Relative and Percentage errors of Numbers.

The difference between the exact value of a number X and its approximate value X_1, obtained by rounding off or truncation, is known as absolute error.

The quantity $\dfrac{X - X_1}{X}$ is called the relative error and is denoted by E_R.

Thus $E_R = \dfrac{X - X_1}{X} = \dfrac{\Delta X}{X}$. This is a dimensionless quantity.

The quantity $\dfrac{\Delta X}{X} \times 100$ is known as percentage error and is denoted by E_p, i.e. $E_p = \dfrac{\Delta X}{X} \times 100$.

Remark 1: If a number is rounded off to n decimal digits, then $|E_R| < 0.5 \times 10^{-n+1}$

Remark 2: If a number is truncated to n decimal places, then $|E_R| < 10^{-n+1}$