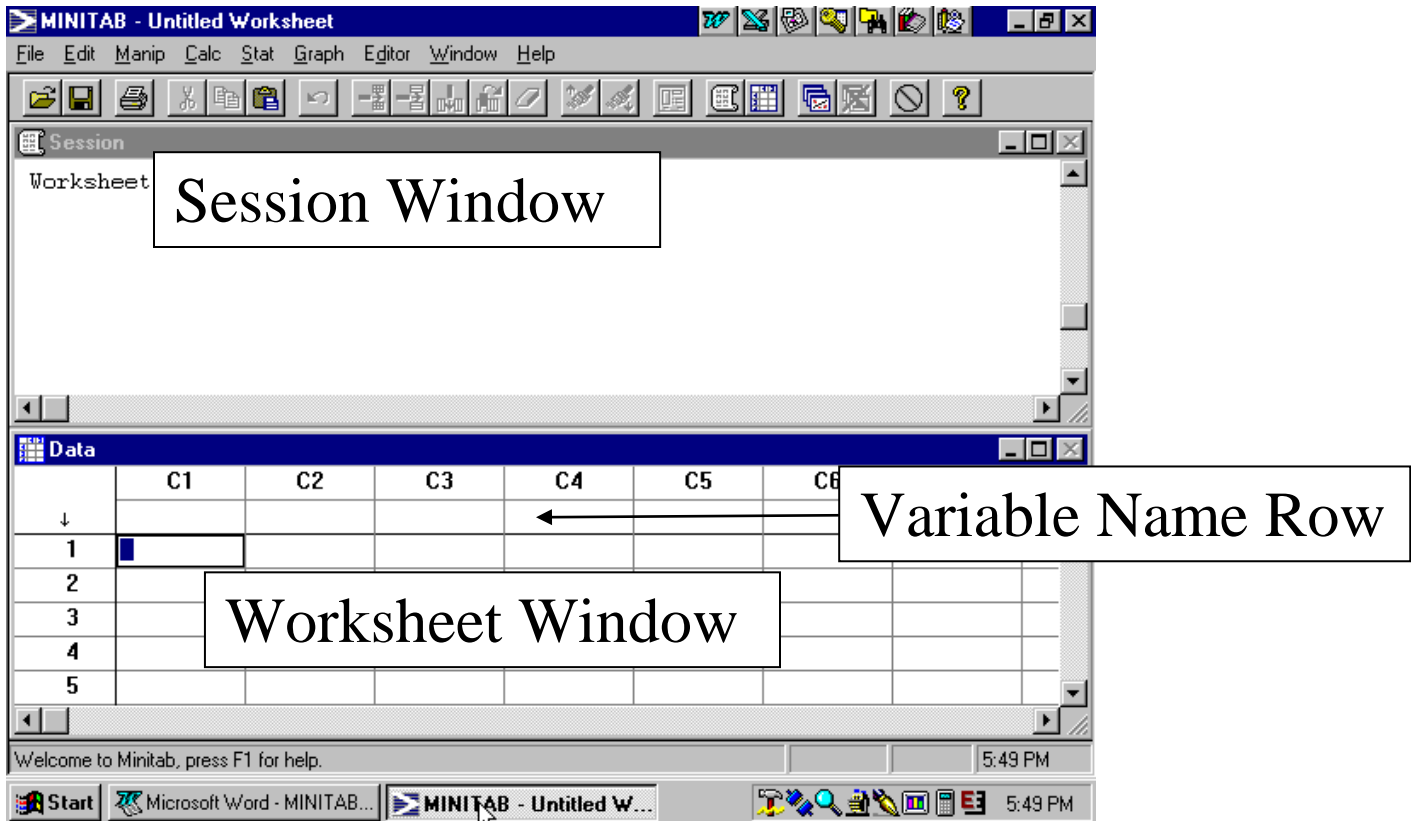


Getting Started with MINITAB

STARTING MINITAB:

Double click on MINITAB icon. You will see a split screen:



