polynomial in one or more variables by factoring out its greatest common factor. Factor a trinomial. Factor the difference of squares.

6. KYOTECA.06.3: Add, subtract, multiply and divide simple rational expressions.

7. KYOTECA.07.3: Simplify a rational expression.

8. KYOTECA.08.3: Solve a linear equation.

9. KYOTECA.09.3: Solve a multivariable equation for one of its variables.

10. KYOTECA.10.3: Solve a linear inequality in one variable.
11. KYOTECA.11.3: Solve a quadratic equation.

12. KYOTECA.12.3: Solve an equation involving a radical, a rational or an absolute value expression.

13. KYOTECA.13.3: Solve a system of two linear equations in two variables.

14. KYOTECA.14.3: Solve problems that can be modeled using a linear or quadratic equation or expression.

15. KYOTECA.15.3: Solve geometry problems using the Pythagorean theorem and the properties of similar triangles.

16. KYOTECA.16.3: Understand and apply the relationship between the properties of a graph of a line and its equation.

17. KYOTECA.17.3: Find the intercepts and the graph of a parabola given its equation. Find an equation of a parabola given its graph.

18. KYOTECA.18.3: Evaluate a function at a number in its domain. Find the domain of a rational function or the square root of a linear function.