Tips for Teachers

Chapter 8 Geometry and Measures: Length and Area

Section 8.1 Linear Measures: American Units

Converting American Units of Length

We can substitute to convert from one American unit of length of a smaller American unit of length as in the following example.

Complete: 5 yd = _____ in.

$$\begin{aligned} 5 \text{ yd} &= 5 \times 1 \text{ yd} \\ &= 5 \times 3 \text{ ft} \\ &= 5 \times 3 \times 1 \text{ ft} \\ &= 5 \times 3 \times 12 \text{ in.} \\ &= 180 \text{ in.} \end{aligned}$$

We can multiply by 1 when converting from one American unit of length to a larger American unit as shown below.

Complete: 16 ft = _____ yd

$$\begin{aligned} 16 \text{ ft} &= 16 \text{ ft} \times \frac{1 \text{ yd}}{3 \text{ ft}} \\ &= \frac{16}{3} \times \frac{\text{ft}}{\text{ft}} \times 1 \text{ yd} \\ &= 5\frac{1}{3} \times 1 \text{ yd} \\ &= 5\frac{1}{3} \text{ yd} \end{aligned}$$

Canceling can also be used:

$$\begin{aligned} 16 \text{ ft} &= 16 \cancel{\text{ft}} \times \frac{1 \text{ yd}}{3 \cancel{\text{ft}}} \\ &= \frac{16}{3} \times 1 \text{ yd} \\ &= 5\frac{1}{3} \text{ yd} \end{aligned}$$

Choosing a Technique

Sometimes students are confused about whether to substitute or to multiply by 1 when making conversion of units of length. If this is the case, explain that they can do *any* conversion of American units of length, including larger units to smaller ones, by multiplying by 1. For example, the first conversion shown above could also be done as follows:

Complete: 5 yd = _____ in.

$$\begin{aligned} 5 \text{ yd} &= 5 \cancel{\text{yd}} \times \frac{3 \cancel{\text{ft}}}{1 \cancel{\text{yd}}} \times \frac{12 \text{ in.}}{1 \cancel{\text{ft}}} \\ &= 5 \times 3 \times 12 \text{ in.} \\ &= 180 \text{ in.} \end{aligned}$$

Some students will find it easier to use a single technique than to decide whether to substitute or to multiply by 1.

Supplement Key
Further Instruction and Practice for Your Students

Video	Audio cassette	InterAct Math Online Exercises	Printed Test Bank/Instructor's Resource Guide	
			Exercises	Chapter Review
Tape 13	12B		p. 637	p. 739

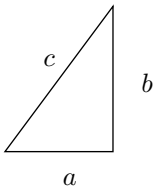
Section 8.7 Square Roots

Squares and Square Roots

It is not uncommon for students to confuse the square of a number, or a number squared, with the square root of a number. Associating the square of a number with the area of a square can be helpful for these students. We find the area of a square by multiplying the length of a side by itself just as we square a number by multiplying that number by itself. Once this association is made, students will find it easier to remember the difference between the *square* of a number and the square *root* of a number.

The Pythagorean Theorem

Squares of numbers and square roots of numbers are both used in the Pythagorean theorem. Encourage your students to commit memory a drawing of a right triangle with the sides labeled as shown below.



This will help them remember the Pythagorean equation $a^2 + b^2 = c^2$ as well as the correct substitutions to make when solving a problem using this equation.

Solving Problems in Class

Always write the Pythagorean equation as the first step in solving such problems. That is, don't start with the substitutions when you show a solution in class but, rather, write $a^2+b^2 = c^2$ first and then do the substitutions. This will also help your students remember the Pythagorean equation. It is always a good idea to sketch a drawing of the triangle in question, if one is not provided in the problem, when doing an example.

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			Exercises	Chapter Review
Tape 14	14A		p. 642	p. 739