MULTIPLE CHOICE

1. Solve the following system by substitution.
   a. \(3m + n = 7\)
   b. \(2m = 5n - 1\)

2. Solve: \(\frac{18}{4} = \frac{x}{10}\)
   a. 45  b. 30  c. 50  d. 40

3. Solve. \(x + 16 = -2\)
   a. 18  b. 10  c. -10  d. -18

4. Solve. \(-13x = -104\)
   a. 8  b. 10  c. -8  d. 15

5. Evaluate \((x - 3y)(2x + y)\) when \(x = -2\) and \(y = -1\)
   a. 25  b. -25  c. -3  d. -5

6. Solve by extracting roots. \(9x^2 = 25\)

7. Solve. \(-2x + 21 = -11\)
   a. 16  b. -5  c. 10  d. -12

8. Simplify \(2^2 - (-2)^3\)
   a. 12  b. -2  c. 8  d. 10

9. Find the equation of a line with a slope of \(m = -2\) and containing point (3,5).

10. Give the slope of the line that runs through (2, -1) and (4, 2)

11. 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)

12. Solve. \(9x^2 = 25\)

13. Multiply: \((x + 3)(5x - 1)\)
   a. \(5x^2 + 14x - 3\)  b. \(5x^2 + 15x - 3\)  c. \(5x^2 - x - 3\)  d. \(5x^2 + 16x + 3\)

14. If \(x = 4\) and \(y = 2\), evaluate: \(x^2 + 2xy + 7\)
   a. 10  b. -5  c. 20  d. 39

15. Factor by pulling the GCF. \(5x + 10 + 15y\)
   a. \(5x(1 + 2 + 3y)\)  b. \(5y(x + 2 + 3)\)  c. \(5(x + 2 + 3y)\)  d. \(x(5 + 2 + 3y)\)

16. Factor completely: \(x^2 - 5x - 14\)
   a. \((x + 7)(x - 2)\)  b. \((x - 7)(x + 2)\)  c. \((x - 14)(x + 1)\)  d. \((x - 7)(x + 2)\)

17. Factor completely: \(6x^2 + 19x + 10\)
   a. \((6x + 5)(x + 2)\)  b. \((3x + 2)(2x + 5)\)  c. \((6x + 1)(x + 10)\)  d. cannot factor

18. Solve using the quadratic formula. \(-5.2z^2 + 176z + 1218\)

19. Given \(f(x) = 6 - 2x\)
   a. Find \(f(-2)\)  b. \(f(3)\)  c. \(f(2/3)\)

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. \( y = \frac{1}{4}x - 7 \)

22. Solve.
   a. \( \log_7 49 \)  
   b. \( \log_2 32 \)  
   c. \( \log_{10} x = -1.3 \)

SHORT ANSWER

23. Coffee beans from 14 trees are required to produce 15lbs of coffee. How many trees are
    required to produce 375lbs of coffee?

24. Combine exponents as appropriate.
   a. \( x^4y^2 \)  
   b. \( (s + 1)^2(s + 1)(s + 1)^3 \)  
   c. \( 23y^3w^4w^6y^2 \)  
   d. \( 4^24^9 \)  
   e. \( x^{4m+3}x^{5m-1} \)  
   f. \( y^{3j}y^{12j+m} \)

25. 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?
1. n = 13; m = -2
   a. Get n by itself in the first equation
      i. Subtract 3m from both sides
         1. 3m + n – 3m = -3m + 7
         2. n = -3m + 7
   b. Plug this new equation in place of n in the 2\textsuperscript{nd} equation.
      i. 2m = 5(-3m + 7) – 1
   c. Use the distributive property.
      i. 2m = -15m + 35 – 1
   d. Combine like terms
      i. 17m = -34
   e. Divide by 17 on both sides
      i. 17m/17 = -34/17
      ii. m = -2
   f. Plug -2 where m is in the n = -3m + 7
      i. n = -3(-2) + 7
   g. Follow the order of operations to solve for n.
      i. n = 6 + 7
      ii. n = 13
2. The correct answer is a.
   a. Cross Multiply
      i. 18 * 10 = 180
      ii. 4 * x = 4x
   b. Divide
      i. 180 / 4 = 45
3. The correct answer is d.
   a. Subtract 16 from both sides to get x by itself.
      i. X + 16 – 16 = -2 – 16
      ii. -2 – 16 = -18
4. The correct answer is a.
   a. Divide by -13 on both sides to get x by itself.
      i. (-3x) / -13 = -104 / -13
      ii. -104 / -13 = 8
5. 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. $-3 * -1 = 3$
   
   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. $2 * -2 = -4$
   
   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. $1 * -5 = -5$

6. The correct answer is $-5/3$
   
   a. Divide both sides by 9.
      
