

4.5 Dividing Decimals and Order of Operations

4.5 Exercise Set, page 294: 1, 5, 7, 9, 35, 41, 45, 55, 85

4.6 Fractions and Decimals

4.6 Exercise Set, page 303: 3, 13, 17, 27

Chapter 5 - Ratio, Proportion, and Percent

5.1 Ratio and Proportion

5.1 Exercise Set, page 331: 1, 3, 7, 11, 19, 25, 31, 41, 43, 49, 51, 67

5.2 Introduction to Percent

5.2 Exercise Set, page 342: 1, 3, 5, 9, 13, 31, 37, 45, 53

5.1

Memorize

A **ratio** is the quotient of two quantities. A ratio, in fact, is no different from a fraction, except that a ratio is sometimes written using notation other than fractional notation. For example, the ratio of 1 to 2 can be written as

$$1 \text{ to } 2 \quad \text{or} \quad \frac{1}{2} \quad \text{or} \quad 1 : 2$$

↑
↑

fractional notation
colon notation

These ratios are all read as, “the ratio of 1 to 2.”

Writing a Ratio as a Fraction

The order of the quantities is important when writing ratios. To write a ratio as a fraction, write the *first number* of the ratio as the *numerator* of the fraction and the *second number* as the *denominator*.

Memorize

A **proportion** is a statement that 2 ratios or rates are equal.

$$\frac{a}{b} = \frac{c}{d} \Leftrightarrow ad = bc$$

cross multiply

$$\frac{1}{3} = \frac{4}{12} \Leftrightarrow (1)(12) = (4)(3)$$

$$\Leftrightarrow 12 = 12$$

$$\Leftrightarrow 12 = 12$$

$$\frac{2}{7} \stackrel{?}{=} \frac{3}{8}$$

$$(2)(8) \stackrel{?}{=} (3)(7)$$

$$16 \neq 21$$

$$\therefore \frac{2}{7} \neq \frac{3}{8}$$

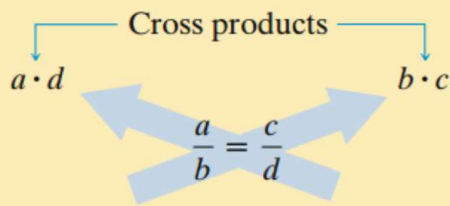
Therefore

Prove $\frac{a}{b} = \frac{c}{d}$ is equivalent to $ad = bc$

$$\frac{a}{\cancel{b}} (\cancel{bd}) = \frac{c}{\cancel{d}} (\cancel{bd})$$

$$ad = bc$$

Using Cross Products to Determine Whether Proportions Are True or False



If cross products are *equal*, the proportion is *true*.

If $ad = bc$, then the proportion is true.

If cross products are *not equal*, the proportion is *false*.

If $ad \neq bc$, then the proportion is false.

Finding an Unknown Value n in a Proportion

Step 1: Set the cross products equal to each other.

Step 2: Divide the number not multiplied by n by the number multiplied by n .

Find n such that

$$\frac{7}{8} = \frac{n}{2}$$

$$8n = (7)(2)$$

$$n = \frac{(7)(2)}{8}$$

$$n = \frac{7}{4}$$

$$\frac{7}{8} = \frac{7}{4} \cdot \frac{1}{2}$$

solve $\frac{1}{2} = \frac{a}{b}$

is this problem fair?

strategy: cross-multiply
and solve for
unknown
variable

is this problem fair?

There are an infinite number of choices for a and b that will make the proportion true.

$$(1)(b) = 2a$$
$$\boxed{b = 2a}$$

5.2

memorize

$$\text{percent } \% = \frac{1}{100} = 0.01$$
$$\Leftrightarrow 100 \% = 1$$

what % of 80 is 5?

$$x \% \cdot 80 = 5$$

$$x \left(\frac{1}{100} \right) (80) = 5$$

$$x \left(\frac{80}{100} \right) = 5$$

$$x \left(\frac{8}{10} \right) = 5$$

$$x \left(\frac{4}{5} \right) = 5$$

$$\therefore x = \frac{5 \cdot 5}{4} = \frac{25}{4} = 6.25$$

$$x\left(\frac{4}{5}\right)\left(\frac{5}{4}\right) = 15\left(\frac{5}{4}\right)$$

$$x(1) = \frac{25}{4}$$

$$x = \frac{25}{4}$$

$$x = 6.25$$

5 is 6.25% of 80

$$\begin{array}{r} 6.25 \\ 4 \overline{) 25.00} \\ \underline{24} \\ 10 \\ \underline{8} \\ 20 \end{array}$$

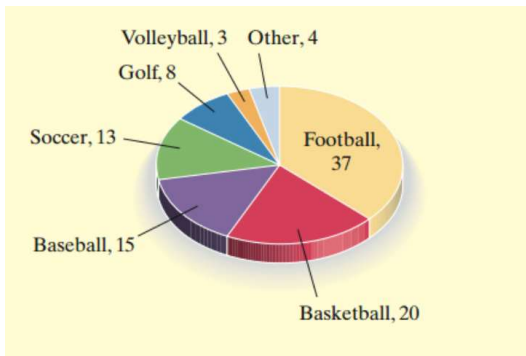
5.2

2. A basketball player makes 81 out of 100 attempted free throws. What percent of free throws are made?

change $\frac{81}{100}$ to a %

$$\frac{81}{100} = 81\left(\frac{1}{100}\right) = \boxed{81\%}$$

One hundred adults were asked to name their favorite sport, and the results are shown in the circle graph.



6. What sport was preferred by the least number of adults? What percent preferred this sport?

Volleyball is the least popular, because 3 is less than each of the other numbers.

$$\frac{3}{100} = 3\left(\frac{1}{100}\right) = 3\%$$

Write each percent as a decimal. See Examples 3 through 7.

10. 62%

$$= 62(0.01)$$

$$= 0.62$$

22. 500%

$$= 5(100\%)$$

$$= 5(1) = 5$$

18. 1.4%

$$= (1.4)(0.01)$$

$$= .014$$