## <u>SPSS Chapter 1 Example 4 – Normal Distribution Probability Calculations</u>

The Wechsler Intelligence Scale for Children (WISC) is normally distributed with  $\mu = 100$  and  $\sigma = 15$ . We would like to know what score will place a child in the top 5% of the population, as well as the score that will place a child in the top 1% Two variables have been created (i.e., x1 and x2). The data have been entered into SPSS and look like the following:

📰 P90 - SPSS Data Editor 📃 🗖									
<u>File Edit View Data Transform Statistics Graphs U</u> tilities <u>W</u> indow <u>H</u> elp									
<mark>≥∎⊴</mark> ¤ ∽ <u>⊾ № # 4∎≣ ⊒⊈≣ ∛</u> ⊘									
1:x1		100					-		
	x1	x2	var	ısv	var	var	]		
1	100	80							
2									
3									
4									
5									
6							┏		
SPSS Processor is ready									

Follow these steps to perform these computations:

1. Click **Transform** and click **Compute**. The following window will appear.

📲 Compute Variable		×
Target Variable: Type&Label	Numeric <u>E</u> xpression:	*
	+ > 7 8 9 Eunctions: ▲   - <=	•
	<u>I</u> f OK <u>P</u> aste <u>R</u> eset Cancel Help	

- 2. Type "score" in the box entitled *Target Variable*.
- 3. In the box entitled *Functions*, click the vert button until the function entitled *IDF.NORMAL(p, mean, stddev)* appears in the box. Double click on **IDF.NORMAL(p, mean, stddev)** to move this function into the box entitled *Numeric Expression*.

Note: The IDF.NORMAL(p, mean, stddev) function stands for the inverse of the cumulative distribution function for the normal distribution, and it calculates the X value such that the area to the left of X under the normal curve is p.

The IDF.NORMAL(p, mean, stddev) function will appear as *IDF.NORMAL(?, ?, ?)* in the *Numeric Expression* box. The variable "x1" replaces the p, and the population mean and standard deviation are 100 and 15, respectively. Thus the Numeric Expression should appear as "IDF.NORMAL(x1, 100, 15)".



5. Click OK.

The WISC score necessary for a child to place in the top 5% of the population will appear in the SPSS Data Editor window in the variable entitled *score*:

🛗 P90 - SPSS Data Editor 📃 🗖 🛛								
<u>File E</u> dit <u>V</u> iew <u>D</u> ata <u>T</u> ransform <u>S</u> tatistics <u>G</u> raphs <u>U</u> tilities <u>W</u> indow <u>H</u> elp								
<u>≥∎⊜</u> <u>⊳</u> <u>⊾ </u> <u>∧</u> <u>⊀</u> <u>∔</u> <u>⊳</u> <u>⊳</u> <u>⊳</u>								
1:x2		.99						
	x1	x2	score	var	var	var		
1	.95	.99	124.67					
2								
3								
4								
5								
6							•	
┖						•		
SPSS Processor is ready								

To answer the remaining question, repeat steps 1-5, but with the following modification:

The WISC score necessary for a child to place in the top 1% of the population will be entered in the *Numeric Expression* box as "**IDF.NORMAL(x2, 100, 15)**". (Remember that x2=0.99.)

The answer will always appear in the SPSS Data Editor window in the variable entitled *score*.