MC25 Diagnostic Exam

Students should be able to solve **at least 8 out of 10 problems within two attempts** on the following page to demonstrate readiness for the MC25 level. This exam doesn't necessarily show readiness for the next level.

This exam evaluates **proficiency** in the following key areas:

Algebra

1. **Number Sense**
   - Arithmetic with integers, decimals, fractions, percent, order of operations (PEMDAS)
   - Converting decimals to fractions
   - Evaluating expressions with exponents and square roots
   - Prime factorization, determining if a positive integer is prime or composite
2. **Ratio/Proportion**
   - Setting up a ratio to solve for an unknown value
3. **Variables, Equations**
   - Translating word problems into single-variable linear equations
   - Solving single-variable linear equations

Geometry

1. **Area and Perimeter**
   - Area of rectangles, squares, triangles, circles
   - Perimeter of a polygon, circumference of a circle
2. **Coordinate Plane**
   - Identifying quadrants, plotting points in the coordinate plane

1. Compute $\frac{5}{12} + \frac{7}{18}$, and express the result as a common fraction in simplest form.

2. What is the value of $7(5 - 2^3)^2$?

3. A rectangular sheet of paper is 11 inches long and 8.5 inches wide. What is the perimeter of the sheet of paper, in inches?

4. Kylie ran 2.8 miles in 21 minutes. At this speed, how many minutes would it take her to run 6 miles?

5. Out of the integers 91, 93, 95, 97, and 99, which one is prime?

6. Evaluate the expression $2ac + \sqrt{a^2 - 4b}$ when $a = 7$, $b = 6$, and $c = -2$.

7. Solve for x in the following equation: $5(4 - 2x) = 17 - 3x$. Express your answer as a common fraction in simplest form.

8. A taxi charges a \$5 base fare, plus \$3 per mile traveled. If Eric paid \$92, how many miles was his taxi ride?

9. The prime factorization of 840 is $2^a \times 3^b \times 5^c \times 7^d$, where a, b, c, and d are positive integers. What is the value of a?

10. Triangle ABC has coordinates $A(-2, -2)$, $B(4, -2)$, and $C(2, 3)$. What is the area of $\triangle ABC$?