ACTIVE WINDOW = BLUE
INACTIVE WINDOW = GRAY

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Lesson 1: PROBABILITY DISTRIBUTION OF A RANDOM VARIABLE can be characterized by either one of the following functions:

Probability density function (pdf) of a **discrete random variable** (takes integer values)

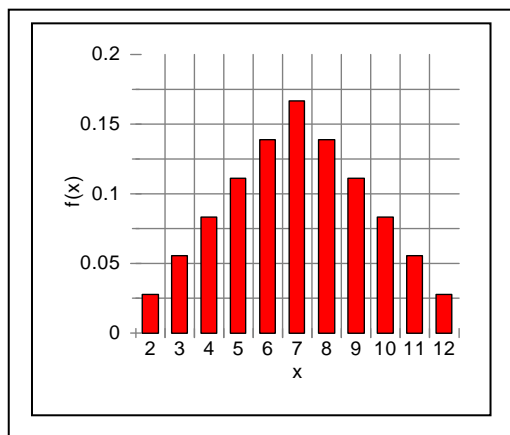
$f(x) = P(X=x)$ = probability that the random variable X takes value x = probability at the point x

Cumulative distribution function (cdf) of a **discrete random variable** (takes integer values)

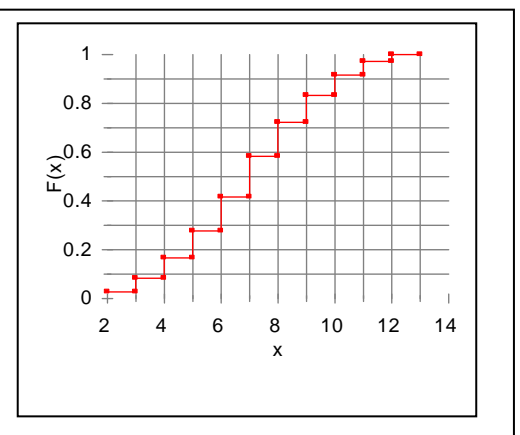
$F(x) = P(X \leq x)$ = cumulative probability upto and including the value x

EXAMPLE 1: In a game, two fair dice are rolled. Let random variable X = sum on both faces. The pdf and the cdf of X are shown below:

x	$f(x)$
2	1/36
3	2/36
4	3/36
5	4/36
6	5/36
7	6/36
8	5/36
9	4/36
10	3/36
11	2/36
12	1/36



$f(x) = P(X=x)$



$F(x) = P(X \leq x)$

TABLE LOOK-UP for the above example:

1) looking up cumulative distribution function: given x , find $F(x)$.

- (a) For the above distribution, find cdf at $x = 7$: $F(7) = 21/36$
- (b) For the above distribution, find cdf at $x = 9$: $F(9) = 30/36$

2) looking up inverse cumulative distribution function: given $F(x)$, find the value of x .

- (a) Find the inverse cdf at probability $15/36$: the value of x at which $F(x) = 15/36$ is 6.
- (b) Find the inverse cdf at probability $26/36$: the value of x at which $F(x) = 26/36$ is 8.

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PROBABILITY TABLE LOOK-UP IN MINITAB

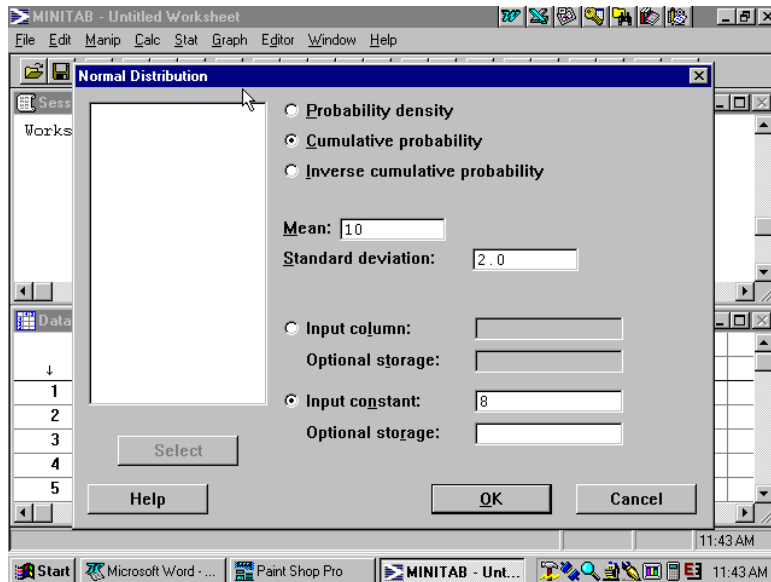
USE THE FOLLOWING SEQUENCE:

