

Learning Outcomes For Math 120  
Fundamentals of College Mathematics  
University of Nevada, Reno

**1. DIMENSIONAL ANALYSIS.**

- (a) Convert one unit of measurement to another

**2. UNDERSTANDING MONEY: INTEREST, ANNUITIES, AMORTIZATION.**

- (a) Simple interest
- (b) Compound interest
- (c) Annuities
- (d) Amortization

**3. SPATIAL RELATIONSHIPS: GEOMETRY, RIGHT ANGLE TRIGONOMETRY.**

- (a) Measurement of area
- (b) Measurements of volume
- (c) Right Angle Trigonometry

**4. SET THEORY**

- (a) Sets and Their Basic Operations
- (b) Venn Diagrams and Cardinal Numbers
- (c) Tree Diagrams and Fundamental Principle of Counting
- (d) Factorial notation
- (e) Permutations and combinations

**5. PROBABILITY**

- (a) Basic rules of probability
- (b) Odds
- (c) Probability using combinatorics
- (d) Expected value
- (e) Conditional probability

**6. DATA ANALYSIS, STATISTICS.**

- (a) Samples vs. populations
- (b) Frequency distributions and histograms
- (c) Mean, median and mode.
- (d) Measures of dispersion: variance and standard deviation
- (e) The normal distribution and applications of the normal distribution
- (f) Margin of error

**7. EXPONENTIAL GROWTH & DECAY**

- (a) Exponential and logarithmic functions and their properties
- (b) Exponential growth & decay

## PERFORMANCE STANDARDS

### APPROACHES STANDARDS:

Student knows definitions of concepts and executes computations in simple cases.

### MEETS STANDARDS:

Student understands definitions and concepts, executes computations, and applies concepts to practical situations.

### EXCEEDS STANDARDS:

Student understands definitions and concepts, executes complex computations, applies concepts to practical situations, and uses concepts to make informed decisions.

## **1. DIMENSIONAL ANALYSIS.**

Convert one unit of measurement to another

### Sample assessment questions:

- If you are driving at 56.316 in /sec and the speed limit is 30 miles/hr, are you speeding?
- A soft drink sells for \$1.09 for a two-liter bottle or \$1.24 for a 6-12oz pack. Which is the better buy?

## **2. UNDERSTANDING MONEY: INTEREST, ANNUITIES, AMORTIZATION.**

Simple interest

Compound interest

Annuities

Amortization

### Sample assessment questions:

- Find the future value of \$5,000 compounded quarterly at  $4\frac{1}{2}\%$  for 13 years.
- You want to buy a house that is being sold for \$370,000. You can afford to put 15% down and the bank is offering you a Simple Interest Amortized Loan at 6% for 30 years. Find your monthly payments and the interest you paid during the 30 years.

## **3. SPATIAL RELATIONSHIPS: GEOMETRY, RIGHT ANGLE TRIGONOMETRY.**

Measurements of area

Measurements of volume

Right Angle Trigonometry

### Sample assessment questions:

- You are 700 ft away from the tallest building. You measure the angle from the ground to the top of the building to be  $50.2^\circ$ . How tall is the building in feet and in meters?
- Find the volume and surface area of a cylinder.
- The diameter of the planet Jupiter is approximately 88,640 miles; the diameter of earth is approximately 7,920 miles. How many earths could fit inside Jupiter?

## **4. SET THEORY**

Sets and Their Basic Operations

Venn Diagrams and Cardinal Numbers

Tree Diagrams and Fundamental Principle of Counting

Factorial notation

Permutations and combinations

### Sample assessment questions:

- About 6 years ago the prefix 888 was adopted for toll-free calls in addition to 800. Why? How many "800" phone numbers are possible?
- Draw a Venn Diagram of the following situation. A survey of 950 students found that 150 do not drink coffee or tea, 453 drink coffee and 398 of those who drink coffee do not drink tea.
- At a local high school 170 people buy raffle tickets. If 4 tickets are drawn to determine winners and the prizes are all different (say for 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> prize) how many different arrangements of winners can there be?

## **5. PROBABILITY**

Basic rules of probability

Odds

Probability using combinatorics

Expected value

Conditional probability

### Sample assessment questions:

- The percentage of cats that will develop Feline Leukemia is 1.5%. The National Veterinary Association has developed a test will correctly return a positive test result 98% of the time and it will correctly return a negative result 97.5% of the time. Given that the cat had a positive test result, what is the probability that it has the disease?
- The President is going to select a committee of 5 from the U.S. Senate. Let's suppose that there are 44 Democrats and 56 Republicans in the Senate. If the President picks the committee at random what is the probability that the committee contains at most one Republican.

## **6. DATA ANALYSIS, STATISTICS.**

Samples vs. populations

Frequency distributions and histograms

Mean, median and mode.

Measures of dispersion: variance and standard deviation

The normal distribution and applications of the normal distribution

Margin of error

### Sample assessment questions:

- The price of a high quality digital camera has a normal distribution with a mean of \$250 and a standard deviation of \$23. What is the probability that you pick a camera that costs more than \$265? What is the least amount that you can pay for a camera that is listed in the top 10.75% of all the cameras?
- Find the mean, median, mode and standard deviation of these numbers. 2, 5, 4, 10, 11, 5, 3, 2, 16, 14, 5, 10
- A survey was distributed to people in Reno and asked, "Do you own a dog?" Of the 2,345 people surveyed, 921 said yes, and the rest said no. Using the margin of error at a 97% level. Find and interpret a 97% confidence interval associated with the sample proportion.

## **7. EXPONENTIAL GROWTH & DECAY**

Exponential and logarithmic functions and their properties

Exponential growth & decay

### Sample assessment questions:

- A chicken farm starts with 234 chickens and 15 days later there are 607 chickens. How many chickens are there in 25 days? When does the farm reach 1500 chickens?
- How long will it take plutonium, with a half-life of 24,400 yrs, to lose 74% of its radioactivity?