

Name: \_\_\_\_\_

## Test1 Version A: Math 1030 Section 6

Read all directions carefully and completely. Answer each question to the best of your ability. It is important to note that the correct answer is only worth one point. So the emphasis will be placed on whether or not you know how to do the problem.

Some useful information that should be helpful

1 inch is 2.54 centimeters

1 kilogram is 2.205 pounds

1 ton is 2000 pounds

1 euro is 1.169 dollars

1 pound is 1.678 dollars

1 Canadian dollar is .7483 dollars

1 milliliter of water weighs 1 gram

1  $cm^3 = 1$  mL

For the numbers 1. and 2. state whether the argument is inductive or deductive. If it is inductive and uses a mathematical rule inductively test each rule and state whether the argument is strong or not and why. If it is deductive use the Venn Diagram Test for validity to show that the statement is either valid or invalid then state whether you think the statement is sound or unsound.

1. Premise: No cats have fur.

Premise: If something has fur, then it likes to climb trees.

Premise: If something has fur, then it likes to swim.

Premise: Frank is a cat

Conclusion: Frank likes to climb trees and Frank likes to swim.

2. Premise:  $\frac{n^3-n}{3}$  is a positive integer for all  $n \in \mathbb{N}$ .

Premise:  $\frac{n^5-n}{5}$  is a positive integer for all  $n \in \mathbb{N}$ .

Premise:  $\frac{n^7-n}{7}$  is a positive integer for all  $n \in \mathbb{N}$ .

Conclusion: If  $p$  is a prime number then  $\frac{n^p-n}{p}$  is a positive integer for all  $n \in \mathbb{N}$ .

3. Make a **reasonable** order of magnitude estimation (one specific number) about the number of miles between Moscow (Russia) and Berlin (Germany). Using your estimation find how long it would take you to travel from Moscow to Berlin in a car (65 mph) and walking (4mph). Is it possible to make it from Moscow to Berlin in one day driving? In two months walking? (Assume you have 18 traveling hours per day and that while traveling you don't stop anywhere)

4. There is a rectangular box of water sitting in your back yard. Given that it is 1 meter high, 5 meters wide, and 2 meters long, what is the mass of the water in the container in terms of pounds. When the water is placed on three scales the scales read: Scale one  $\rightarrow$  11 tons, Scale two  $\rightarrow$  12 tons, Scale 3  $\rightarrow$  11.5 tons. For each scale (using your answer for the actual value) find the relative and absolute error of each scale and indicate which scale is most precise and which one is most accurate and why.

5. Dave, George, and Tom have all bought new cars. Dave spent 20,000 Canadian dollars. George spent 10,000 pounds. And Tom spent 15,000 euros. Compare how much person spent relative to the other two using relative and absolute difference, and then find the price of each person's car in terms "of" the price of the other two people's cars. (Express the relative difference and the price in terms "of" in a percentage)

6. Say you have an animal shelter that might contain birds (two legs), dogs (4 legs), ants (six legs), or snakes (0 legs). If the shelter must hold exactly 7 animals and must contain exactly 18 legs how many combinations of animals are possible? (note you need not find them all exactly)(use a table)

7. Emilia would like to invest 10,000 dollars in a bank account. There are four different banks that she can choose from. Bank one has a savings account that has simple interest at 8%, Bank two has a savings account which has interest that is compounded annually at 7.5%, Bank three has a savings account which has interest that is compounded quarterly at 7%, and Bank four has a savings account that is compounded continuously at 6.5%. Which bank should Emilia choose if she leaves the money alone and wants the greatest amount in her bank account after 7 years? After 40 years?