Keystone Algebra I Review
Operations with Real Numbers and Expressions

1. Evaluate the following expression for $m = 9$ $\sqrt{4m} + 5$

A. 7 **B.** 11 **C.** 1 **D.** 17

2. Simplify the following expression: $8^4 \times 8^3$

A. 96 **B.** 8^7 **C.** 8^{12} **D.** 56

3. Simplify: $7\sqrt{54} - 2\sqrt{24}$

A. $25\sqrt{6}$ **B.** $9\sqrt{6}$ **C.** $17\sqrt{6}$ **D.** $55\sqrt{6}$

4. The expression below should be further simplified for which value of x?

$$\sqrt{85x}$$

A. 185 **B.** 53 **C.** 74 **D.** 3

5. Factor the following polynomial completely: $-0.9x^2 - 4.5x + 12.6$

A. $-0.9(x + 7)(x + 2)$ **B.** $0.9(x + 7)(x - 2)$

C. $-0.9(x2 + 5x - 14)$ **D.** $-0.9(x + 7)(x - 2)$

6. Order the following from least to greatest: $\frac{2}{3}$, 0.56, 14%, 77%, $\frac{1}{2}$

A. $\frac{1}{2}$, $\frac{2}{3}$, 0.56, 14%, 77%, **B.** 14%, $\frac{1}{2}$, 0.56, $\frac{2}{3}$, 77%,

C. 14%, $\frac{1}{2}$, $\frac{2}{3}$, 77%, 0.56, **D.** 77%, $\frac{2}{3}$, 0.56, $\frac{1}{2}$ 14%,

7. The Rose Theater seats 146 people, and the theater is hosting a play for 8 nights. If the theater is at about 80% capacity for each night of the play, approximately how many people will attend the play?

A. 1168 **B.** 934 **C.** 123 **D.** 1176

8. Mick is participating in a cross county bike race. Every 2 hours he travels between 38 and 50 miles. Four hours ago, Mick had traveled 52 miles from the start of the race. Which is a reasonable measure of Mick's distance from the start of the race now?

A. 158 miles **B.** 142 miles **C.** 166 miles **D.** 118 miles

9. Evaluate the following expression when $n = 2$

$$2|3 - 6n| + |2|$$

A. 20 **B.** 16 **C.** -20 **D.** -16

10. Simplify the following expression. $\frac{3x^3+18x^2-15x}{3x}$

A. $3x^3 + 18x^2 - 5$ **B.** $x^2 + 6x - 5$

C. $19x^2 + 5x$ **D.** $x^2 + 15x - 12$

11. Simplify: $(7x^2 + 6x + 3) - (2x^2 - 3x + 7)$

A. $x^2 + 9x - 4$ **B.** $5x^2 + 9x - 4$

C. $9x^2 + 9x - 10$ **D.** $5x^2 + 9x - 10$

12. Factor the following polynomial. $16x^2 + 20x$

A. $4x(4x + 20)$ **B.** $4x^2(4x + 5)$ **C.** $4x(4x + 5)$ **D.** $4(4x + 5)$

13. Factor the following expression completely: $x^4 - 1$

A. $(x - 1)(x^3 + 1)$ **B.** $(x - 1)(x + 1)(x^2 + 1)$

C. $(x - 1)(x + 1)(x - 1)(x + 1)$ **D.** $(x^2 - 1)(x^2 + 1)$

14. First State Bank has a drive-thru for customers who are making withdrawals or deposits. The drive-thru is open 5 days a week for 8 hours per day. Every hour, the bank serves 4 to 8 drive-thru customers. If two-thirds of drive-thru customers make a deposit, then about how many drive-thru customers will make a deposit in one work week?

A. 160 drive-thru customers **B.** 80 drive-thru customers

C. 20 drive-thru customers **D.** 224 drive-thru customers

15. Simplify: $4(13 - |-9 + 4|) - |9 - 7|^2$

A. -4 **B.** 28 **C.** 43 **D.** 16

16. Evaluate the following expression when $r = 3$ and $t = 2$.

$(2 \times r^t)^{-2}$

A. $\frac{4}{81}$ **B.** -36 **C.** $\frac{1}{2}$ **D.** $\frac{1}{324}$

17. Simplify: $(6x^2 - 8x - 1)(2x - 5)$

A. $12x^3 - 46x^2 + 38x - 5$ **B.** $12x^3 - 14x^2 - 42x + 5$

C. $12x^3 + 14x^2 - 42x - 5$ **D.** $12x^3 - 46x^2 + 38x + 5$

18. What is the greatest common factor (GCF) of the monomials shown below?

$$\mathbf{14x^3y^3z^2} \quad \textbf{\textit{and}} \quad \mathbf{22xy^2}$$

A. $2xy^2$ **B.** $2x^3y^3z^2$ **C.** $154x^4y^5z^2$ **D.** $154x^3y^3z^2$

19. What is the least common multiple (LCM) of the monomials shown below?

$$\mathbf{6u^2v^2w^3} \quad \textbf{\textit{and}} \quad \mathbf{10u^3vw^4}$$

A. $30u^3v^2w^4$ **B.** $30u^5v^3w^7$ **C.** $2u^5v^3w^7$ **D.** $2u^2vw^3$

20. Simplify the following expression: $\dfrac{2x^2+12x+16}{2x^2+4x-16}$

A. $\dfrac{2x+4}{x+2}$ **B.** $\dfrac{x+2}{x-2}$ **C.** $\dfrac{x-2}{2x-1}$ **D.** $\dfrac{x-2}{x+4}$

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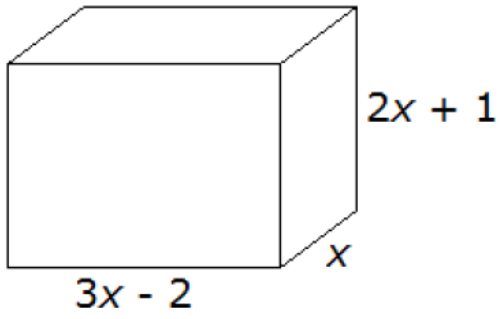
21. Alena is packing a box that has a height of one inch more than twice the width and a length of two inches less than three times the width, as shown in the diagram below.

A. Write a polynomial expression, in simplified form, that represents the volume of the box.



B. Alena packs another box. This box has a square base with an area of $9x^2 + 6x + 1$ square inches. Write an expression to represent one side length of the base.

C. Alena has a third box whose height is the same as the first box, but whose volume is $6x^3 + 15x^2 + 6x$ cubic inches. Determine how much wider and longer this box is than the first box. Assume that the length of the box has a larger coefficient than the width. Show all your work. Explain why you did each step.