MAT-171 Prerequisite Skills Assessment

Directions: Respond to each of the following items to the best of your ability without the use of calculators or online resources of any kind.

1. **Learning Objective:** Use properties of real numbers to evaluate expressions.

   Find the value of the following expressions:

   a. $\dfrac{13-4}{5-2}$

   b. $\dfrac{2^3+7(2)}{3^2}$

   c. $\dfrac{1+5^2}{\frac{6}{3}}$

2. **Learning Objective:** Perform operations on real numbers.

   Express as a single fraction:

   a. $\dfrac{2}{3}+\dfrac{1}{6}$

   b. $4+\dfrac{5}{x}$

   c. $\dfrac{1}{2}+\dfrac{2}{x}-\dfrac{3}{7}$

   d. $\dfrac{2}{x-1}+\dfrac{3}{x-2}$

MAT-171 Prerequisite Skills Assessment

3. **Learning Objective:** Use properties of real numbers to solve linear equations/inequalities.

   Solve the equations. If necessary, express your solution as a fraction.

   a. $4y + 7 = 22 + y$

   b. $3(x - 2) = 13 - x$

   c. $5 - x = 3(x + 1) - 2$

   Solve the inequalities. Express your solution in interval notation.

   a. $3x + 1 > 6x - 2$

   b. $3x - 4 \leq 4 - (2x + 8)$

   c. $4 < -2(x - 4) \leq 20$

4. **Learning Objective:** Find the equation of the line with given criteria.
   a. Find the equation of the line with slope 6 and y-intercept -2.
   b. Find the equation of the line with slope ½ that goes through the point $(6, 4)$.
   c. Find the equation of the line that contains the point $(5, 0)$ and the point $(0, 10)$.
   d. Find the equation of the line that contains the point $(4, 2)$ and the point $(-3, -5)$.

5. **Learning Objective:** Use mathematical symbols to create an expression or equation that represents a given context.
   a. John is knitting a scarf. It takes him 5 minutes to knit a row. Write an expression that represents the number of rows in John's scarf after *t* minutes.
   b. Jane goes to the arcade with 75 tokens. She plays 4 games every hour. If each game uses one token, write an expression that represents the number of tokens that Jane has after *x* hours.
   c. Jane and John are selling bird houses for $10 each. They have paid $100 to rent a stall at the flea market. Write an expression that represents the amount of money they will take home if they sell *h* bird houses.

MAT-171 Prerequisite Skills Assessment

6. **Learning Objective**: Factor expressions or be able to determine if an expression is not factorable.
   Factor the following expressions completely.
   a. x^2+5x+6

   b. $5x^2-14x-3$

   c. u^2-25

   d. $3x^3-6x^2+3x$

   e. $(y-1)^2-(y-1)-12$

7. **Learning Objective:** Solve quadratic equations by factoring.
   Solve the following equations ***by factoring***.
   a. $7r^2-14r=-7$

   b. $6n^2-18n-18=6$

   c. $10b^2=27b-18$

8. **Learning Objective:** Use properties of exponents to expand binomial expressions.
   Expand the expressions.
   a. $(a-2b)^2$

   b. $(3r+1)^2$

c. $(1-7x)^2$

9. **Learning Objective**: Evaluate functions with function notation (for numbers and parameters).

   Given $f(x) = -x^2+2x+3$

   Evaluate:

   a. $f(0)$
   b. $f(2)$
   c. $f(-2)$
   d. $f(a)$
   e. $f(-a)$

10. **Learning Objective:** Perform indicated operations on polynomials (addition/subtraction with distribution focus on quadratic).
    Simplify the expression.

    a. $3(x+4)-4(x^2+3x-1)$

    b. $x^2+xy+2-(xy+y^2-4)$

    c. $4(x^2+x)-3(2+3x-6x^2)$