- (1) Calc/Probability Distributions/NORMAL or BINOMIAL or POISSON
- (2) To find the probability corresponding to an argument (i.e., you need to look-up the cdf), click on the CIRCLE CUMULATIVE PROBABILITY.
- To find the argument corresponding to a given probability, click on the CIRCLE INVERSE CUMULATIVE PROBABILITY.
- (3) Enter the INPUT parameters of the distribution, click on the circle INPUT CONSTANT, ignore storage. Click on OK.

EXAMPLE 2: For a $N(10, sd=2)$, find $P(X < 8)$.

CLICK on the sequence

Calc/Probability Distributions/NORMAL/Cumulative probability
enter mean (=10), standard deviation (=2) of the normal distribution
enter INPUT CONSTANT (=8), then click on OK.



This will produce (in the SESSION WINDOW) the following:

Cumulative Distribution Function

Normal with mean = 10.0000 and standard deviation = 2.00000

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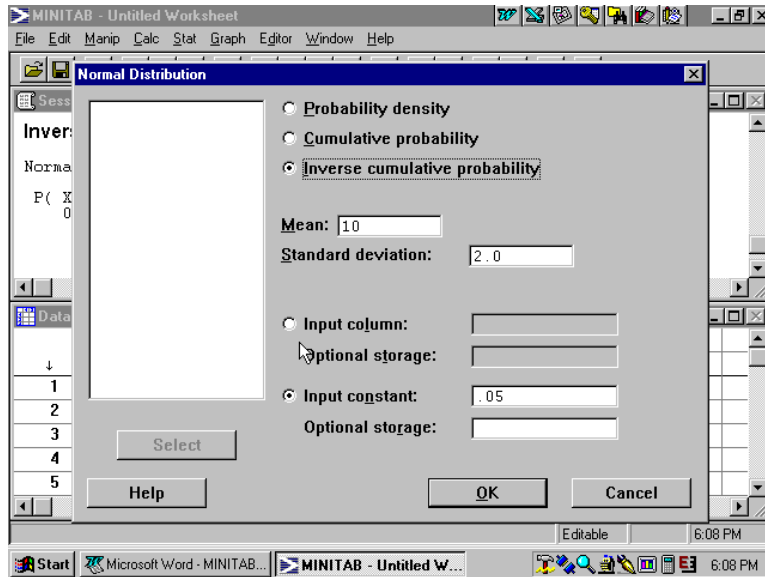
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x	$P(X \leq x)$
8.0000	0.1587

EXAMPLE 3: For a $N(10, sd=2)$, find c such that $P(X < c) = 0.05$.

CLICK on the sequence

Calc/Probability Distributions/NORMAL/Inverse cumulative probability
enter mean (=10), standard deviation (=2) of the normal distribution
enter INPUT CONSTANT (=8), then click on OK.



OUTPUT is -

Inverse Cumulative Distribution Function

Normal with mean = 10.0000 and standard deviation = 2.00000

$P(X \leq x)$	x
0.0500	6.7103

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EXAMPLE 4:

