1. Simplify. $\dfrac{9}{z^5\, w^2} - \dfrac{8}{z\, w^7}$

☐ A) $\dfrac{9\, w^5 - 8\, z^4}{z^6\, w^9}$ ☐ B) $\dfrac{1}{z^5\, w^2 - z\, w^7}$ ☐ C) $\dfrac{9\, w^5 - 8\, z^4}{z^5\, w^7}$

☐ D) $\dfrac{1}{z^6\, w^9}$ ☐ E) $\dfrac{1}{z^5\, w^7}$

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

☐ A) 9   ☐ B) 2   ☐ C) 18

☐ D) -5 ☐ E) -10

3. A woman works two jobs, making 35 dollars per hour on the first and 25 dollars per hour on the second. One week she works twice as many hours on the first job than the second job and earns 1330 dollars. How many hours did she work on the second job?
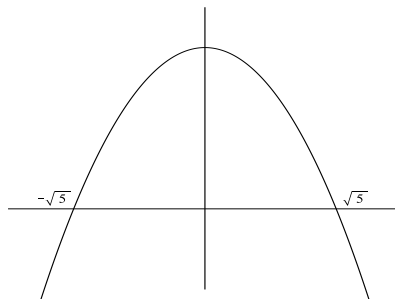
☐ A) 11   ☐ B) 14   ☐ C) 13

☐ D) 10   ☐ E) 12

4. Solve $4\, x - 5\, y = 3\, z$ for y.

☐ A) $\frac{4}{5} x + \frac{3}{5} z$ ☐ B) $\frac{-3}{5} z - 4\, x$ ☐ C) $\frac{4}{5} x + \frac{-3}{5} z$

☐ D) $\frac{-4}{5} x + \frac{3}{5} z$ ☐ E) $\frac{-3}{5} z + 4\, x$

5. The graph of $y = c - x^2$ where c is a constant, is shown below. What is c?

☐ A) $2\sqrt{5}$ ☐ B) $\sqrt{5}$ ☐ C) 5

☐ D) -5 ☐ E) $-\sqrt{5}$

6. Find $\dfrac{x}{y} - 2(y^2 - 7)$ when $x = 3$ and $y = 4$.

  ☐ A) $\dfrac{-153}{4}$ ☐ B) $\dfrac{-181}{4}$ ☐ C) $\dfrac{-75}{4}$

  ☐ D) $\dfrac{-69}{4}$ ☐ E) $\dfrac{-97}{4}$

7. Find $\sqrt{\dfrac{x^3}{y^2}}$ when $x = 2$ and $y = -7$.

  ☐ A) $\dfrac{2\sqrt{2}}{7}$ ☐ B) $\dfrac{4}{49}$ ☐ C) $\dfrac{2\sqrt{2}}{49}$

  ☐ D) $\dfrac{-2\sqrt{2}}{7}$ ☐ E) $\pm\dfrac{2\sqrt{2}}{7}$

8. Simplify. $6 - 2x(x^2 - 9x) - (x^2 - 7)$

  ☐ A) $-2\,x^3 - 19\,x^2 + 13$ ☐ B) $-2\,x^3 + 17\,x^2 + 13$ ☐ C) $-2\,x^3 - x^2 - 9\,x - 1$

  ☐ D) $-2\,x^3 + 17\,x^2 - 1$ ☐ E) $-2\,x^3 - 19\,x^2 - 1$

9. Solve $5\,x - 20 \geq 10\,x - 10$ and express the solution in interval notation.

  ☐ A) $[\frac{-3}{5}, \infty)$ ☐ B) $(-\infty, \frac{-3}{5}]$ ☐ C) $(-\infty, -2]$

  ☐ D) $[-2, \infty)$ ☐ E) $(-\infty, 2]$

10. Solve $\dfrac{1}{x-1} - \dfrac{4}{7} = 5$ for x.

  ☐ A) $\dfrac{46}{39}$ ☐ B) $\dfrac{39}{46}$ ☐ C) $\dfrac{39}{38}$

  ☐ D) $\dfrac{-8}{13}$ ☐ E) $\dfrac{38}{39}$

11. Simplify. $\dfrac{x^2 + x - 6}{x^2 - 4\,x + 4}$

  ☐ A) $\dfrac{x+3}{x-2}$ ☐ B) $\dfrac{x+6}{x-2}$ ☐ C) $\dfrac{x+2}{x-2}$

  ☐ D) $\dfrac{x-3}{x-2}$ ☐ E) $\dfrac{x-6}{x-2}$

12. Simplify. $\left(\dfrac{6\,x}{x^{-5}}\right)^{-2}$

☐ A) $6\,x^8$ ☐ B) $\dfrac{1}{36\,x^{12}}$ ☐ C) $\dfrac{1}{36\,x^8}$

☐ D) $\dfrac{6}{x^{12}}$ ☐ E) $\dfrac{1}{36}\,x^8$

13. One solution of $2\,x^2 = x + 3$ is

☐ A) 1 ☐ B) $\dfrac{2}{3}$ ☐ C) $\dfrac{3}{2}$

☐ D) $\dfrac{-3}{2}$ ☐ E) $\dfrac{-1}{2}$

14. Expand and simplify. $(1 - 3\,x - x^2)(x - 5)$

☐ A) $-x^3 - 8\,x^2 + 16\,x - 5$ ☐ B) $-x^3 + 2\,x^2 - 14\,x - 5$ ☐ C) $x^3 + 2\,x^2 + 16\,x - 5$

