

## CH 6: THE NORMAL DISTRIBUTION

Probabilities for Normal Distributions are calculated in Minitab using the function **Calc** → **Probability Distributions** → **Normal**

- The **Probability density** choice returns the y value for a given x value for the normal probability function.
- The **Cumulative probability** choice returns the area under the normal curve from the left up to the given point k:  $A(x < k)$
- The **Inverse cumulative probability** finds the value of x for which the cumulative probability is known.
- When one has the mean and standard deviation of a Normal Distribution, Minitab will perform the appropriate transformation to the Standard Normal Distribution.
- If **Input column** is selected, then all elements of that column will be evaluated.
- If we have a single value, then the **Input constant** option should be selected (most common occurrence)

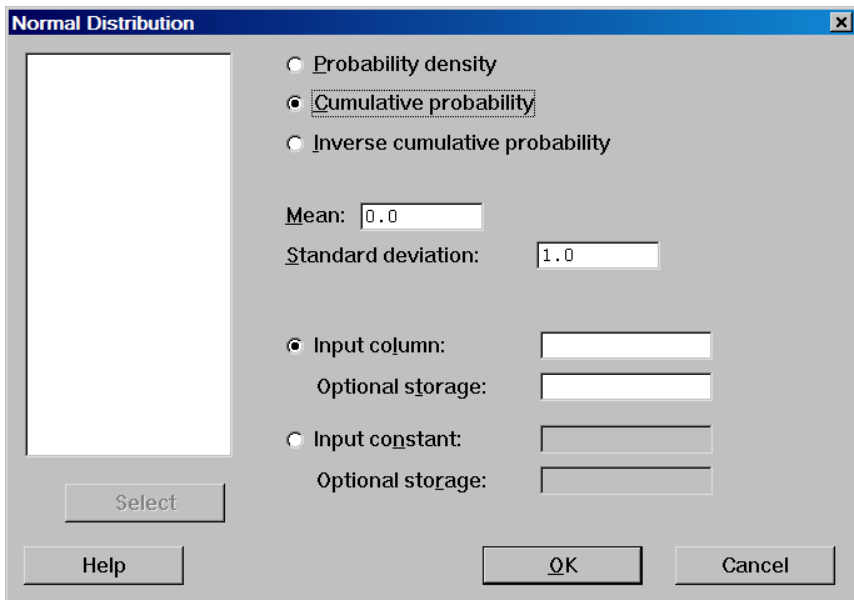


Figure 6.1

Example: Calculate the probability  $P(x < 5)$  when  $\sigma = 2.1$  and  $\mu = 4.2$

Select **Cumulative Probability**, Enter 4.2 in the box for the **Mean**, 2.1 in the box for the **Standard Deviation**, check **Input constant** and enter 5. Click OK. Output is shown below

### Cumulative Distribution Function

Normal with mean = 4.2 and standard deviation = 2.1

x	P( X <= x )
5	0.648381

One can **Check for Normality** for a data set by using the function:

**Stat** → **Basic Statistics** → **Graphical Summary** and then calculate the Pearson's Index of Skewness using the Calculator function. The output of the Graphical Summary for the Temperatures data in Example E-C01-S02-01 is shown below.

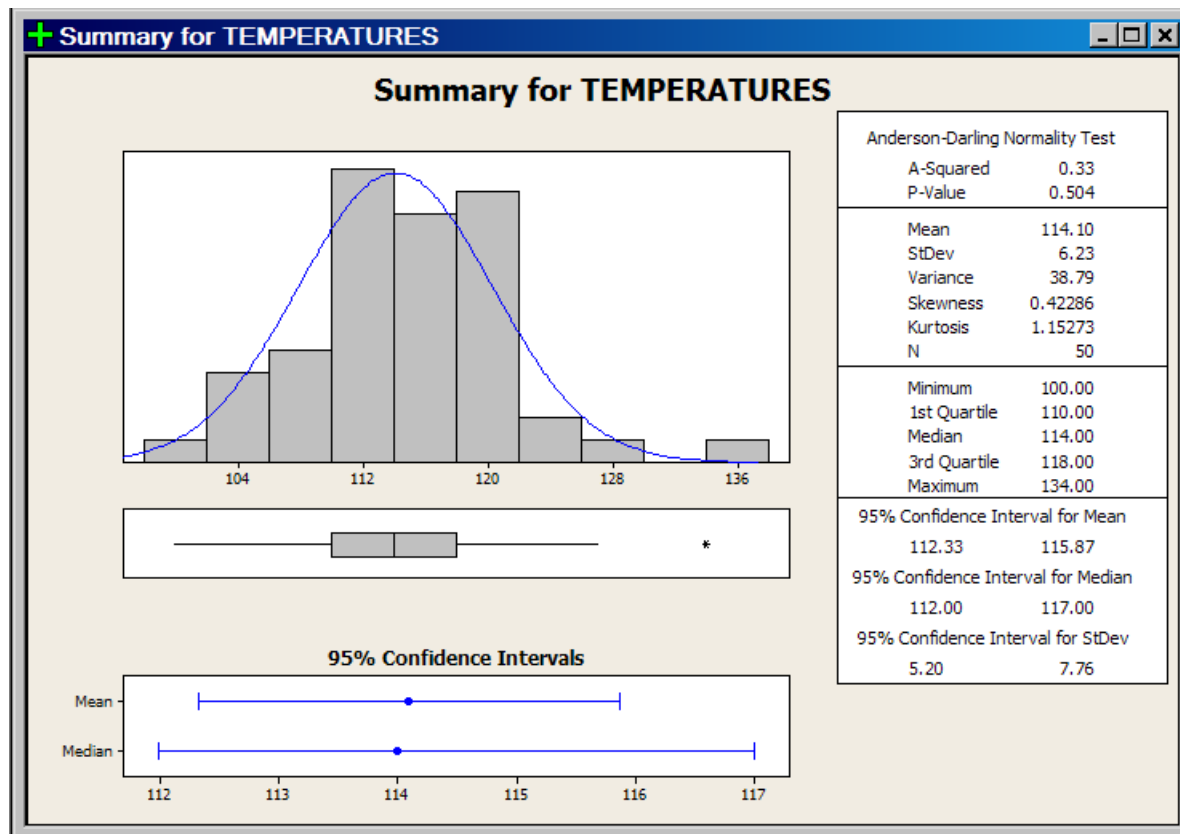


Figure 6.2