



Repeated Measurements of a Single Quantity

- When a single quantity is measured several times or when a series of quantities is measured, random errors tend to accumulate in proportion to the square root of the number of measurements.
- > This is called the *law of compensation*:

$$E_{Total} = \pm E \sqrt{n}$$
 $\pm E = \frac{E_{Total}}{\sqrt{n}}$

Introduction to Measurements

Repeated Measurements of a Single Quantity

If a distance is measured 9 time and the estimated error in each measurement is ± 0.05 ft., what is the estimate of the total error?

$$E_{Total} = \pm E \sqrt{n}$$
$$E_{Total} = \pm 0.05 ft \sqrt{9} = \pm 0.15 \text{ ft.}$$
$$= \pm 0.2 \text{ ft.}$$



