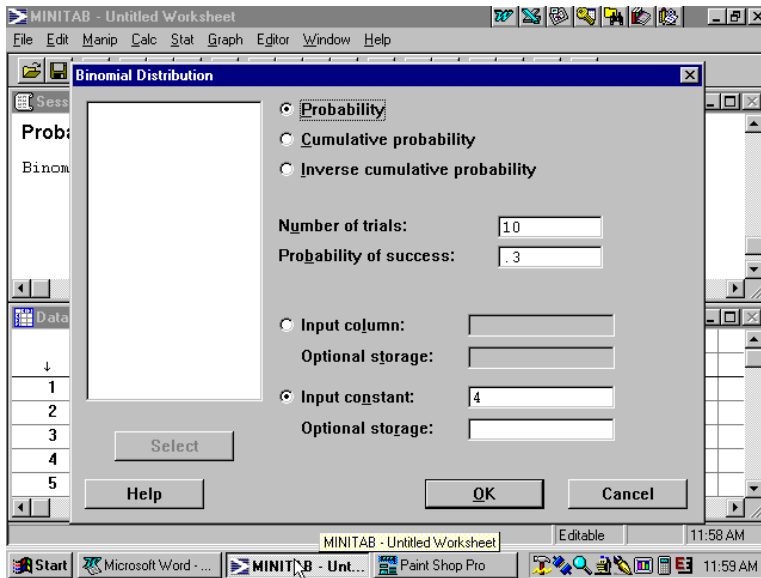
To find: $P(X=4)$ for a binomial $BIN(n=10, p=0.3)$:

CLICK on the sequence

Calc/Probability Distributions/Binomial/probability

Enter number of trials (=10), probability of success (=0.3) of the binomial distribution

enter INPUT CONSTANT (=4), then click on OK.



Probability Density Function

Binomial with $n = 10$ and $p = 0.300000$

x	$P(X = x)$
4.00	0.2001

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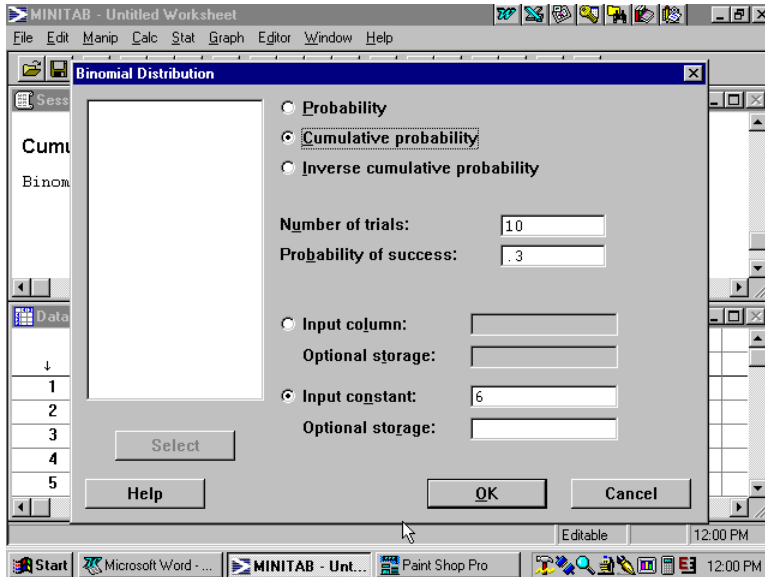
EXAMPLE 5: For the binomial distribution $BIN(n=10, p=0.3)$, find $P(X \leq 6)$.

CLICK on the sequence

Calc/Probability Distributions/Binomial/cumulative probability

enter number of trials (=10), probability of success (=0.3) of the binomial distribution

enter INPUT CONSTANT (=6), then click on OK.



OUTPUT:

