Math 102
Problem Solving and Reasoning Worksheet
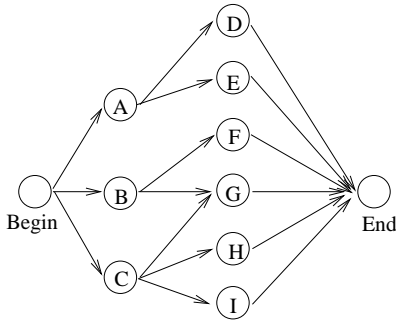
Name:———————————————————————

1. In the following diagram, list all possible routes you could take to get from "Begin" to "End".

2. A family has seven children. If we list the genders of the children (for example *bbggbgb* where *b* is a boy and *g* is a girl), how many lists are possible? [Instead of solving this problem, state a simpler version of the problem and solve it instead.]

3. For each of the following statements, determine whether the statement is true or false. If the statement is true, give two specific examples that illustrate the statement. If it is false, give a specific counterexample.

   (a) If $a < b$, then $a + c < b + c$.

   (b) If Person X knows Person Y and Person Y knows Person Z, then Person X knows Person Z.

4. Use **guided guessing** to solve the following: Janine worked 15 hours last week. One job as a clerk in a sporting goods store paid her $5.25 per hour, while her other job giving piano lessons paid her $12 per hour. If shed earned $119.25 between the two jobs, how many hours did she work at each job? [Do NOT use algebra to solve this problem.]

5. In each of the following, determine whether it is an example of *inductive reasoning* or *deductive reasoning*.

   (a) Carla is calculating her income taxes to determine if she will get a refund this year.

   (b) You tell your friend Jay to be ready 15 minutes before you actually intend to pick him up because Jay is always running late.

   (c) Luis has noticed that the stock market has gone up on the Friday before each of the last three national holidays. He decides to buy stock on the Friday before Labor Day to cash in on this trend.

6. Use inductive reasoning to predict the next two terms in each given sequence of numbers.

   (a) 3, 6, 12, 24, ———, ———

   (b) $\dfrac{1}{2}, \dfrac{3}{5}, \dfrac{5}{8}, \dfrac{7}{11}, $ ——, ——

   (c) 0.1, 0.10, 0.101, 0.1010, ————, ————

7. Use inductive reasoning to find the ones digit of the number 2^{50}.