**Fundamental Theorem of Calculus (Pre-Test)**

1. Write down the Fundamental Theorem of Calculus.
2. Solve the following derivative:
3. Suppose that , then what is at ?
4. Does every function have an antiderivative? (True or False)
5. Write down an expression for the area of the colored region.

y=f(t)

t

y

a

x

**Fundamental Theorem of Calculus (Post-Test)**

1. According to the Fundamental Theorem of Calculus, if *f* is a continuous function and *F* is defined by , then what is ?
2. Solve the following derivative:
3. What is the condition for a function to have an antiderivative?
4. Suppose that , then what is at ?
5. Write down an expression for the area under the curve defined by the function in the interval (that is, ).

**Proving Trigonometry Formulas from Euler’s Formula (Pre-Test)**

1. Write down Euler’s formula for
2. Write the angle sum formula for .
3. If then what is the value of *y*?
4. Write the double angle formula for .
5. Which of the following is an even function?

**Proving Trigonometry Formulas from Euler’s Formula (Post-Test)**

1. Write down Euler’s formula for .
2. Write the angle sum formula for sin(2a+3b)
3. If , then what is the value of ?
4. Write the double angle formula for .
5. Please describe what an *odd* function means.

**Uniform Distribution (Pre-Test)**

1. Draw the graph of f(x), the probability distribution of a uniform random variable X between lower limit 2 and upper limit 5.
2. What is a uniform random variable?
3. For a uniform distribution with a minimum value 2 and maximum value 10, what is the probability that the variable is less than 9?
4. Write down the expression for the Cumulative Distribution Function () of a uniform random variable X with minimum value *a* and maximum value *b*, in terms of an integral.
5. For a uniform random variable X with minimum value *2* and maximum value *5,* Why is this so? (CDF = Cumulative Distribution Function)

**Uniform Distribution (Post-Test)**

1. What is the shape of the graph *f(x)*, the probability distribution of a uniform random variable X?
2. Which of the following is true about the uniform random variable X with minimum value 2 and maximum value 10, and its probability distribution function *f(x)*?
4. For a uniform distribution with a minimum value 3 and maximum value 7, what is the probability that the variable is less than 5?
5. Define the cumulative distribution function, , of a random variable X.
6. For a uniform random variable X with minimum value *0* and maximum value *3,* indicate on the graph below the area that represents *.* (CDF = Cumulative Distribution Function)

3

0

1/3

*f(x) = PDF (Probability Distribution Function)*

*x*

**Method of Moments (Pre-Test)**

1. Write down an expression for the variance of *y*, , in terms of the sample mean and sample second moment .
2. Write down the Probability Distribution Function, for a uniform random variable between values 3 and 2.