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](image)

Example: Calculate the probability P(x < 5) when σ = 2.1 and μ = 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

<table>
<thead>
<tr>
<th>x</th>
<th>P(X &lt;= x)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>0.648381</td>
</tr>
</tbody>
</table>

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