Keystone Review Packet

A1.1.1.1.1 Compare and/or order any real numbers. Note: Rational and irrational may be mixed.

1.) Write the following number is increasing order: 0, 6, -3, ½ , -0.5, -¾

2.) Which of the following inequalities is true for all real values of x?

A. $x^3 \geq x^2$　　　　B. $4x^2 \geq 3x^3$　　　　C. $(3x)^2 \geq 4x^2$　　　　D. $4(x - 3)^2 \geq 3x^2 - 4$

A1.1.1.1.2　　Simplify square roots (e.g., $\sqrt{24} = 2\sqrt{6}$).

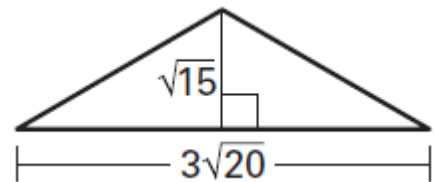3.) Simplify $\sqrt{192}$　　　　4.) Simplify $\frac{1}{3}\sqrt{450}$　　　　5.) $\sqrt{12} \cdot \sqrt{6}$

6.) Find the area of the triangle using the formula A = ½ bh.

A.) $3\sqrt{15}$　　　　　　B.) $15\sqrt{3}$

C.) $\frac{13}{2}\sqrt{2}$　　　　　　D.) $5\sqrt{3}$

7.) Simplify the expression $\frac{2\sqrt{45}}{-4\sqrt{5}}$.

8.) An expression is shown below.

$3\sqrt{29x}$

Which value of x makes the expression equivalent to $27\sqrt{29}$?

A.) 9　　　　　　B.) 81　　　　　　C.) 243　　　　　　D.) 729

9.) An expression is shown below.

$\sqrt{57x}$

For which value of x should the expression be further simplified?

A.) x = 10　　　　　　B.) x = 11　　　　　　C.) x = 15　　　　　　D.) x = 17

10.) The steps taken to simplify $6\sqrt{1625}$ are shown below.

$$\text{Step 1: } 6(\sqrt{1600} + \sqrt{25})$$
$$\text{Step 2: } \quad 6(40 + 5)$$
$$\text{Step 3: } \quad 6(45)$$
$$\text{Step 4: } \quad 270$$

a.) One of the steps shown is incorrect. Rewrite the correct step so that it is correct.

b.) Using the correct step from part a, simplify $6\sqrt{1625}$.

A1.1.1.2.1   Find the Greatest Common Factor (GCF) and/or the Least Common Multiple (LCM) for sets of monomials.

11.) Find the Least Common Multiple of each pair of numbers.

A.) 4, 12   B.) 13x, 16   C.) $75xy^2$, 100y   D.) 22, 55, 60

12.) Determine the Greatest Common Factor of each pair of numbers.

A.) 12, 15   B.) $26xy$, $34x^2y^3$ C.) 300, 550y   D.) 14, 63, 84

A1.1.1.3.1   Simplify/evaluate expressions involving properties/laws of exponents, roots, and/or absolute values to solve problems. Note: Exponents should be integers from -10 to 10.

13.) Evaluate the expression $(m + p)^3$ when $m = 4$ and $p = 3$.

14.) What is the value of $\dfrac{15 - 6 \cdot 2}{8 \cdot (4^2 - 7)}$?

15.) Evaluate the expression $|-7| + 3$

16.) Determine the value of each expression.
    A.) $-|3 + 2|$ B.) $-|-8| - 6$ C.) $2 - |3|$

17.) Simplify $(-3xy^2)^4$ 17.) Simplify $-(x^3)^2(3x)^2$ 18.) Simplify $(3^3)^{-4}(3^7)$

18.) Simplify $(2x^{-2}y)(3x^{-2})$

A.) $\dfrac{6y}{x^4}$ B.) $\dfrac{5y}{x^2}$ C.) $\dfrac{6y^3}{x^2}$ D.) $\dfrac{6}{x^2y}$

19.) Simplify $\dfrac{3x^5 y}{2xy^2}\cdot\dfrac{6xy^4}{4x^7}$ 20.) Simplify $\left(\dfrac{5x^3 y}{3y^2}\right)^2\cdot\left(\dfrac{3^2 xy^3}{5x^8}\right)$

21.) Which expression simplifies to x^2?

A.) $\dfrac{x^5}{x^{-3}}$ B.) $\dfrac{5x^5 y}{5x^{-4}y}$ C.) $\dfrac{3x^{-3}}{3x^5}$ D.) $\dfrac{x^{-7}y^2}{x^{-9}y^2}$

22.) Simplify: $6(2\sqrt{9})^{-2}$

A.) $\dfrac{1}{6}$ B.) $\dfrac{1}{36}$ C.) 36   D.) 216

A1.1.1.4.1   Use estimation to solve problems.

23.) Ski Roundtop Mountain Resort charges $62 for an extended day lift ticket and $53 for junior extended day lift ticket. In December, 5,492 extended day lift tickets and 3,895 junior extended day lift tickets were sold. Which is the **_closest estimate_** of the total amount of money paid for the lift tickets in December?

