Liberal Arts Modules Placement Test Study Guide

For this test, you will have to demonstrate proficiency in the following skills:

- Rounding a number to a given place value

- Adding, subtracting, multiplying, and dividing integers, fractions, and decimal numbers

- Exponents on integers and fractions

- Solving problems that require understanding the Order of Operations rule

- Prime factorization

- Finding the Greatest Common Factor or Least Common Multiple of two or more numbers

- Converting fractions to decimal numbers and vice versa

Applying any of the above to a real-world situation

- Solving problems that require understanding of the definition of Complementary and Supplementary angles

- Using the *Interior Angles Sum Theorem* to find the sum of the angles in various parallelograms

- Classifying triangles according to angles and sides (equilateral, isosceles, scalene/acute, right, obtuse)

- Solving problems that involve angles formed by parallel lines (corresponding, vertical, alternate interior and exterior)

- Determining the number of lines of symmetry in a given figure

- Classifying quadrilaterals (is it just a quadrilateral? a parallelogram? a rectangle? a rhombus? a square? or more than one of the above?)

- Using the *Pythagorean Theorem* to find the length of a missing side of a right triangle.

- Finding the square root of a number.

- Using the *Distance Formula* to find the distance between two points

- Determining to which number set(s) a number belongs (counting numbers? integers? rational numbers? irrational numbers? real numbers? or more than one of the above?)

- Finding the **perimeter** of a *triangle*, *rectangle*, *parallelogram*, or *circle* (except with a circle it is called the circumference)

- Finding the **area** of a *triangle*, *rectangle*, *parallelogram*, or *circle*

- Finding the **volume** of a *rectangular prism*, *pyramid*, *cylinder*, *cone*, or *sphere*

- Finding the **surface area** of a *rectangular prism*, or *cylinder*

Applying any of the above to a real-world situation

- Choosing which metric measurement would be appropriate to use to measure given objects (would you use kilometers or centimeters to measure a pencil?)

- Converting measurements from metric to metric (Ex: meters to centimeters)

- Converting measurements from U.S. standard to U.S. standard (Ex: quarts to gallons or square feet to square yards—hint: there are more than 3 square feet in a square yard!)

- Converting measurements from U.S. standard to metric and vice versa (Ex: pounds to kilograms)

- Changing numbers to Scientific Notation and back (Ex: $5.4 \times 10^5 = 540,000$)

  The conversion factors will be provided, they need not be memorized.

Applying any of the above to a real-world situation

- Finding the mean, median, mode, and range of a set of data

- Figuring out the number of possible combinations there are in a set (Ex: 5 kinds of ice cream, 3 toppings, and waffle or sugar cone yields how many different treats?)

- Figuring out the probability that a certain outcome or set of outcomes will occur in a given situation (Ex: Flip a coin 3 times. What is the probability of getting all 3 heads? Or given 4 red, 4 white, and 4 blue balls in a bag, what is the probability of drawing a red? The answers to all of the above will be *fractions.*)

- Figuring out the probability if you have 2 independent outcomes that *both* of them will happen or that *either* of them will happen. (Ex: Flip a coin and roll a die at the same time. What is the probability that you will get heads <u>and</u> a six? What about heads <u>or</u> a six?)

- Correctly placing an ordered pair on the coordinate plane

- Classifying triangles according to angles and sides (equilateral, isosceles, scalene/acute, right, obtuse)

- Interpreting data presented with a Bar Graph

- Interpreting data presented with a Pie Graph

- Interpreting data presented with a Line Graph

- Interpreting data presented with a Stem and Leaf Graph (with these you can find the exact median, range, and mode of the data)

- Interpreting data presented with a Histogram

- Interpreting data presented with a Box and Whisker Graph (with these you can find the exact median and range of the data, as well as where 25% above and below the median fall—the 50% at the center)

Applying any of the above to a real-world situation

- Solving one-, two-, and multi-step equations with integers, fractions, and decimals (For instance, **$2x + 3 = 8$**, solve for *x* would be a two-step equation with integers.)

- Solving equations presented in words
  (For instance, "The sum of a number and five is seven—what is the number?")

- Given the perimeter and width of a rectangle, finding the *area*

- Correctly placing an ordered pair on the coordinate plane

- Identifying the slope and y-intercept of an equation (even if the equation is presented in standard form)

- Identifying points that lie on a line given the equation of the line

- Finding the slope of a line given 2 points

- Finding the slope of straight horizontal or vertical lines

- Finding the equation of a line given the slope and y-intercept, *or* a graph of the line, *or even* just 2 points

- Finding the slope of lines that are parallel or perpendicular to a given line

Applying any of the above to a real-world situation

- Discerning the difference between conclusions reached by *Deductive Reasoning* and *Inductive Reasoning*

- Reasoning inductively (find the pattern in a set of numbers or figures)

- Solving problems that require understanding of the definition of Complementary and Supplementary angles (review) as well as Vertical Angles and sets of angles that form a complete circle

- Finding the perimeter or area of figures even when certain dimensions are left out and must be inferred

- Knowing how to apply the *Angle Addition Postulate* as well as the *Segment Addition Postulate*

- Knowing how to apply the *Reflexive Property of Equality* and of *Congruence* (same property—just one applies to numbers and the other to shapes), as well as the *Symmetric* and *Transitive* properties.

- Knowing how to apply the *Addition Property of Equality* as well as the *Subtraction*, *Multiplication*, and *Division* properties.

- Correctly interpreting the symbols ∧, ∨, and ¬ in the context of mathematical reasoning and correctly setting up and using truth tables to determine whether a statement is true or false (Ex: If p is true and q is false, what is the value of $\neg p \wedge q$?)

- Knowing the meaning and correct use of the following terms in the context of mathematical reasoning: *Converse, Inverse* and *Contrapositive*; *Conjunction* and *Disjunction*; *Counterexample*; and *Biconditional*

- Correctly identifying the statements that can be put together to form a conclusion that follows the *Law of Syllogism*

- Correctly identifying the statements that can be put together to form a conclusion that follows the *Law of Detachment*

Applying any of the above to a real-world situation