



Name _____ Date _____

Precision and Significant Digits

(Pages 504–507)

The **precision** of a measurement depends on the unit of measure being used. The digits you record when you measure are **significant** digits. These digits indicate the precision of the measurement. The **greatest possible error** in a measurement is half of the smallest unit used to make the measurement. The relative error uses division to compare the greatest possible error to the measurement itself.

Relative Error	The relative error of a measurement is found by dividing the greatest possible error by the measurement itself. $\text{relative error} = \frac{\text{greatest possible error}}{\text{measurement}}$
-----------------------	---

EXAMPLE

With a ruler that measures in 0.1 cm increments, Lloyd finds that a pencil is 12.8 cm long. Analyze this measurement.

precision: 0.1 cm

(The measurement is to the nearest 0.1 centimeters.)

significant digits: 3

(same as the number of digits in the measurement)

greatest possible error: 0.05 cm

(half the smallest unit used to make the measurement)

relative error: $\frac{0.05}{12.8}$ or about 0.004

(Greatest possible error divided by the measurement itself.)

PRACTICE

Analyze each measurement. Give the precision, significant digits, greatest possible error, and relative error to two significant digits.

1. 2 in. 2. 35.4 cm 3. 0.046 oz 4. 39.5 lb

5. Which, if either, would be the more precise measurement for a bag of flour: 1 kilogram or 966 gram?

6. Which, if either, would be the more precise measurement for the height of a child: 46 inches or 4 feet?



7. **Standardized Test Practice** Television ratings are based on the number of viewers. A game show had 31.6 million viewers in one evening. How many significant digits are used in the number and what is the greatest possible error?

A 1; 1,000,000

B 3; 5,000,000

C 3; 500,000

D 3; 50,000

Answers: 1. 1 in.; 1, 0.5 in.; 0.25 2. 0.1 cm; 3; 0.05 cm; 0.0014 3. 0.001 oz; 2; 0.0005 oz; 0.014 4. 0.1 lb; 3; 0.05 lb; 0.0013 5. 966 g 6. 46 in. 7. D