

In exercises 1 - 5 odd, express each ratio as a fraction reduced to lowest terms.

1) 24 to 48

3) 48 to 20

5) 27 : 36

In a class, there are 20 men and 10 women. Find each ratio in exercises 7 and 9. First express the ratio as a fraction reduced to lowest terms. Then rewrite the ratio using the reduced fraction and a colon.

7) Find the ratio of the number of men to the number of women.

9) Find the ratio of the number of women to the number of students in the class.

Solve each proportion for x in exercises 11 - 25 odd.

11) $\frac{20}{x} = \frac{5}{3}$

13) $\frac{x}{3} = \frac{5}{2}$

$$15) \frac{x}{12} = -\frac{3}{4}$$

$$21) \frac{x+9}{5} = \frac{x-10}{11}$$

$$17) \frac{x-2}{12} = \frac{8}{3}$$

$$23) \frac{x}{a} = \frac{b}{c}$$

$$19) \frac{x}{7} = \frac{x+14}{5}$$

$$25) \frac{a+b}{c} = \frac{x}{d}$$

The bar graph on page 200 shows drinks that contain caffeine and the number of milligrams in each serving. In exercises 29 and 31, use the graph to find each ratio. First express the ratio as a fraction reduced to lowest terms. Then rewrite the ratio using the reduced fraction and a colon.

29) The number of milligrams of caffeine in a cup of strong coffee to that cup of weak coffee

31) The number of milligrams of caffeine in two glasses of cola to that in a cup of strong coffee

Use a proportion to solve each problem in exercises 33 - 41 odd.

33) The tax on a property with an assessed value of \$65,000 is \$720. Find the tax on a property with an assessed value of \$162,500, assuming the tax rate is the same.

35) St. Paul Island in Alaska has 12 fur seal rookeries (breeding places). In 1961, to estimate the fur seal pup population in the Gorbath rookery, 4963 fur seal pups were tagged in early August. In late August, a sample of 900 pups was observed and 218 of these were found to have been previously tagged. Estimate the total number of fur seal pups in this rookery.

37) In example 1 from the book, you saw that in a global village of 200 people, 28 suffered from malnutrition. How many people of the world's 6.5 billion people (population of Earth in 2006) suffer from malnutrition? Round to the nearest tenth of a billion.

39) Height is proportional to foot length. A person whose foot length is 10 inches is 67 inches tall. In 1951, photos of large footprints were made by the "Abominable Snowman." Each footprint was 23 inches long. If indeed they belonged to the Abominable Snowman, how tall is the critter?

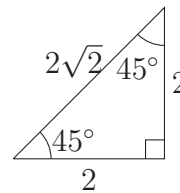
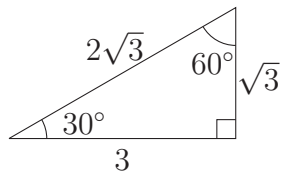
41) The formulas

$$C_{Gas} = 12,000 + 700x$$
$$C_{Solar} = 30,000 + 150x$$

model the total cost, in dollars, for gas and solar heating systems x years after installation. What is the ratio of the total cost for gas heating to the total cost for solar heating 5 years after installation? What is the ratio 40 years after installation?

SUPPLEMENTAL QUESTIONS

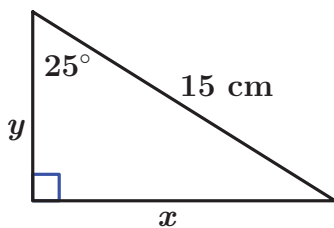
1. The angles 30° , 45° , and 60° occur frequently in trigonometry. Use the given triangles to fill out Table 1.



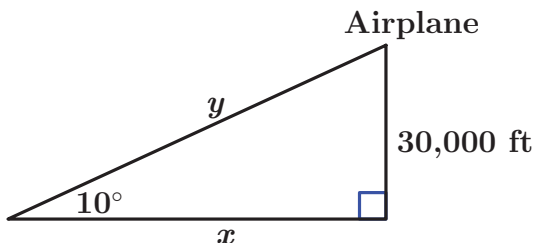
θ	$\sin(\theta)$	$\cos(\theta)$	$\tan(\theta)$
30°			
60°			
45°			

Table 1

2. Find the lengths of the sides of the triangle (x and y) accurate to 3 decimal places.



3. An airplane is flying at an altitude of 30,000 feet. When the airplane is at a 10° angle of elevation from the airport, it will start to receive radar signals from the airport's landing system. How far away, measured along the ground as x , is the plane from the airport when it receives the radar signals? How far away, measured by line of sight as y , is the plane from the airport when it receives the radar signals? Answer both questions accurate to the nearest hundred feet.



ANSWERS TO SUPPLEMENT §2.8:

- 1.

θ	$\sin(\theta)$	$\cos(\theta)$	$\tan(\theta)$
30°	$\frac{1}{2}$	$\frac{3}{2\sqrt{3}}$	$\frac{\sqrt{3}}{3}$
60°	$\frac{3}{2\sqrt{3}}$	$\frac{\sqrt{3}}{2\sqrt{3}}$	$\frac{3}{\sqrt{3}}$
45°	$\frac{1}{\sqrt{2}}$	$\frac{1}{\sqrt{2}}$	1

Table 1

2. The base length, x , is $15 \sin(25^\circ) \approx 6.339$ centimeters. The height length, y , is $15 \cos(25^\circ) \approx 13.595$ centimeters.
3. The **ground** distance of the plane from airport, x , is $\frac{30,000}{\tan(10^\circ)} \approx 170,100$ feet and the **line of sight** distance of the plane from the airport, y , is $\frac{30,000}{\sin(10^\circ)} \approx 172,800$ feet when the plane starts receiving radar signals.