

## **MAT 158 Project 2**

**Objectives:** At the end of this project you should know the following.

1. The Binomial Distribution using Minitab
2. How to answer questions about Binomial probabilities from table and graph
3. Graph a probability density Binomial curve
4. Graph a Cumulative Binomial curve

## The Binomial Distribution.

### Objectives:

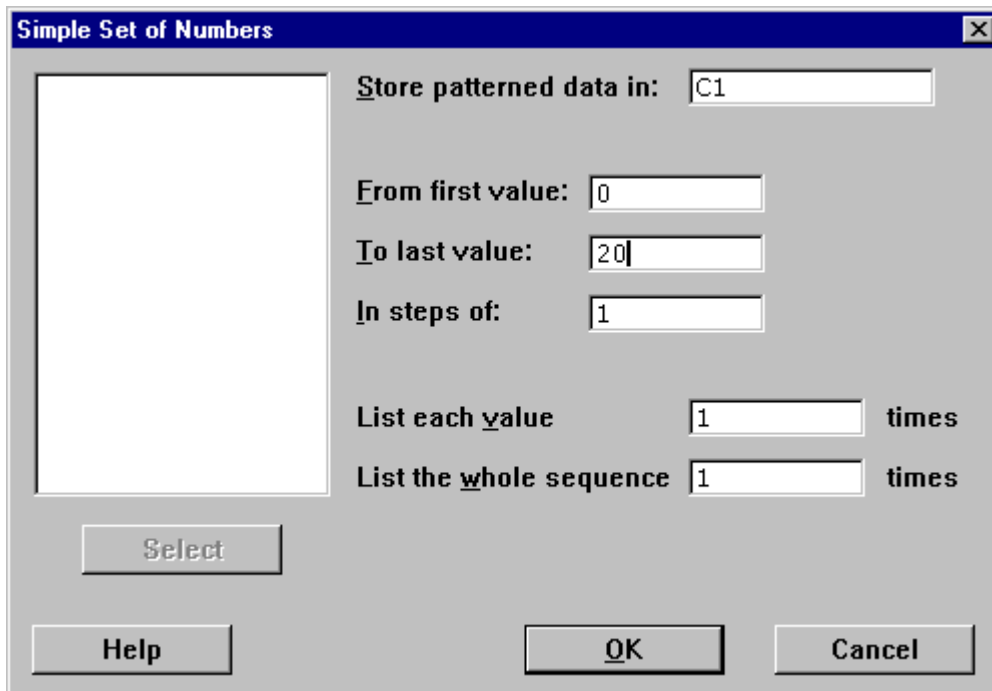
1. To determine Binomial Probabilities and Cumulative Binomial Probabilities.
2. Graphing Binomial Probability Functions and cumulative distribution functions.

**Problem.** Suppose that you take a 20 question multiple-choice quiz by guessing. Each question has exactly one correct answer of the four alternatives given. Let  $x$  is the possible number of correctly guessed answers. Then  $x$  follows a Binomial distribution.

1. List the values of  $x$  in column C1:

Go to :

- **Calc**→ **Make patterned Data** →**Simple set of numbers**
- **Store patterned data in C1**
- **From first value 0**
- **To last value 20**
- **In steps of 1**
- **List each value 1 times**
- **List whole sequence 1 times**
- **OK**



2. Binomial Probabilities will be listed in Column C2 as follows:

Choose:

- **Calc → Prob dist → Binomial**
- **Select: Probability**
- **Enter: Number of trials: 20**
- **Probability: 0.25**
- **Input Column: C1**
- **Optional storage: C2**
- **OK**

**Binomial Distribution**

C1

**Probability**

**Cumulative probability**

**Inverse cumulative probability**

**Number of trials:** 20

**Probability of success:** 0.25

**Input column:** C1

**Optional storage:** C2

**Input constant:**

**Optional storage:**

Select

Help

OK

Cancel

3. Cumulative Binomial Probabilities will be listed in C3.

Choose:

- **Calc → Prob dist → Binomial**
- **Select: Cumulative Probability**
- **Enter : number of trials: 20**
- **Probability: 0.25**
- **Input Column C1**
- **Optional storage C3**
- **OK**
- **Print**

**Binomial Distribution**

C1

Probability

Cumulative probability

Inverse cumulative probability

Number of trials: 20

Probability of success: 0.25

Input column: C1

Optional storage: C3

Input constant:

Optional storage:

