

Tips for Teachers

Chapter 5 Ratio and Proportion

Section 5.4 Applications of Proportions

Translating to a Proportion

A stumbling block that students frequently encounter when translating an applied problem to a proportion is knowing how to write the proportion correctly. Consider, for example, the following application.

Gregory jogs 14 mi in 4 days. At this rate, how far will he jog in 7 days?

Students should be made aware that this problem can be translated to more than one correct proportion, but that the positions of the data must be consistent in the two ratios that make up the proportion. Letting d = the distance Gregory will jog in 7 days, we could write any one of the following proportions:

$$\begin{array}{l} \text{Distance in 4 days} \rightarrow 14 \quad d \leftarrow \text{Distance in 7 days} \\ \text{Number of days for 14 mi} \rightarrow 4 \quad 7 \leftarrow \text{Number of days for } d \text{ mi} \end{array} \quad \frac{14}{4} = \frac{d}{7}$$

$$\begin{array}{l} \text{Number of days for 14 mi} \rightarrow 4 \quad 7 \leftarrow \text{Number of days for } d \text{ mi} \\ \text{Distance in 4 days} \rightarrow 14 \quad d \leftarrow \text{Distance in 7 days} \end{array} \quad \frac{4}{14} = \frac{7}{d}$$

$$\begin{array}{l} \text{Distance in 4 days} \rightarrow 14 \quad 4 \leftarrow \text{Number of days for 14 mi} \\ \text{Distance in 7 days} \rightarrow d \quad 7 \leftarrow \text{Number of days for } d \text{ mi} \end{array} \quad \frac{14}{d} = \frac{4}{7}$$

$$\begin{array}{l} \text{Distance in 7 days} \rightarrow d \quad 7 \leftarrow \text{Number of days for } d \text{ mi} \\ \text{Distance in 4 days} \rightarrow 14 \quad 4 \leftarrow \text{Number of days for 14 mi} \end{array} \quad \frac{d}{14} = \frac{7}{4}$$

Each of these proportions could be written in the reverse order as well.

Achieving Consistency

Point out that, although the problem can be translated to a proportion in a variety of ways, in each correct translation the relative position of a distance and the time that corresponds to it are the same on both sides of the equals sign. For this reason the following translation and ones similar to it are incorrect:

$$\begin{array}{l} \text{Distance in 4 days} \rightarrow 14 \quad d \leftarrow \text{Distance in 7 days} \\ \text{Number of days for } d \text{ mi} \rightarrow 7 \quad 4 \leftarrow \text{Number of days for 14 mi} \end{array} \quad \frac{14}{7} = \frac{d}{4}$$





To help your students achieve consistency, you could show several correct translations of an applied problem as well as several incorrect translations of the same problem and analyze together whether each is correct or incorrect and why.

An Informal Check

As a check on their translations, encourage students to determine whether the answer they get when solving an applied problem seems reasonable. Using the incorrect translation above, for example, we get $d = 8$. However, given that Gregory jogs 14 mi in 4 days, it is not reasonable that, at

the same rate, he would jog only 8 mi in 7 days. The same type of reasoning can be applied when working with similar triangles in Section 5.5.

Supplement Key
Further Instruction and Practice for Your Students

Video	Audio cassette	MathMax CD-ROM	InterAct Math Online Exercises	Printed Test Bank/ Instructor's Resource Guide	
				Exercises	Chapter Review
Tape 9	9A	Section 5.4		p. 631	p. 714