Integrating $sinc^2(x)$ function from 0 to some number p

1.0 From Haykin S. (Communications Systems, 4^{th} Edition):

$Sinc(x) = 1-1/6(\pi x)^2 + 1/120(\pi x)^4\ldots$ (1)

2.0 From the Web:

(2) $\int Sinc^2(x)dx = ½(\pi)= 1.57$ (From o to infinity)

3.0 Squaring (1) we get:

$$0.656x^8-2.66x^6+4.3x^4-3.3x^2+1 \quad (3)$$

4.0 Integrating (3) from 0 to πfT where f is the frequency and T is the time period of the PRBS waveform we get:

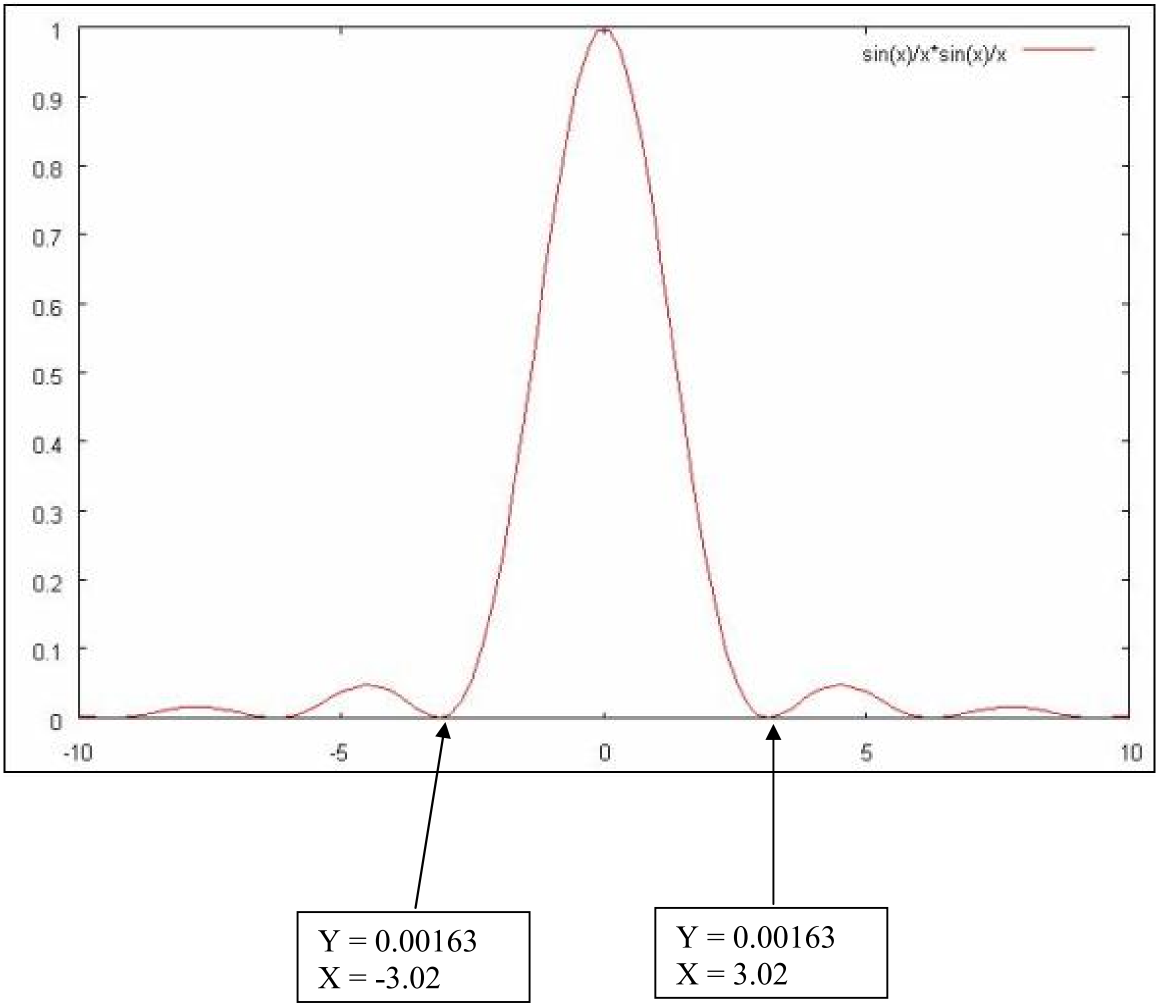
$$0.073x^9-0.38x^7+0.86x^5-1.1x^3+x \quad (4)$$

5.0 Evaluating the polynomial above for x = 0.12. Frequency = 100 Mhz, T = 400ps we get:

Power over 0 to 0.125 = 0.125 approximately

By substituting the value of x = 0.125. For low values of x the power over the band is 1 X x = area. That is why the value of power is close to x.

The first null for the $sinc^2x$ function occurs at: Please refer to Figure 1.0 below:



In the above figure the x values shown should be normalized to π and then the series representations above can be used. Thus it will be seen that when x = 3.02 is normalized by π, the series representation of $\sin^2 x$ will prove quite accurate. (Depends on the number of terms the user takes into account).
I.e at x=3.02/π the y = 0.001 approximately. The figure above shows that the first null occurs at a nomalized x value of 0.96π).