Cumulative Distribution Function

Binomial with $n = 10$ and $p = 0.300000$

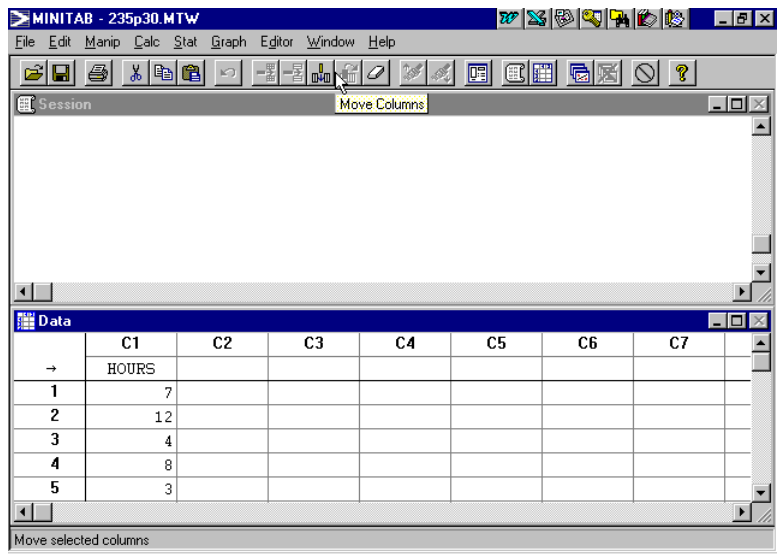
x	P(X <= x)
6.00	0.9894

Getting Started with MINITAB
LESSON 2: SUMMARIZATION OF DATA

Hours
7
12
4
8
3
6
10
10
1
12
12
3
8
4
10
5
11
2
3
10
5
6
5
9
9
7
11
5
3
6
1
8
4
7
2
7
2
3
11
6
1
11
5
5
2

Example 6: The hours spent studying for a final examination for a random sample of 45 students is given on the left. We will summarize the data graphically and also by calculating descriptive measures.

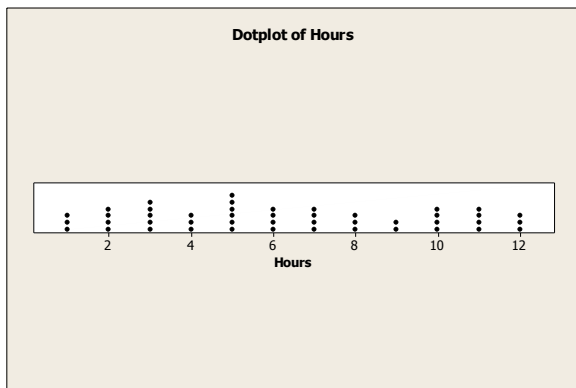
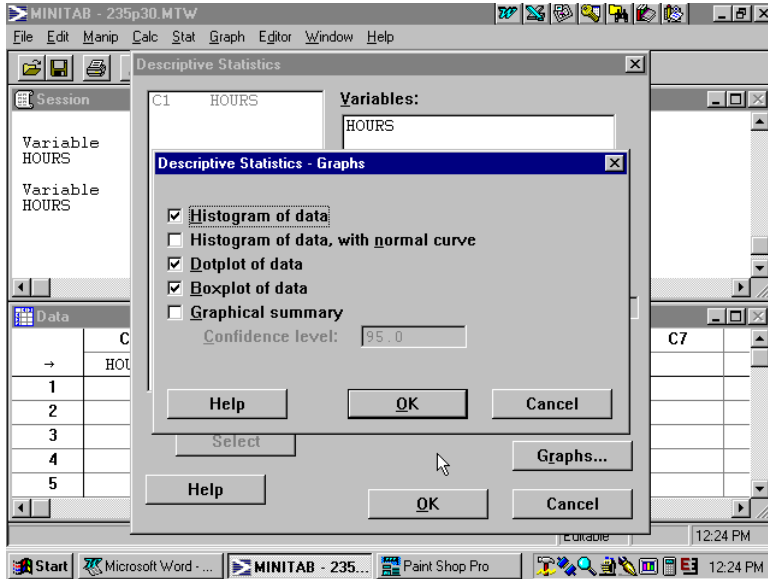
STEP 1: Type data in the DATA window - each variable gets its own column. You can type a variable name under column heading.



