Math Placement Review

MULTIPLE CHOICE

1. Reduce the fraction to lowest terms. \( \frac{36}{64} \)
   a. \( \frac{18}{32} \)   b. \( \frac{9}{16} \)   c. \( \frac{14}{21} \)   d. \( \frac{3}{4} \)
2. \( 2 \times 15 = \)
   a. 45   b. 25   c. 30   d. 35
3. Add 4.23 + 3.7 + 2.006
   a. 24.66   b. 9.36   c. 9.936   d. 9.306
4. If one square yard of carpet costs $15.00, how much will 30.5 square yards cost?
   a. $702.98   b. $457.50   c. $500.00   d. $350.00
5. If A represents the number of apples purchased at 15 cents each and B represents the number of bananas purchased at 10 cents each, which of the following represents the total value of purchases?
   a. A + B   b. \( 0.25(A + B) \)   c. \( 0.10A + 0.15B \)   d. \( 0.15A + 0.10B \)
6. Simplify: \((6 - 3) - (3 - 6)\)
   a. 3   b. 0   c. 6   d. -6
7. Simplify: \(-11 - (-3) + (-1) - 9\)
   a. -16   b. -22   c. -24   d. -18
8. Simplify: \( \frac{9 + 6}{3} - \frac{12(4)}{2} \)
   a. -14   b. -19   c. -18/5   d. -1
9. Translate to an algebraic expression. Twice the sum of 4x and y
   a. 2(4x) + y   b. 8x + 2y   c. 4x + 2y   d. 2 + 3x + y
10. Evaluate \((x - 3y)(2x + y)\) when \(x = -2\) and \(y = -1\)
    a. 25   b. -25   c. -3   d. -5
11. Combine like terms: \(6x - 7b - 10x + 11b\)
    a. -x - 7   b. 4x - 4b   c. -4x + 4b   d. -4x - 4b
12. Solve \(-2x + 21 = -11\)
    a. 16   b. -5   c. 10   d. -12
13. Simplify \(2^2 - (-2)^3\)
    a. 12   b. -2   c. 8   d. 10
14. Graph \(2x - y = 6\). Indicate x- and y-intercepts (if any).
    a. (6,0)(-3,0)   b. (0,3)(0,6)   c. (-6,0)(3,0)   d. (0,0)
15. Multiply: \((x + 3)(5x - 1)\)
    a. \(5x^2 + 14x - 3\)   b. \(5x^2 + 15x - 3\)   c. \(5x^2 - x - 3\)   d. \(5x^2 + 16x + 3\)
16. If \(x = 4\) and \(y = 2\), evaluate: \(x^2 + 2xy + 7\)
    a. 10   b. -5   c. 20   d. 39
17. Factor completely: \(x^2 - 5x - 14\)
    a. \((x + 7)(x - 2)\)   b. \((x - 7)(x - 2)\)   c. \((x - 14)(x + 1)\)   d. \((x - 7)(x + 2)\)
18. Factor completely: $6x^2 + 19x + 10$
   a. $(6x + 5)(x + 2)$  
b. $(3x + 2)(2x + 5)$  
c. $(6x + 1)(x + 10)$  
d. cannot factor
19. Simplify: $(3x^2y^3)(2xy)$
   a. $18x^7y^4$  
b. $18x^2y^5$  
c. $\frac{54y^4}{x^5}$  
d. $\frac{54y^4}{x^7}$
20. Find the slope and the y-intercept of the line: $x + 3y = 9$
   a. Slope = $\frac{1}{3}$; y-intercept = 3  
b. slope = 1; y-intercept = 9  
c. slope = -3; y-intercept = 9  
d. slope = -1; y-intercept = 3
21. Find the slope-intercept equation of the line passing through the points (1, -3) and (3, 5)
   a. $y = 4x - 7$  
b. $y = x - 4$  
c. $y = 4x + 13$  
d. $y = \frac{1}{4}x - 7$