Select

Help

OK

Cancel

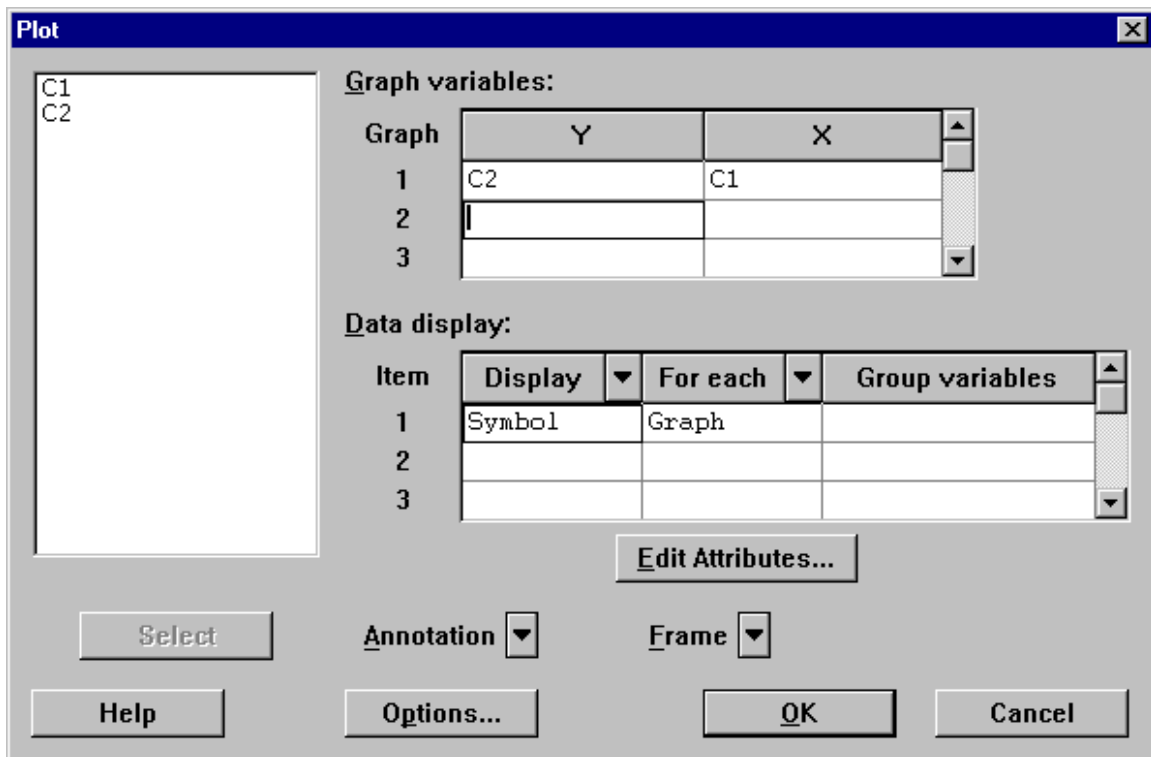
Use the **printouts** to answer the following questions:

1. What is the probability of getting exactly 10 questions correctly?
2. What is the probability of getting at most 10 questions correctly?
3. What is the probability of getting at least 2 questions correctly?
4. What is the probability of getting all 20 questions correctly?
5. What is the probability of getting all 20 questions incorrectly?

4. Graph the probability density function:

Go to :

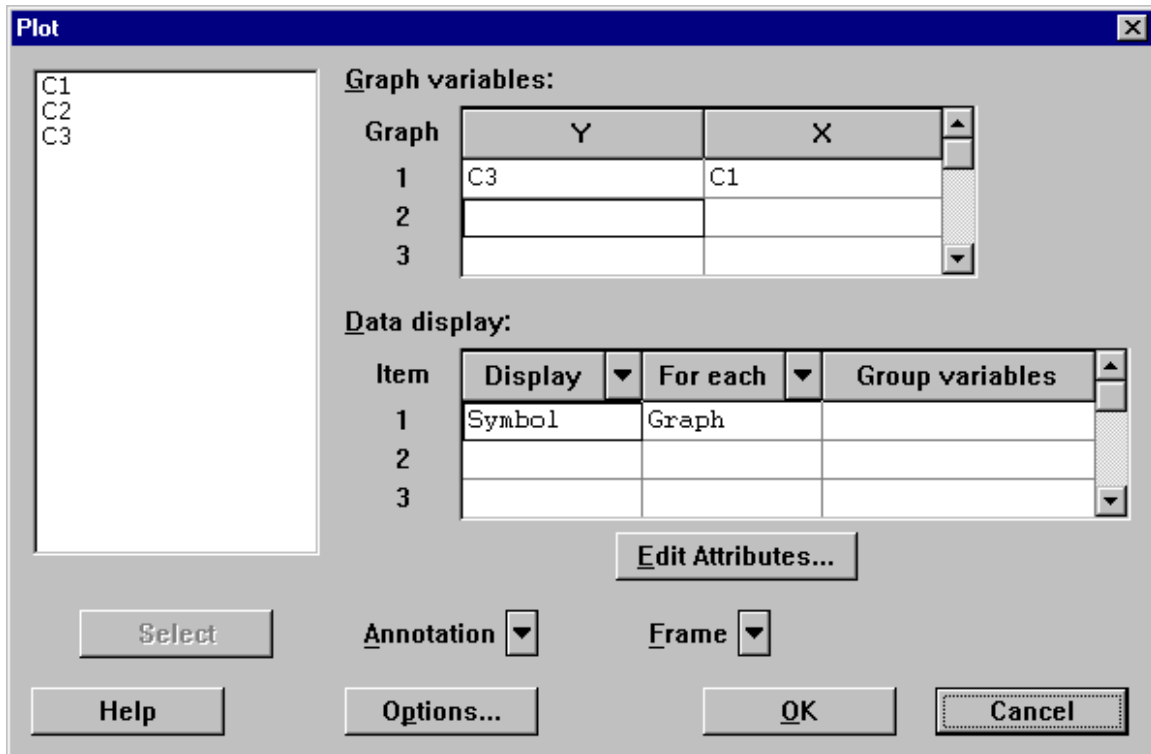
- **Graph → ScatterPlot**
- **Click on Simple then OK**
- **Under Y Enter C2 and Under X Enter C1**
- **Click OK**
- **Print Graph**



5. Graph the cumulative probability density function

Go to:

- **Graph→ ScatterPlot**
- **Click on Simple then OK**
- **Under Y Enter C3 and Under X Enter C1**
- **Click OK**
- **Print Graph**



6. Look at the cumulative probability distribution graph and make a conclusion about the probabilities (When do you think the cumulative probability reaches 1? Does it make sense?)