Packet 11: Proportional Reasoning

Dear Parents/Guardians,

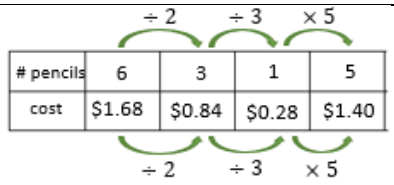
Packet 11 builds from grade 6 ratios and rates. In Lessons 1 and 2, students use several strategies to solve ratio and rate problems. In Lesson 3, students use multiple representations to solve best buy problems.

Strategies for Solving Proportional Reasoning Problems

Students choose strategies to solve proportional reasoning problems. A few are illustrated below.

How much will 5 pencils cost if 6 pencils cost $1.68?

Table



5 pencils cost $1.40.

Unit Rate

6 pencils cost $1.68.
The unit rate (the cost of 1 pencil):

$$\frac{\$1.68}{6} = \$0.28$$

The cost of 5 pencils:

$$5(\$0.28) = \$1.40$$

In grade 7, students also solve problems using proportions.

Cross Multiply.

$$\frac{6}{\$1.68} = \frac{5}{x}$$

$$6x = 5(\$1.68)$$

Divide both sides by 6.

$$6x = \$8.40$$

$$x = \$1.40$$

Work Rates

Students solve problems involving work hours to complete a particular job.

Example 1: Suppose painting a fence requires 30 painter-hours of labor. This could mean…

- One painter can paint the fence in 30 hours, OR
- 30 painters can paint the fence in 1 hour

How long would it take 4 painters? $\frac{30}{4} = 7.5$ hours

Example 2: Suppose it takes 6 painters 5 hours to paint a fence. How long will it take 12 painters to paint the same fence? Since there are double the workers, it should take half the time. 12 painters should finish the fence in 2.5 hours.

By the end of the packet, your student should know…

How to solve proportional reasoning problems using various methods. Lesson 11.1

How to solve problems involving work rates. Lesson 11.2

How to determine the best buy Lesson 11.3

How to determine when quantities are proportional. Lesson 11.3

Additional Resources

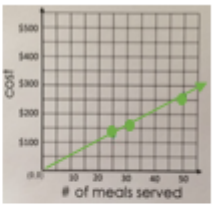
Resource Guide (RG)
Part 1, pages 49-52

Testing for Proportional Relationships

Students determine if quantities are proportional by comparing unit rates or graphs.

The number of meals Mark served to the homeless and their cost.

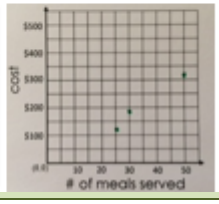
	Friday	Saturday	Sunday
# of meals	30	25	50
cost	$157.50	$131.25	$262.5
unit rate	$\frac{157.50}{30} = \$5.25$	$\frac{131.50}{25} = \$5.25$	$\frac{262.5}{50} = \$5.25$
Proportional?	Yes, since the unit rate is the same for each day.		



This illustrates a proportional relationship. The points are linear and begin at the origin (0,0).

The number of meals Vu served to the homeless and their cost.

	Friday	Saturday	Sunday
# of meals	30	25	50
cost	$186	$125	$310
unit rate	$\frac{186}{30} = \$6.20$	$\frac{125}{25} = \$5$	$\frac{310}{50} = \$6.20$
Proportional?	No, even though two days have the same unit rate, they must ALL have the same unit rate to be directly proportional.		



This does **not** show a proportional relationship. The points are non-linear.