SHORT ANSWER

22. Combine exponents as appropriate.
   a. $x^4x^2$  
b. $(s + 1)^2(s + 1)(s + 1)^3$  
c. $23y^3w^4w^8y^2$  
d. $4^24^9$  
e. $x^{4m+3}x^{5m-1}$  
f. $y^{3i}y^{12j+m}$
23. Let $f(x) = -x^2 + 6x - 8$. Find the vertex and x- and y-intercepts of the graph of $f$.
24. A ball is tossed in the air. Its distance in feet above ground $t$ seconds later is given by the formula $d(t) = 6 + 96t - 16t^2$. What is the ball’s maximum height?
SOLUTION PAGE

1. The correct answer is b.
   a. Find the Greatest Common Factor. In this case it’s 4.
   b. Divide the numerator (36) by the GCF (4).
   c. Divide the denominator (64) by the GCF (4).
   d. The final answer is 9/16.

2. The correct answer is c.

3. The correct answer is c.
   a. Just add from left to right.

4. The correct answer is b.
   a. Multiply the price of carpet ($15.00) by the amount of carpet needed (30.5).

5. The correct answer is d.
   a. You are adding the price of the number of apples you buy to the price of the number of bananas you buy.
   b. .15A is the price of the apples where A is the number of apples.
   c. .10B is the price of the bananas where B is the number of bananas.

6. The correct answer is c.
   a. Follow the order of operations which states that you first work with the numbers that appear in the parentheses.
   b. Looking at the first set of parentheses, 6 – 3 is 3.
   c. Looking at the second set of parentheses, 3 – 6 is –3.
   d. 3 – (-3) Because there is now two negatives next to each other, the problem is now 3 + 3
   e. 3 + 3 = 6.

7. The correct answer is d.
   a. First change the signs of the numbers that are in parentheses.
      i. -11 + 3 – 1 – 9
   b. Then add or subtract from left to right.
      i. –11 + 3 = - 8
      ii. –8 – 1 = - 9
      iii. –9 – 9 = - 18

8. The correct answer is b.
   a. Follow the order of operations and do the multiplication first.
      i. 12(4) = 48
   b. Look at the numerator of the first fraction and follow the given operation.
      i. 9 + 6 = 15
   c. Still working with the first fraction, divide 15 by 3.
      i. 15 / 3 = 5
   d. Now looking at the second fraction, divide 48 by 2.
   e. You now have 5 – 24.
      i. 5 – 24 = - 19
9. The correct answer is b.
   a. The word “twice” tells you to multiply the numbers by 2.
      i. $4x \times 2 = 8x$
      ii. $y \times 2 = 2y$
   b. The word “sum” means to add.
      i. $8x + 2y$

10. The correct answer is d.
    a. Wherever you see an ‘x’ in the problem, plug in $-2$.
       i. $(-2 - 3y)(2(-2) + y)$
    b. Wherever you see a ‘y’ in the problem, plug in $-1$.
       i. $(-2 - 3(-1))(2(-2) + (-1))$
    c. Working with the first set of parentheses, follow the order of operations.
       i. Do the multiplication first
          1. $-3 \times -1 = 3$
       ii. Then do the addition
          1. $(-2 + 3) = 1$
    d. Working with the second set of parentheses, follow the order of operations.
       i. Do the multiplication first
          1. $2 \times -2 = -4$
       ii. Now do the subtraction
          1. $-4 - 1 = -5$
    e. You now have to multiply the answer to the first set of parentheses by the answer to the second set.
       i. $1 \times -5 = -5$

11. The correct answer is c.
    a. Like terms are terms that share the same variable. In this case, the x terms go together and the y terms go together.
       i. $6x - 10x = -4x$
       ii. $-7y + 11y = 4y$
    b. $-4x + 4y$

12. The correct answer is a.
    a. The goal is to get x by itself.
    b. Subtract 21 from both sides.
       i. $-11 - 21 = -32$
    c. Divide both sides by $-2$
       i. $-32 / -2 = 16$

13. The correct answer is a.
    a. First, change the sign.
       i. $2^2 + 2^2$
    b. Do the exponents
i. \(2^2 = 4\)
ii. \(2^3 = 8\)

c. Add
\[\begin{align*}
i. & \quad 4 + 8 = 12 \\
\end{align*}\]

