Absolute Error:

Absolute error is simply the amount of physical error in a measurement.

$$E_{absolute} = | x_{measured} - x_{accepted} |$$

If you need to calculate it, then it is ALWAYS half of what the measurement was measured to.

For example, if you measured a side of a rectangle to be 12 cm, then the AE would ± 0.5 since it is measured to the nearest 1 cm and half of one is 0.5.

If you measured a side of a rectangle to be 12.35 ft, then the AE would be ± 0.005 since it is measured to the nearest 0.01 and half of 0.01 is 0.005.

Relative Error:

Relative error is the ratio of the absolute error of the measurement to the accepted measurement. The relative error expresses the "relative size of the error" of the measurement in relation to the measurement itself.

$$\text{Relative Error} = \frac{|\text{measured value - actual value}|}{\text{actual value}}$$

Percent of Error:

Error in measurement may also be expressed as a **percent of error.** The percent of error is found by multiplying the relative error by 100%.

$$\text{Percent of Error} = \frac{|\text{measured value - actual value}|}{\text{actual value}} \cdot 100\%$$

1. Acme Manufacturing co. is making a jewelry box. What is the least amount of cardboard needed to make the box (assume no overlap), with the dimensions of 18cm x 30cm x 6cm?

2. Bobby estimates that they will need 1800 cm^2 of cardboard. Calculate the relative error of Bobby's estimate to the *nearest tenth*.

3. Skeeter, the dog, weighs exactly 36.5 pounds. When weighed on a defective scale, he weighed 38 pounds. What is the percent of error in measurement of the defective scale to the nearest tenth?

4. The actual length of a field is 500 feet. A measuring instrument shows the length to be 508 feet.
   a.) Find the absolute error in the measured length
   b.) Find the relative error in the measured length
   c.) Find the percentage error in the measured length

5. Find the absolute error, relative error and percent of error of the approximation 3.14 to the value of pi, using a scientific calculator as the actual value.