Algebra 1 Keystone Multiple Choice Sampler

1. Which of the following inequalities is true for ALL real values of x?
   A. $x^3 \geq x^2$
   B. $3x^2 \geq 2x^3$
   C. $(2x)^2 \geq 3x^2$
   D. $3(x - 2)^2 \geq 3x^2 - 2$

2. Simplify $\sqrt{32}$

3. Simplify $\sqrt{108}$

4. An expression is shown below:
   $$2\sqrt{51}x$$
   Which value of x makes the expression equivalent to $10\sqrt{51}$?
   A. 5
   B. 25
   C. 50
   D. 100

5. An expression is shown below.
   $$\sqrt{87}x$$
   For which value of x should the expression be further simplified?
   A. $x = 10$
   B. $x = 13$
   C. $x = 21$
   D. $x = 38$

6. Find the Least Common Multiple (LCM) of 16 and 36
7. Two monomials are shown below:
\[ 450x^2y^5 \quad 3000x^4y^3 \]
What is the least common multiple (LCM) of these monomials?
A. \(2xy\)  
B. \(30xy\)  
C. \(150x^2y^3\)  
D. \(9000x^4y^5\)

8. What is the Greatest Common Factor (GCF) of 24 and 60.

9. Two monomials are shown below:
\[ 330x^3y^4 \quad 231x^2y^5 \]
What is the Greatest Common Factor (GCF) of these monomials?
A. \(2310x^3y^5\)  
B. \(x^2y^4\)  
C. \(33x^2y^4\)  
D. \(3x^2y^4\)

10. Simplify \(3^{-4}\)

11. Simplify: \(2(2\sqrt{4})^{-2}\)
A. \(\frac{1}{8}\)  
B. \(\frac{1}{4}\)  
C. 16  
D. 32

12. A theme park charges $52 for a day pass and $110 for a week pass. Last month, 4,432 day passes were sold and 979 week passes were sold. Which is the closest estimate of the total amount of money paid for the day and week passes for last month?
A. $300,000  
B. $400,000  
C. $500,000  
D. $600,000

13. Simplify \((3x^2 + 4)(2x - 5)\)
14. Simplify \((3x^2 + 2x - 3) + (2x^2 - 4x + 5)\)

15. Simplify \((5x^2 + x - 2) - (2x^2 - 3x + 7)\)

16. A polynomial expression is shown below.
   \((mx^3 + 3)(2x^2 + 5x + 2) - (8x^5 + 20x^4)\)
   The expression is simplified to \(8x^3 + 6x^2 + 15x + 6\). What is the value of \(m\)?
   A. -8
   B. -4
   C. 4
   D. 8

17. Factor: \(x^2 + x - 20\)

18. Factor completely: \(6x^2 + 48x + 90\)

19. When the expression \(x^2 - 3x - 18\) is factored completely, which is one of its factors?
   A. \((x - 2)\)
   B. \((x - 3)\)
   C. \((x - 6)\)
   D. \((x - 9)\)

20. Simplify: \(\frac{x^2 + x - 6}{x^2 + 2x - 8}; x \neq -4, 2\)
21. Simplify: $\frac{-3x^2+9x^2+30x}{-3x^3-18x^2-24x}$; \( x \neq -4, -2, 0 

A. $\frac{-1}{2}x^2 - \frac{5}{4}x$

B. $x^2 - \frac{1}{2}x^2 - \frac{5}{4}x$

C. $\frac{x+5}{x-4}$

D. $\frac{x-5}{x+4}$
Algebra 1 Keystone Open-ended questions

22. Keng creates a painting on a rectangular canvas with a width that is four inches longer than the height, as shown in the diagram below.

Keng adds a 3-inch-wide frame around all sides of his canvas.

A. Write a polynomial expression, in simplified form, that represents the area of the canvas.

Keng is unhappy with his 3-inch-wide frame, so he decides to put a frame with a different width around his canvas. The total area of the canvas and the new frame is given by the polynomial $h^2 + 8h + 12$, where $h$ represents the height of the canvas.

B. Write a polynomial expression, in simplified form, that represents the total area of the canvas and the frame.

C. Determine the width of the new frame. Show all your work. Explain why you did each step.
23. The results of an experiment were listed in several numerical forms as listed below.

\[ 5^{-3} \quad 4 \quad \sqrt{5} \quad \frac{3}{8} \quad 0.003 \]

A. Order the numbers listed from least to greatest.

Another experiment required evaluating the expression below.

\[ \frac{1}{6} \left( \sqrt{36} \div 3^{-2} \right) + 4^3 \div | -8 | \]

B. What is the value of the expression?

The last experiment required simplifying \(7\sqrt{425}\). The steps taken are shown below.

\[ 7\sqrt{425} \]

Step 1: \(7\left(\sqrt{400} + \sqrt{25}\right)\)

Step 2: \(7(20 + 5)\)

Step 3: \(7(25)\)

Step 4: 175

One of the steps shown is incorrect.

C. Rewrite the incorrect step so that it is correct.

D. Using the corrected step from Part C, Simplify \(7\sqrt{425}\).