      i. $9x^2/9 = 25/9$
   
   b. Square root both sides
      
      i. $\sqrt{x^2} = \sqrt{25}/9$
   
   c. $x = \pm 5/3$

7. 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. $-32 / -2 = 16$

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

   c. Add
      
      i. $4 + 8 = 12$

9. Plug the given information into the equation of a line.
   
   a. $y = mx + b$
      
      i. $5 = -2(3) + b$

   b. Solve for b.
      
      i. $5 = -6 + b$
   
      ii. $5 + 6 = -6 + b + 6$

      iii. $11 = b$

   c. Write the equation of the line
      
      i. $y = -2x + 11$
10. Find the slope using \( \frac{\Delta y}{\Delta x} \)
   a. \( \frac{2-(-1)}{4-2} \)
   b. \( m = \frac{3}{2} \)

11. The correct answer is c.
   a. To find the x-intercept, plug in 0 for y.
      i. \( 2x - 0 = 6 \)
      ii. Divide by 2 on both sides. \( 6 / 2 = 3 \).
      iii. X-intercept (3, 0)
   b. To find the y-intercept, plug in 0 for x.
      i. \( 2(0) - y = 6 \)
      ii. Divide by \(-1\) on both sides. \( 6 / -1 = -6 \)
      iii. Y-intercept (0, -6)

12. The solutions are \(-5 / 3\) and \(5 / 3\)
   a. Divide both sides by 9
      i. \( \frac{(9x^2)}{9} = \frac{25}{9} \)
   b. Square root both sides
      i. \( \sqrt{x^2} = \frac{25}{9} \)
   c. Simplify
      i. \( \sqrt{25} = 5 \)
      ii. \( \sqrt{9} = 3 \)
   d. \( x = \pm \frac{5}{3} \)

13. The correct answer is a.
   a. Use the FOIL method.
      i. Front: \( x \times 5x = 5x^2 \)
      ii. Outside: \( x \times -1 = -1x \)
      iii. Inside: \( 3 \times 5x = 15x \)
      iv. Last: \( 3 \times -1 = -3 \)
   b. Combine like terms
      i. \( 15x - 1x = 14x \)
   c. Write in descending powers of ‘x’.
      i. \( 5x^2 + 14x - 3 \)

14. The correct answer is d.
   a. Plug in 4 for x
      i. \( 4^2 + 2(4)y + 7 \)
   b. Plug in 2 for y
      i. \( 4^2 + 2(4)(2) + 7 \)
   c. Follow the order of operations
      i. Exponents: \( 4^2 = 16 \)
      ii. Multiplication: \( 2(4) = 8(2) = 16 \)
      iii. Addition: \( 16 + 16 = 32 + 7 = 39 \)
15. The correct answer is c.
   a. Pull out the GCF.
      i. $5(\_ + \_ + \_)$
   b. Fill in the blanks that will finish the algebraic expression.
      i. $5(x + 2 + 3y)$
16. 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. $(x - 7)(x + 2)$
17. The correct answer is b.
   a. Split the $6x^2$ between two sets of parentheses.
      i. $(3x \_)(2x \_)$
   b. Find two numbers that multiply to equal $10$
   c. These same two numbers when multiplied with $3 \& 2$ must combine to equal $19$.
      i. $(3x + 2)(2x + 5)$
18. Plug the numbers into the quadratic equation.$\frac{-b\pm\sqrt{b^2-4ac}}{2a}$
   a. $-176\pm\sqrt{176^2-4(-5.2)(1218)}$
   b. The answers are $-5.894$ and $39.740$
19. Plug in the given numbers for $x$.
   a. $f(-2) = 6 - 2(-2) = 6 + 4 = 10$
   b. $f(3) = 6 - 2(3) = 6 - 6 = 0$
   c. $f(2/3) = 6 - 2(2/3) = 6 - (4/3) = 4(2/3)$
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. $m = \frac{\Delta y}{\Delta x}; m = (5 - (-3)) / (3 - 1); m = 8/2; m = 4$
   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. Find the answer.
   a. \( \log_7 49 = \)
      i. \( 7^x = 49 \)
      ii. \( x = 2 \) because \( 7^2 = 49 \)
   b. \( \log_2 32 = \)
      i. \( 2^x = 32 \)
      ii. \( x = 5 \) because \( 2^5 = 32 \)
   c. \( \log_{10} x = -1.3 = \)
      i. \( 10^{1.3} = x \)
      ii. \( x = .05 \)

23. Set up a proportion
   a. \( \frac{15}{14} = \frac{375}{x} \)
      Cross multiply
   b. \( 15 \times x = 15x \)
   c. \( 375 \times 14 = 5250 \)
      Divide
   d. \( 5250 / 15 = 350 \) trees

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

25. 150 ft.