A.) $300,000   B.) $400,000   C.) $500,000   D.) $600,000

A1.1.1.5.1   Add, subtract, and/or multiply polynomial expressions (express answers in simplest form). Note: Nothing larger than a binomial multiplied by a trinomial.

24.) Simplify. $(3x^2 + 7x - 6) + (5x^3 + 3x^2 + 10x - 8)$

25.) Simplify. $(4x^2 + 7x - 6) - (3x^2 + 9x - 8)$

26.) $(b - 8)(b + 2)$ 27.) $(x + 5)(3x^2 - 2x + 1)$ 28.) $(2x - 3)^2$

29.) A polynomial expression is shown below.

$$(mx^4 + 2)(3x^2 + 4x + 2) - (9x^6 + 12x^5)$$

The expression is simplified to $6x^4 + 6x^2 + 8x + 4$. What is the value of m?

A.) -9 B.) -3 C.) 3 D.) 9

A1.1.1.5.2 Factor algebraic expressions, including difference of squares and trinomials. Note: Trinomials are limited to the form ax2+bx+c where a is equal to 1 after factoring out all monomial factors.

30.) Factor $x^2 + 4x - 21$. 31.) Factor $x^2 - 5x + 6$. 32.) Factor $x^2 + 13x + 36$

33.) When $x^2 + 4x - 12$ is factored completely, which is one of its factors?
    A.) $(x - 2)$ B.) $(x - 6)$
    C.) $(x - 4)$ D.) $(x - 3)$

34.) Which of the following is the factorization of $25x^2 - 16$?
    A.) $(5x - 4)(5x + 4)$ B.) $(5x - 4)^2$
    C.) $(5x - 16)(5x - 1)$ D.) $(5x + 4)^2$

35.) Which of the following is equal to $x^2 - 16x + 64$?
    A.) $(x + 8)(x - 8)$ B.) $(x + 8)^2$ C.) $2(x - 4)(x - 4)$ D.) $(x - 8)^2$

36.) Which of the following is the factorization of $20x^2 - 125$?
    A.) $5(2x - 10)(2x + 10)$ B.) $5(2x - 5)^2$
    C.) $5(2x - 5)(2x + 5)$ D.) Cannot be factored

A1.1.1.5.3 Simplify/reduce a rational algebraic expression.

37.) Simplify the expression: $\dfrac{-56x}{12y} \div \dfrac{8x^2}{6y}$; $x \neq 0, y \neq 0$

38.) Simplify the expression: $-75x^5 \cdot \dfrac{5}{3x^2}$; $x \neq 0$

39.) Simplify the expression: $\dfrac{3x^2+6x}{x^2+9x+14}$; $x \neq 2,7$

40.) Which value(s) of the variable create an undefined expression for $\dfrac{12}{x^2-x-6}$?

   A.) 2   B.) 2, -3   C.) 3   D.) -2, 3

41.) Simplify the expression:

$$\frac{5x^3}{7x^2} \cdot \frac{21x^2}{20x}$$

42.) Simplify the expression: $\dfrac{5x^2y^{-3}}{8x^3y} \cdot \dfrac{4x^{-2}y^3}{10xy^{-4}}$; $x \neq 0, y \neq 0$.

  A.) $\dfrac{y^3}{4x^2}$ B.) $\dfrac{y}{4x^4}$ C.) $4x^4y^3$ D.) $\dfrac{y^3}{4x^4}$

A1.1.2.1.1   Write, solve, and/or apply a linear equation (including problem situations).

43.) Solve the following equation: $-4x - 6 - 3x = 5$

44.) Solve the equation $8(2x - 1) - 5x = 25$

   A.) – 11   B.) – 3   C.) 3   D.) 1/3

45.) Solve the equation $\dfrac{1}{4}(16x - 8) + 6 = 12 - 5x$.   46.) Solve the equation $4x - 3(x + 2) = 5(4 - x)$.

47.) There are 22 students in an Algebra class. This is an increase of 8 students from last year. Which equation could be used to determine the number of students in the class last year?

      A.) 22 + x = 8   B.) x – 8 = 22   C.) 22 + x = -8   D.) x + 8 = 22

48.) Your club decides to sell boxes of stationery to raise money. Each box costs you $2.50 and there is a one time delivery fee of $30. You plan to sell each box for $4.50. Which equation should you used to determine how many boxes you must sell to cover your costs?

      A.) 4.50x + 30 = 2.50x   B.) 2.50x – 30 = 4.50x

      C.) 30 – 2.50x = 4.50x   D.)2.50x + 30 = 4.50x

49.) Your cell phone company charges $29.95 per month and gives you 30 minutes of free calls per month. Additional minutes cost $.32 per minute. Your bill last month came to $46.82. Let 'x' represent the number of minutes you talked last month.

      A.) Write an equation that models this situation.

