

Our Lady of Holy Cross College

Mathematics Placement Examination Preparation Guide

Students who enter the College without valid ACT scores or college credit in a course comparable to MAT 205 (College Algebra) must take the Mathematics Placement Examination. Students who are unable to satisfy the criteria for the Math Placement Examination in two attempts will be required to take MAT 100 (Developmental Algebra).

Suggestions for preparation for the Mathematics Placement Examination:

1. **DO NOT** take the examination without reviewing and studying **all** topics in this study guide.
2. Bring only a calculator and a pencil to the test. You will be provided with scratch paper and will not be allowed to carry any other items into the test. Calculators with the ability to communicate wirelessly will not be allowed into the test.
3. If you have any questions about the exam or need assistance in preparation, contact Dr. Julie Cooper at 398-2236 or at jcooper@olhcc.edu.
4. You may **only** attempt the exam **twice**. If you fail to pass the test on your second attempt, you will be required to pass MAT 100.

The ACT Compass test will include items requiring the following mathematical skills:

1. Sets
 - a. be able to use the definition of subset of a set to specify the subsets of a given set
 - b. be able to identify the common sets of numbers
 - c. be able to graph sets of real numbers
2. Operations on Real Numbers:
 - a. be able to add, subtract, multiply, and divide real numbers
 - b. be able to use the agreement on the order of operations to simplify numerical expressions
 - c. be able to evaluate expressions for given values of variables
 - d. be able to use the commutative, associative, distributive, inverse, and identity properties to help one evaluate numerical and variable expressions
3. Linear Equations in One Variable
 - a. be able to solve linear equations in one variable
 - b. be able to solve a formula for a specified variable
 - c. be able to solve applied problems using formulas
4. Solving Word Problems
 - a. be able to solve problems about numerical quantities
 - b. be able to solve problems about percents, simple interest, and mixture
 - c. be able to solve problems about angles
 - d. be able to solve problems about uniform motions
 - e. be able to solve problems about geometric figures
 - i. area and perimeter of squares
 - ii. area and perimeter of rectangles
 - iii. area and circumferences of circles

5. Linear Inequalities
 - a. be able to solve linear inequalities using the addition and multiplication properties for inequalities
 - b. be able to solve applied problems using linear equalities
 - c. be able to solve compound linear inequalities with the word 'and or 'or'
6. Absolute Value
 - a. be able to define the absolute value of a number
 - b. be able to solve absolute value equations
 - c. be able to solve absolute value inequalities
7. Exponents
 - a. be able to use the product and quotient rules for exponents
 - b. be able to use the power rules for exponents
 - c. be able to simplify exponential expressions
 - d. be able to use the rules for exponents with scientific notation
8. Polynomials
 - a. be able to add, subtract, multiply, and divide polynomials
 - b. be able to find the greatest common factor and least common denominator of two integers
 - c. be able to factor
 - i. by grouping
 - ii. by substitution
 - iii. the difference of two squares
 - iv. a perfect square trinomial
 - v. a given factorable trinomial
9. Rational Expressions
 - a. be able to define a rational expression
 - b. be able to find the numbers that make a rational expression undefined
 - c. be able to write a rational expression in lowest terms
 - d. be able to add, subtract, multiply, and divide rational expressions
 - e. be able to simplify complex rational expressions
 - f. be able to solve equations with rational expressions
 - g. be able to work problems involving ratios and proportions
10. Radical Expressions
 - a. be able to convert from radical to exponential form
 - b. be able to convert from exponential to radical form
 - c. be able to use the rules of exponents with rational exponents
 - d. be able to use the product and quotient rule for radicals
 - e. be able to simplify radicals by writing a radical in simplified radical form
 - f. be able to simplify radical expressions involving addition, subtraction, multiplication, and division
 - g. be able to solve radical equations
11. Systems of Equations
 - a. be able to solve linear systems of equations in two variables
 - b. be able to work 'word' problems involving linear systems of equations in two variables
12. Quadratic Equations
 - a. be able to solve quadratic equations by using the Zero-Factor Theorem
 - b. be able to solve quadratic equations by completing the square
 - c. be able to solve quadratic equations by using the quadratic formula
 - d. be able to find the discriminant of the quadratic equation
 - e. be able to use the discriminant to determine the number and type of solutions

ITEMS FROM MATH PLACEMENT

1. (Elementary Algebra: Linear Equations in One Variable)

A student has earned scores of 87, 81, and 88 on the first 3 of 4 tests. If the student wants an average (arithmetic mean) of exactly 87, what score must she earn on the fourth test?

- A. 85
- B. 86
- C. 87
- D. 92
- E. 93

2. (Elementary Algebra: Basic Operations with Polynomials)

Which of the following expressions represents the product of 3 less than twice x and 2 more than the quantity 3 times x ?

- A. $-6x^2 + 25x + 6$
- B. $6x^2 + 5x + 6$
- C. $6x^2 - 5x + 6$
- D. $6x^2 - 5x - 6$
- E. $6x^2 - 13x - 6$

3. (Elementary Algebra: Substituting Values into Algebraic Expressions)

If $x = -1$ and $y = 2$, what is the value of the expression $2x^3 - 3xy$?

- A. 8
- B. 4
- C. -1
- D. -4
- E. -8

4. (Intermediate Algebra: Rational Expressions)

For all $r \neq \pm 2$, $\frac{r^2 - 5r + 6}{r^2 - 4} = ?$

- A. $\frac{r-3}{r+2}$
- B. $\frac{r-2}{r+2}$
- C. $\frac{r-2}{r+3}$
- D. $\frac{r+3}{r-2}$
- E. $\frac{r+3}{r+2}$

5. (Coordinate Geometry: Linear Equations in Two Variables)

What is the equation of the line that contains the points with (x,y) coordinates $(-3,7)$ and $(5,-1)$?

- A. $y = 3x - 2$
- B. $y = x + 10$
- C. $y = -\frac{1}{3}x + 8$
- D. $y = -\frac{3}{2}x + \frac{11}{4}$
- E. $y = -x + 4$

Answers:

- 1. D
- 2. D
- 3. B
- 4. A
- 5. E