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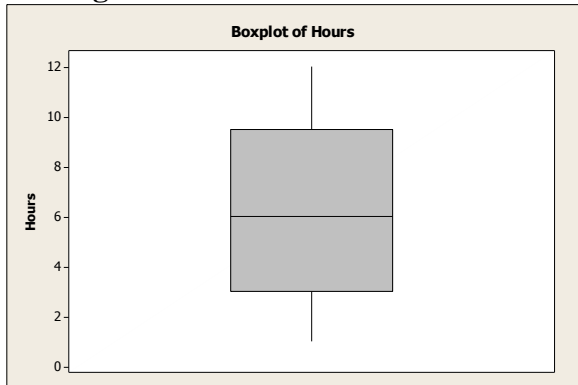
GRAPHICAL DISPLAY OF DATA

STAT/Basic Statistics/Descriptive Statistics then click on **GRAPHS**, and select **Histogram**, **Dotplot**, and **Boxplot** (as shown below):

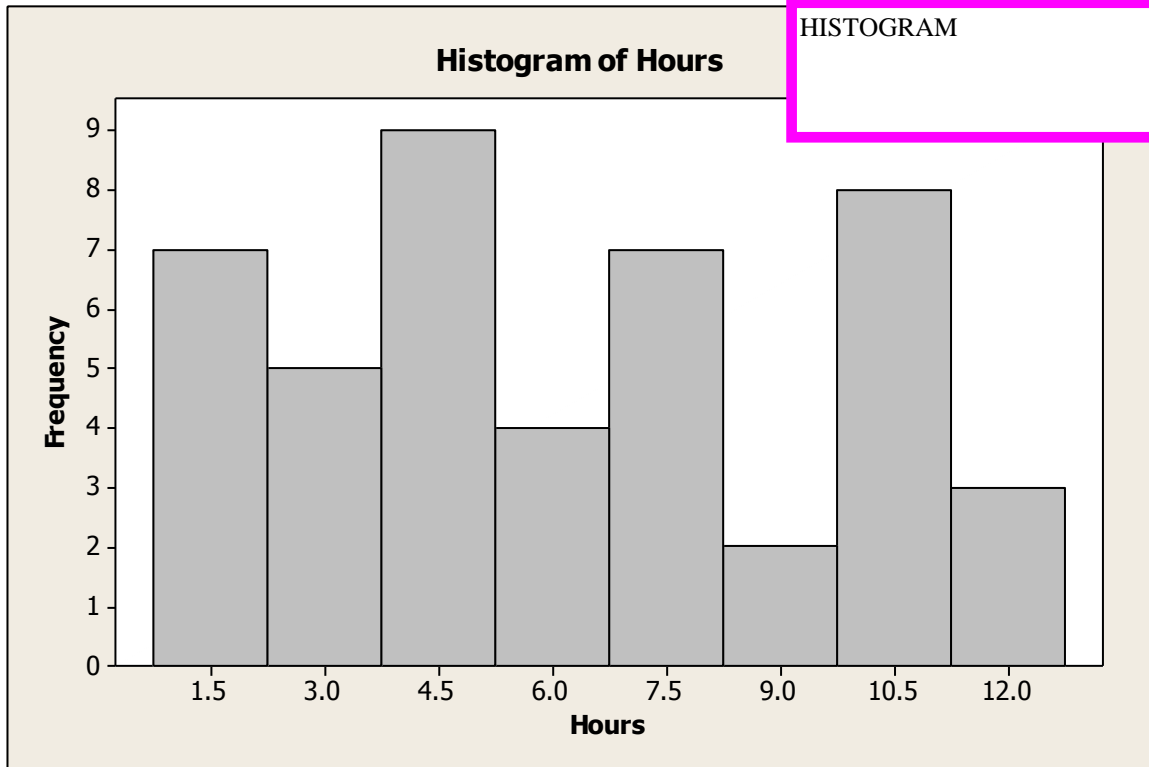


DOT PLOT

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BOX PLOT



HISTOGRAM

NOTE: The sample histogram is an estimate of the probability distribution of the random variable observed. For example, from the above histogram, we can see that:

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$$P(1 \leq X \leq 2) = \frac{7}{45}$$

$$P(4 \leq X \leq 5) = \frac{9}{45}$$

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Computing Descriptive Statistics for data of Example 6.

**STEP 2: Use
STAT/Basic Statistics/Descriptive Statistics
to compute summary stats.**

OUTPUT is

Descriptive Statistics: Hours

Variable	N	N*	Mean	StDev	Variance	Minimum	Q1	Median	Q3	Maximum
Hours	45	0	6.267	3.387	11.473	1	3	6	9.5	12