☐ D) $-x^3 - 8\,x^2 - 14\,x - 5$ ☐ E) $-x^3 + 2\,x^2 + 16\,x - 5$

15. If $f(x) = \dfrac{|x - 6|}{7 - x}$, then $f(-1) =$?

☐ A) $\dfrac{-7}{6}$ ☐ B) $\dfrac{5}{8}$ ☐ C) $\dfrac{-7}{8}$

☐ D) $\dfrac{7}{8}$ ☐ E) $\dfrac{7}{6}$

16. Solve $\dfrac{1}{7}x - 8 = \dfrac{4}{5}$ for x.

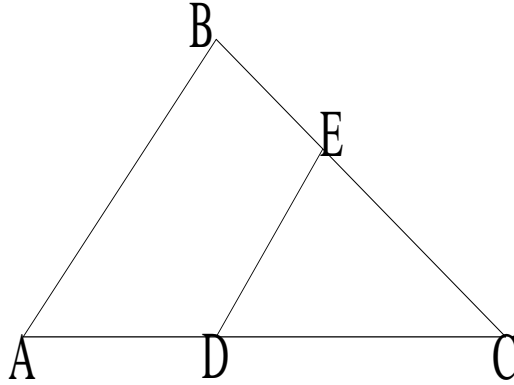☐ A) $\dfrac{5}{308}$ ☐ B) $\dfrac{84}{5}$ ☐ C) $\dfrac{5}{84}$

☐ D) $\dfrac{-252}{5}$ ☐ E) $\dfrac{308}{5}$

17. For some real number b, the graph of the line $y = 3\,x + b$ passes through the point $(7, -3)$. What is its y-intercept?

☐ A) 16 ☐ B) -24 ☐ C) -2

☐ D) 3 ☐ E) 18

3

18. In the figure below, $\overline{AB}$ is parallel to $\overline{DE}$, $\overline{AB}$ has length 9 feet, $\overline{DE}$ has length 8 feet, and $\overline{DC}$ has length 13 feet. What is the length of $\overline{AC}$, rounded to the nearest tenth of a foot.

☐ A) 14.9   ☐ B) 14.4   ☐ C) 14.7

☐ D) 14.5   ☐ E) 14.6

19. Which of the following numbers is **not** in the domain of the function $f(x) = \dfrac{x\,(x^2 - 16)}{x^2 - 5\,x - 6}$?

☐ A) -4 ☐ B) 4   ☐ C) 0

☐ D) 6   ☐ E) 1

20. A man invests 10,000 dollars in two accounts, the first yielding 4 percent annual interest and the second, 5 percent. If x dollars is invested in the first account, how much annual interest does the man earn on his investement?

☐ A) 900.0   ☐ B) $-0.01\,x + 500.0$ ☐ C) $-x + 50000$

☐ D) $0.09\,x$ ☐ E) $9\,x$

21. If a line has slope -2 and passes through the point $(3, 2)$, what is the y-coordinate of the point on the line whose x-coordinate is 5?

☐ A) -2 ☐ B) -5 ☐ C) -6

☐ D) -3 ☐ E) -4

22. Simplify. $(x^7(-y^8 z^5)^2)^3$

☐ A) $-\,x^{21}\,y^{48}\,z^{30}$ ☐ B) $-\,x^{21}\,y^{13}\,z^{10}$ ☐ C) $x^{21}\,y^{48}\,z^{30}$

☐ D) $x^{21}\,y^{14}\,z^{11}$ ☐ E) $x^{21}\,y^{13}\,z^{10}$

23. If x and y are positive numbers, then $\sqrt{20(x^3y^4)^3} =$?

☐ A) $2\,x^4\,y^6\sqrt[6]{5\ x}$ ☐ B) $\pm 2\,x^4\,y^6\sqrt[6]{5\ x}$ ☐ C) $2\sqrt{5}\,x^3\,y^4$

☐ D) $10\,x^3\,y^4\sqrt{x^3\,y^4}$ ☐ E) $\pm 10\,x^3\,y^4\sqrt{x^3\,y^4}$

24. Which of the following equations has the same solution as $7\,x + 4 = x - 7$?

☐ A) $6\,x = -11$ ☐ B) $8\,x = -11$ ☐ C) $6\,x = -3$

☐ D) $6\,x = 11$ ☐ E) $8\,x = 11$

25. One of the factors of $3\,x^2 + 18\,x + 24$ is

☐ A) $3\,x + 2$ ☐ B) $x + 4$ ☐ C) $x + 8$

☐ D) $x + 24$ ☐ E) $3\,x + 4$

Key: KYOTE12CART2

1) ◇ C	2) ◇ D	3) ◇ B	4) ◇ C	5) ◇ C
6) ◇ D	7) ◇ A	8) ◇ B	9) ◇ C	10) ◇ A
11) ◇ A	12) ◇ B	13) ◇ C	14) ◇ E	15) ◇ D
16) ◇ E	17) ◇ B	18) ◇ E	19) ◇ D	20) ◇ B
21) ◇ A	22) ◇ C	23) ◇ A	24) ◇ A	25) ◇ B

Standards Table

Standard	Problems	Max	Score
KYOTECA.01.3:	6,7	2	
KYOTECA.02.3:	8,14	2	
KYOTECA.03.3:	12,22	2	
KYOTECA.04.3:	23	1	
KYOTECA.05.3:	25	1	
KYOTECA.06.3:	1	1	
KYOTECA.07.3:	11	1	
KYOTECA.08.3:	16,24	2	
KYOTECA.09.3:	4	1	
KYOTECA.10.3:	9	1	
KYOTECA.11.3:	13	1	
KYOTECA.12.3:	10	1	
KYOTECA.13.3:	2	1	
KYOTECA.14.3:	3,20	2	
KYOTECA.15.3:	18	1	
KYOTECA.16.3:	17,21	2	
KYOTECA.17.3:	5	1	
KYOTECA.18.3:	15,19	2	

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.