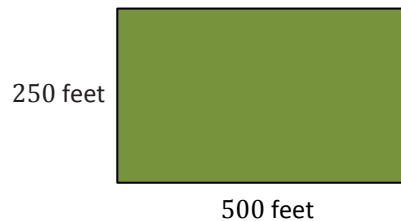


**Lesson Summary**

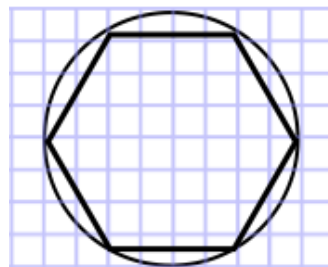
- The absolute error is defined as  $|a - x|$ , where  $x$  is the exact value of a quantity and  $a$  is an approximate value.
- The percent error is defined as  $\frac{|a - x|}{|x|} \times 100\%$ .
- The absolute error will tell how big the error is, but the percent error compares the error to the actual value. A good measurement has a small percent error.

**Problem Set**

1. The odometer in Mr. Washington's car does not work correctly. The odometer recorded 13.2 miles for his last trip to the hardware store, but he knows the distance traveled is 15 miles. What is the percent error? Use a calculator and the percent error formula to help find the answer. Show your steps.
2. The actual length of a soccer field is 500 feet. A measuring instrument shows the length to be 493 feet. The actual width of the field is 250 feet, but the recorded width is 246.5 feet. Answer the following questions based on this information. Round all decimals to the nearest tenth.
  - a. Find the percent error for the length of the soccer field.
  - b. Find the percent error of the area of the soccer field.
  - c. Explain why the values from parts (a) and (b) are different.

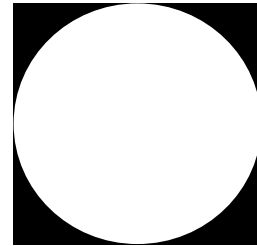


3. Kayla's class went on a field trip to an aquarium. One tank had 30 clown fish. She miscounted the total number of clown fish in the tank and recorded it as 24 fish. What is Kayla's percent error?
4. Sid used geometry software to draw a circle of radius 4 units on a grid. He estimated the area of the circle by counting the squares that were mostly inside the circle and got an answer of 52 square units.



- a. Is his estimate too large or too small?
- b. Find the percent error in Sid's estimation to the nearest hundredth using the  $\pi$  key on your calculator.

5. The exact value for the density of aluminum is  $2.699 \text{ g/cm}^3$ . Working in the science lab at school, Joseph finds the density of a piece of aluminum to be  $2.75 \text{ g/cm}^3$ . What is Joseph's percent error? (Round to the nearest hundredth.)
6. The world's largest marathon, The New York City Marathon, is held on the first Sunday in November each year. Between 2 million and 2.5 million spectators will line the streets to cheer on the marathon runners. At most, what is the percent error?
7. A circle is inscribed inside a square, which has a side length of 12.6 cm. Jared estimates the area of the circle to be about 80% of the area of the square and comes up with an estimate of  $127 \text{ cm}^2$ .
- Find the absolute error from Jared's estimate to two decimal places using the  $\pi$  key on your calculator.
  - Find the percent error of Jared's estimate to two decimal places using the  $\pi$  key on your calculator.
  - Do you think Jared's estimate was reasonable?
  - Would this method of computing the area of a circle always be too large?
8. In a school library, 52% of the books are paperback. If there are 2,658 books in the library, how many of them are not paperback to the nearest whole number?
9. Shaniqua has 25% less money than her older sister Jennifer. If Shaniqua has \$180, how much money does Jennifer have?
10. An item that was selling for \$1,102 is reduced to \$806. To the nearest whole, what is the percent decrease?
11. If 60 calories from fat is 75% of the total number of calories in a bag of chips, find the total number of calories in the bag of chips.



12.6 cm