14. The correct answer is c.

a. To find the x-intercept, plug in 0 for y.
\[\begin{align*}
i. & \quad 2x - 0 = 6 \\
ii. & \quad \text{Divide by 2 on both sides. } 6 / 2 = 3. \\
iii. & \quad \text{X-intercept } (3, 0) \\
\end{align*}\]
b. To find the y-intercept, plug in 0 for x.
\[\begin{align*}
i. & \quad 2(0) - y = 6 \\
ii. & \quad \text{Divide by } -1 \text{ on both sides. } 6 / -1 = -6 \\
iii. & \quad \text{Y-intercept } (0, -6) \\
\end{align*}\]

15. The correct answer is a.

a. Use the FOIL method.
\[\begin{align*}
i. & \quad \text{Front: } x \cdot 5x = 5x^2 \\
ii. & \quad \text{Outside: } x \cdot -1 = -1x \\
iii. & \quad \text{Inside: } 3 \cdot 5x = 15x \\
iv. & \quad \text{Last: } 3 \cdot -1 = -3 \\
\end{align*}\]
b. Combine like terms
\[\begin{align*}
i. & \quad 15x - 1x = 14x \\
\end{align*}\]
c. Write in descending powers of ‘x’.
\[\begin{align*}
i. & \quad 5x^2 + 14x - 3 \\
\end{align*}\]

16. The correct answer is d.

a. Plug in 4 for x
\[\begin{align*}
i. & \quad 4^2 + 2(4)y + 7 \\
\end{align*}\]
b. Plug in 2 for y
\[\begin{align*}
i. & \quad 4^2 + 2(4)(2) + 7 \\
\end{align*}\]
c. Follow the order of operations
\[\begin{align*}
i. & \quad \text{Exponents: } 4^2 = 16 \\
ii. & \quad \text{Multiplication: } 2(4) = 8(2) = 16 \\
iii. & \quad \text{Addition: } 16 + 16 = 32 + 7 = 39 \\
\end{align*}\]

17. The correct answer is d.

a. Find two numbers that multiply to equal – 14
b. These same two numbers must combine to equal -5
c. \((x - 7)(x + 2)\)

18. The correct answer is b.

a. Split the 6x\(^2\) between two sets of parentheses.
\[\begin{align*}
i. & \quad (3x \quad ) (2x \quad ) \\
\end{align*}\]
b. Find two numbers that multiply to equal 10
c. These same two numbers when multiplied with 3 & 2 must combine to equal 19.
\[\begin{align*}
i. & \quad (3x + 2)(2x + 5) \\
\end{align*}\]
19. The correct answer is c.
   a. Distribute the cube to everything in the first set of parentheses
      i. 3^3x^6y^3
   b. Multiply 3x^6y^3 with the second set of parentheses
      i. 54x^5y^4
   c. Rewrite without negative exponents
      i. 54y^4 / x^5

20. The correct answer is a.
   a. Get the equation in slope-intercept form.
      i. Subtract x from both sides.
         1. X + 3y – x = 9 – x
      ii. Divide by 3 on both sides.
         1. 3y / 3 = (9 – x) / 3
      iii. Y = - 1/3x + 3
         1. Slope = - 1/3
         2. y-intercept: (0,3)

21. The correct answer is a.
   a. First, find the slope.
      i. m = Δy / Δx; m = (5 – (-3)) / (3 – 1); m = 8/2; m = 4
   b. Pick a point and plug it into the y = mx + b form
      i. – 3 = 4(1) + b
      ii. – 3 = 4 + b
      iii. – 7 = b
   c. Write the equation in slope-intercept form
      i. y = 4x – 7

22. Follow the laws of exponents.
   a. x^8y^2 (add the exponents)
   b. (s + 1)^16 (add the exponents)
   c. 23w^12y^5 (add the exponents)
   d. 4^11 DO NOT change the coefficient. Add the exponents.
   e. x^9m^2 (add the exponents)
   f. y^15j^1m (add the exponents)

23. Vertex: (3 , 1)
    x-intercepts: (2, 0) and (4, 0)
    y-intercept: (0, -8)

24. 150 ft.