      B.) Approximate how many minutes you used last month (total).

      C.) How many minutes did you have to pay extra money for?

50.) Solve the absolute value equation. $|x + 2| - 3 = 8$

51.) Your cable TV company charges $32 a month for basic cable and one premium channel. Additional premium channels cost $12 per month.

A.) Let 'x' represent the number of premium channels you subscribe to. Write an equation that would model the total cost of your cable bill.

B.) Your bill came to $56 last month. How many premium channels did you order?

A1.1.2.1.2   Use and/or identify an algebraic property to justify any step in an equation-solving process. Note: Linear equations only.

52) The equation a(b) = b(a) represents which property of multiplication?

      A.) Commutative Property   B.) Associative Property

C.) Identity Property   D.) Property of Zero

53.) Solve the following equation. After each step state the reason/property that allowed you to perform each new line:
$3(x + 2) - 3x - 1 = 2x - 3$

54.) One of the steps Mary used to solve an equation is shown below.
$-\frac{1}{2}(4x - 7) = 18$
$4x - 7 = -36$

Which statements describe the procedure Mary used in this step and identify the property that justifies this procedure?

A.) Mary multiplied the $-\frac{1}{2}$ and the 18 to eliminate the parentheses. This procedure is justified by the multiplicative property of equality.
B.) Mary multiplied both sides of the equation by -2 to eliminate the parentheses. This procedure is justified by the multiplicative property of equality.
C.) Mary multiplied the $-\frac{1}{2}$ and the 4x to eliminate parentheses. This procedure is justified by the distributive property.
D.) Mary added $\frac{1}{2}$ to both sides of the equation to eliminate parentheses. This procedure is justified by the additive property of equality.

55.) Mark's work for solving the equation is shown. In which step did Mark make a mistake and how would you explain to him why it is wrong?
$-2(x - 4) - 5x = -13$
Step 1: $-2x + 8 - 5x = -13$
Step 2: $3x + 8 = -13$
Step 3: $3x = -21$
Step 4: $x = -7$

56.) Annie correctly solved the following equation. Which is the correct list of steps and properties of equality that she used?
$4(2x + 4) + 3x - 2 = -41$
$8x + 16 + 3x - 2 = -41$
$11x + 14 = -41$
$11x = -55$
$x = -5$

A.) Distributive property, combine like terms, subtraction property of equality, multiplicative property of equality
B.) Distributive property, combine like terms, subtraction property of equality, division property of equality
C.) multiplicative property of equality, combine like terms, subtraction property of equality, division property of equality
D.) Multiplicative property of equality, combine like terms, subtraction property of equality, multiplicative property of equality

A1.1.2.1.3   Interpret solutions to problems in the context of the problem situation.
Note: Linear equations only.

57.) There was a holiday concert at the school. They sold x adult tickets and y student tickets and raised a total of $2,388. The equation below describes the relationship between the number of adult tickets and the number of student tickets purchased.
$6x + 3y = 2388$

The ordered pair (240, 316) is a solution of the equation. What does the solution (240, 316) represent?

A.) Adult tickets cost $240 and student tickets cost $316.
B.) They sold 240 adult tickets and 316 student tickets.
C.) 240 student tickets and 316 adult tickets were sold.
D.) They made $240 on adult tickets and $316 on student tickets.

A1.1.2.2.1 Write and/or solve a system of linear equations (including problem situations) using graphing, substitution, and/or elimination. Note: Limit systems to two linear equations.

58.) Using the substitution method, solve the system of equations.

$x + 2y = -6$ $2x - y = 8$

59.) Using the elimination method, solve the system of equations.

$3x + 2y = 8$ $-4x + 3y = -5$

60.) The ordered pair (6, -8) is a solution of which system of equations?

A.) $3x + 2y = 4$ and $x - y = 14$

B.) $x - 2y = 22$ and $y = 4/5 x - 10$

C.) $7x + 3y = 18$ and $x - y = -2$

D.) $2x + y = 4$ and $-x - y = 2$

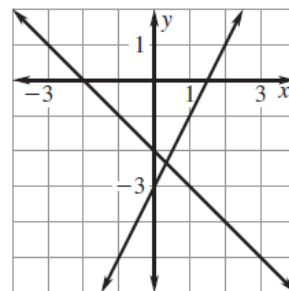61.) Which point represents the solution of the system of linear equations?

$y = 2x - 3$ & $y = -x - 2$

A.) $(0, -3)$ B.) $(0, -2)$ C.) $(\frac{2}{3}, \frac{-5}{3})$ D.) $(\frac{1}{3}, \frac{-7}{3})$

62.) Scott makes $8 per hour delivering papers for x hours and $12 per hour babysitting for y hours. He spent a total of 18 hours working and made $192. The system of equations below can be used to determine how much time Scott spent working at each job.

$8x + 12y = 192$
$x + y = 18$

What is the value of x, the hours Scott spent delivering papers?
A.) 4   B.) 6   C.) 8   D.) 12