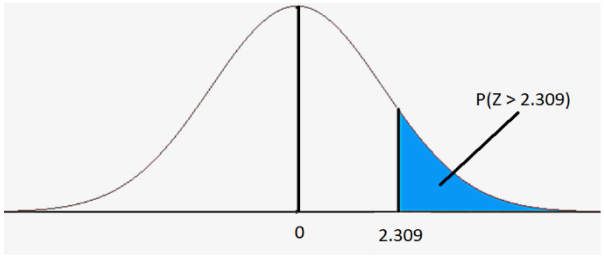
12 APPENDICES

12.1 APPENDIX 1: CALCULATING STANDARD NORMAL PROBABILITIES IN EXCEL

In statistics, we often need to calculate probabilities from a standard normal distribution. For example, in the hypothesis testing example in chapter 8, we had to calculate P(z > 2.309).



Such standard normal probabilities can easily be calculated using the NORM.DIST() function in Excel as follows:

P(Z < 2.309)	= NORM.DIST(2.309,0,1,TRUE) =	0.9895
which implies,	P(Z >2.309) = 1 - 0.9895 =	0.0105

Alternatively, one could use the old-fashioned way to get an approximate value using a Z-score table. We present a subsection of a right-tailed Z score table below.

To get the value of P(Z>2.309) approximated to P(Z>2.31), one should first look vertically to find 2.3, and then look horizontally for the second decimal:

Standard Normal Distribution Table (Right-Tail Probabilities)

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
1.8	.0359	.0351	.0344	.0336	.0329	.0322	.0314	.0307	.0301	.0294
1.9	.0287	.0281	.0274	.0268	.0262	.0256	.0250	.0244	.0239	.0233
2.0	.0228	.0222	.0217	.0212	.0207	.0202	.0197	.0192	.0188	.0183
2.1	.0179	.0174	.0170	.0166	.0162	.0158	.0154	.0150	.0146	.0143
2.2	.0139	.0136	.0132	.0129	.0125	.0122	.0119	.0116	.0113	.0110
2.3	.0107	.0104	.0102	.0099	.0096	.0094	.0091	.0089	.0087	.0084
2.4	.0082	.0080	.0078	.0075	.0073	.0071	.0069	.0068	.0066	.0064
2.5	.0062	.0060	.0059	.0057	.0055	.0054	.0052	.0051	.0049	.0048

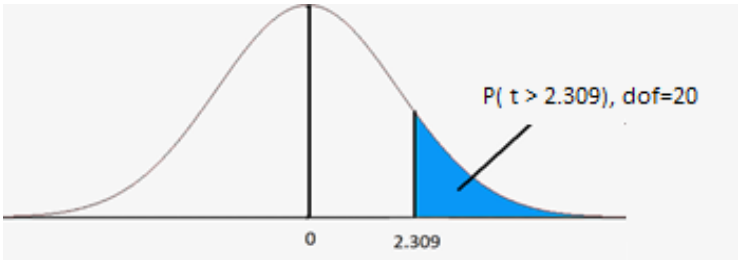
Recall that any normally distributed variable can be transformed into a standard normal variate by subtracting its mean from the variate and then dividing it by its standard deviation. Thus, we can use the above methods for calculating probabilities for any normally distributed variable.

12.2 Appendix 2: Calculating T- Distribution probabilities in Excel

In addition to the standard normal, the t-distribution is another popular distribution which is often encountered in statistics.

The t-distribution is also a symmetric distribution like the normal distribution, and there are in-built functions available to calculate associated probabilities in almost all packages, including Excel.

For example, suppose if 't' is a random variable following the t-distribution with 20 degrees of freedom, and we need to find the probability that t is greater than 2.309 as highlighted in the diagram below:



We can find this probability value using the T.DIST() function in Excel as follows:

P(t < 2.309)	=	T.DIST(2.309, 20, TRUE)	=	0.9841
which implies,		P(t >2.309)	= 1 - 0.98413 =	0.0159

Alternatively, one could use the old-fashioned way to get an approximate value using a t-score table which lists the variable values against values for degrees of freedoms.