

APPLICATION OF BASIC CONCEPTS

QUANTITATIVE APPLICATIONS COMPETENCY

GUIDE

Note: This guide contains all of the original terminology and information from the original guide but it has been reformatted.

COMPETENCY STATEMENT

THE QUANTITATIVE APPLICATIONS COMPETENCY IS

--The ability to

determine and use appropriate statistical and quantitative methods to interpret data, solve problems, and make decisions;

distinguish between appropriate and inappropriate uses of samples, descriptive statistics, and inferential statistics;

describe the basic functions, applications, and limitations of computers.

ASSESSMENT CRITERIA

For the Quantitative Applications competency you must demonstrate the following skills and knowledge:

Part 1, Calculators: Demonstrate the ability to use a calculator and to distinguish between appropriate and inappropriate uses of a calculator. It will be necessary to be able to use a calculator that has:

- a) a square root button
- b) a change sign key
- c) a memory

Part 2, The Metric System: Demonstrate the ability to use the metric system and to convert from one unit to another unit given the conversion factor.

Part 3, Probability: Demonstrate the ability to describe what probability means for individuals and populations; the ability to use simple probability to decide if an event is unusual and to predict the likelihood of future events; the ability to identify situations where past experience does not affect the likelihood of future events.

Part 4, Statistics: Demonstrate the ability to determine and use the appropriate statistical method to interpret data, solve problems, and make decisions. Following is a list of statistical concepts and methods that are needed for this part of the competency.

- a) the ability to use and interpret tables, graphs, frequency distributions, histograms, and scattergraphs.
- b) the ability to calculate the mean, median, and mode; the ability to decide which of these measures is the most appropriate for given situations.
- c) the ability to calculate the standard deviation; the ability to describe what the standard deviation measures and why it is important.

- d) the ability to work problems dealing with percent and percentiles.
- e) the ability to describe random sampling, to describe what results based on a sample mean, and to identify when a biased sample is used.
- f) the ability to describe correlation between two variables; the ability to recognize when correlation is being used to prove causation.
- g) the ability to use the chi-square procedure to test a theory.

Part 5, Computer Literacy: Demonstrate the ability to describe the basic functions, applications, and limitations of computers; the ability to use a computer terminal to run packaged programs. Although the assessment criteria describes what skills and knowledge are needed to pass the competency assessment, they do not include one vital skill that is needed, and that is, the ability to solve problems that require the use of one or more of the skills described. Often, it will be necessary to make a decision based on the solution of a particular problem. A basic outline for solving quantitative problems is:

- 1) Formulate the problem.
- 2) Recognize that mathematics is relevant to the solution of the problem.
- 3) Select the appropriate mathematical procedures to use.
- 4) Carry out the computations accurately and effectively.
- 5) Interpret the computational result to produce a solution to the problem.

ASSESSMENT PROCEDURE

The assessment for the Quantitative Applications competency will be a written test containing questions and problems that will test your ability to determine the appropriate methods to use to interpret data, solve problems, and make decisions. Point values are assigned to items on the assessment, and in order to be certified in this competency, it is necessary to earn at least 80% of the total number of points possible.

PREPARATION FOR ASSESSMENT

In today's society, people are constantly confronted with quantitative facts and arguments. As a citizen and as a professional, you will make decisions based on these facts and arguments. The Quantitative Applications competency is designed to insure that you can use and understand some statistical and other quantitative methods that can be used to help interpret data, solve problems, and make decisions.

Many students will prepare for this competency by taking the competency related course, Math 5915, Quantitative Applications. However, dependent upon a person's previous mathematical

experience and proposed plan of study at College IV, this may not be necessary. For example, if you plan to take or have taken a statistics course, you should consult with a mathematics instructor.

As a first step in preparing for this competency, all College IV students must take the College IV Mathematics Diagnostic and Placement Test. This test will be used to determine if a student is prepared to take the competency related course. In order to begin this course, a student must demonstrate the ability to:

- 1) do arithmetic with decimal numbers;
- 2) do arithmetic with fractions;
- 3) do arithmetic with signed numbers;
- 4) evaluate algebraic expressions;
- 5) solve linear equations;
- 6) work with formulas;
- 7) graph the equation of a straight line;
- 8) solve ratio and proportion problems;
- 9) solve percent problems

The results of this test will be used to determine what a student should do in order to prepare for the competency assessment. Basically, a student will be given one of the following recommendations.

- 1) Take prerequisite courses before taking the competency related course. The primary prerequisite course at College IV is Math 5903, Algebra for Statistics. This is a two credit algebra course emphasizing the use of a calculator. If a student is weak in computational skills, that student may be recommended to take a review course before taking Math 5903.
- 2) Take the competency related course, Math 5915, Quantitative Applications.

So depending on your score on the diagnostic and placement test, you will be advised to start with:

- a) DSI 109, Pre-algebra (4 credits)
- b) Math 5901, Operations in Numbers (1 credit)
- c) Math 5903, Algebra for Statistics (2 credits)

When you have completed Math 5903, you will be able to take the competency related course.

- d) Math 5915, Quantitative Applications (4 credits) or other courses to prepare you for the competency assessment.

COURSES RELATED TO THE COMPETENCY

The following is a list of courses related to the competency. A list of textbooks for these courses can be obtained from a College IV math instructor, and copies of most of these texts are available for inspection at the College IV Learning Center.

DSI 109 Pre-Algebra (4 credits)

This course is offered by the Developmental Skills Institute. It should be taken only by those students who need to review the basic concepts of arithmetic and need additional practice in addition, subtraction, multiplication, and division of whole numbers, fractions, and decimals. This course, or placement by the diagnostic test, is a prerequisite for Math 5901.

Math 5901 Operations in Numbers (1 credit) This is a self-paced course designed for students who need to learn how to do arithmetic with fractions and signed numbers. This course, or placement by the diagnostic test, is a prerequisite for Math 5903.

Math 5903 Algebra for Statistics (2 credits) This course is designed to prepare students with the computational and algebraic skills needed for statistics and many beginning science courses. Topics include calculator operations, linear equations, percent, formulas, and graphs of straight lines. A calculator is required. This course, or placement by the diagnostic test, is a prerequisite for Math 5915 and for Math 5930.

Math 5905 The Metric System (1 credit) This a self-paced course covering the basic concepts of the metric system. Students who plan to take the competency related course, Math 5915, should not take this course as the material in this course will be covered in Math 5915.

Math 5915 Quantitative Applications (4 credits) This course is designed to give students the ability to use certain statistical and other quantitative concepts and methods to interpret data, solve problems, and make decisions. Real world examples and case histories are used extensively. A calculator is required.

Math 5930 Statistics This is a first course in statistics providing an introduction to statistical techniques frequently used in business, economics, and the behavioral sciences. Emphasis is on statistical estimation, hypothesis testing, and inferential techniques. A calculator is required.