3-7 Relative Error and Percent Change

We will need five groups of people to measure the distance across the classroom to the nearest inch.

Measurer	Measured Distance	Difference from Actual	**Relative Error**	

Actual Distance Across the Room: _____

What about this one? I asked a group of seventh graders to measure the length of a pen to the nearest inch. Here's what they came up with...

Measurer	Measured Length	Difference from Actual	**Relative Error**	
Jaime	4 in			
Bethany	7 in			
George	5 in			
Buster	4 in			
Kenny	9 in			

Actual Length of the Pen: _____

Relative Error
$$\frac{\text{Difference from Actual}}{\text{Actual}}$$

Percent Error/Change
$$\frac{\text{Difference from Actual}}{\text{Actual (Original)}} \bullet 100$$

Some Examples in Some Different Contexts...

1. Ryan estimates the measurement of the volume of a popcorn container to be 282 cubic inches. The actual volume of the container is 289 cubic inches. What is the relative error of Ryan's measurement to the *nearest thousandth?*

2. American Eagle placed a rack of sweaters on sale for a week during the summer. The original price a sweater was $20. The sale price was $15. Determine the percent of change to the *nearest percent.*

3. Physical therapists measure strength on a dynamometer, which uses a unit called a foot-pound. Suppose you increase the strength in your elbow joint from 90-foot-pounds to 125-foot-pounds. Find the percent of increase to the *nearest percent.*

4. Sarah measures her rectangular bedroom window for a new shade. Her measurements are 36 inches by 42 inches. The actual measurements of the window are 36.5 inches and 42.5 inches.

a) Using the measurements that Sarah took, determine the number of square inches in the area of the window.

b) Determine the number of square inches in the actual area of the window.

c) Determine the relative error in calculating the area. Express your answer as a decimal to the *nearest thousandth.*

Practice 3-7   Name _____
Actual height of a student's desk <u>28 inches.</u>

1. Find the **Relative Error** the *nearest hundredth.*

A) Timmy measured the height to be 26 in.	B) Dorothy measured the height to be 33 in.

2. Find the **Percent Error** to the *nearest percent.*

A) Timmy measured the height to be 26 in.	B) Dorothy measured the height to be 33 in.

3. Jack wants to replace the flooring in his rectangular kitchen. He calculates the area of the floor to be 12.8 square meters. The actual area of the floor is 13.5 square meters. What is the relative error in calculating the area of the floor, to the *nearest thousandth*?

4. A student calculated the volume of the cassette to be 125 cm³.
The actual measurements are shown in the picture below.

a) Calculate the volume of the cassette. (Hint: the shape is a
                                    rectangular prism)

10.9 cm

6.8 cm

1.6 cm

b) What is the relative error in calculating the volume to the
nearest tenth?