Section 5.5 Fractions, Decimals, and the Volume of a Sphere

1. Converting Fractions to Decimals: To convert a fraction to a decimal, divide the numerator by the denominator. You must divide until the decimal terminates or repeats unless the instructions ask you to round to a given decimal place.

Example 1: Convert the given fraction to a decimal.

a. $\frac{7}{9}$

b. $\frac{5}{12}$

Example 2: Convert the given fraction to a decimal. Round to the nearest thousandth, if necessary.

a. $\frac{5}{7}$

b. $\frac{7}{64}$

2. Converting Decimals to Fractions: To convert a decimal to a fraction,

- Numerator of the fraction: Place the digits to the right of the decimal point.
- Denominator of the fraction: Write the place value named by the last digit in the decimal if the "ths' is left off.
- Reduce the fraction to lowest terms.

Example 3: Convert to a fraction in lowest terms.

a. 3.045

b. 2.125

3. Problems Containing Both Fractions and Decimals: To work problems that have both fractions and decimals, you may

- Change all of the decimals to fractions and simplify.
- Change the fractions to decimals, **if they make terminating decimals,** and then simplify. If the fractions do not make terminating decimals, don't use this technique.
- Try to divide out any common factors, and then simplify.

Common factors can be divided out even when one or both of the numbers are decimals.

Example 4 : $\frac{1}{5} \bullet (3.5) = \frac{1}{5} \bullet \frac{3.5}{1}$

$$= \frac{1}{5 \div 5} \bullet \frac{3.5 \div 5}{1}$$

$$= \frac{1}{1} \bullet \frac{0.7}{1}$$

$$= 0.7$$

Example 5: Simplify by dividing out common factors. Give an exact answer; that is, do not round.

a. $\frac{1}{6} \bullet 1.8$

b. $\frac{2}{3} \bullet 2.1$

c. $\left(\frac{4}{9}\right)(1.8)+\frac{5}{6}(2.4)$

Sometimes, there are no common factors to divide out or it is simply easier to convert the fractions to decimals and complete the arithmetic. As long as the fractions convert to terminating decimals, this technique will work well. However, if the problem contains fractions that convert to repeating decimals, then you will introduce error in the answer when you round that decimal in order to do the remaining calculations. These problems are best done by calculator where the calculator can carry 15 or more decimal places, minimizing the error in the answer.
Try these problems. If the problem contains a fraction that converts to a repeating decimal, use a calculator and round your answer to the nearest hundredth.

Example 6: Simplify.

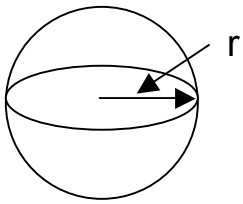
$$\frac{19}{20}(1.32+0.48)$$

Example 7: Simplify. Round your answer to the nearest hundredth.

$$\frac{2}{3}(1.4)+\frac{1}{2}(0.5)$$

4. Volume of a sphere: The volume of a sphere of radius r is given by

$$V = \frac{4}{3}\pi r^3$$



To solve these geometry problems, remember to write out the following steps:

- Write the formula,
- Plug in the known values using 3.14 for π, and
- Use your calculator to complete the calculations and write your answer with the correct units. Round to the nearest hundredth.

Example 8: Find the volume of a sphere of radius 17.859 feet

Practice Problems:

a. Convert the given fraction to a decimal. Do not round.

$$\frac{5}{18}$$

b. Convert the given fraction to a decimal. Round to the nearest hundredth.

$$\frac{5}{17}$$

c. Simplify. Give an exact answer. $\frac{1}{7} \bullet 1.4$

d. Simplify. Give an exact answer . $\frac{1}{2} + (0.75)\left(\frac{2}{5}\right)$

e. Simplify. Use a calculator and round your answer to the nearest hundredth. $\frac{3}{7}(4.1 - 3.3) + \frac{1}{2}(2.4)$

f. Find the volume of a sphere of diameter 23.45 yds.
(Hint: First find the radius of the sphere.)

Answers to Practice Problems:

a. $0.2\overline{7}$; b. 0.29; c. 0.2; d. 0.8; e. 1.54; f. 6748.5 yds^3

Note: Portions of this document are excerpted from the textbook *Prealgebra*, 7th ed. by Charles McKeague