Proportional Relationship: Tables

Procedural Lesson
Grade 7 · Unit 3 · Lesson 6
MC: 7.RP.2a▲

Problem of the Day

Objective: _____

Vocabulary

Equivalent Ratios: ratios, in fraction form, that are equivalent

Ratios 5:2 and 10:4 are equivalent because $\frac{52}{2} = \frac{10}{4}$.

Proportional Relationship: a relationship between two equal ratios

Apples are sold in bags of 5 for $2. To buy 20 apples, what would be the cost (*C*)?

$$\frac{5 \text{ apples}}{2 \text{ dollars}} = \frac{20 \text{ apples}}{C(\cos t)}$$

Multiply the numerator and denominator by 4.
Cost = $8

Apples	Cost
5	2
20	8

Notes

Testing for Equivalent Ratios:
1. Identify the form of the ratio.
2. Convert ratio pairs in the table to fractions (*use the first quantity as the denominator*).
3. Determine if the fractions are equivalent.
4. If equivalent, there is a proportional relationship.

Directions: Use equivalent fractions to answer the following.

1. Determine whether any of the ratios below are proportional. What would happen if the third ratio were $\frac{6}{18}$?

$$\frac{10}{45}, \frac{20}{90}, \text{ and } \frac{6}{27}$$

2. The table below gives the dimensions of two tents. Are the tents in proportion? What if Tent 2 had a height of 2.5 ft?

	Tent 1	Tent 2
Length	8 ft	4 ft
Width	6 ft	3 ft
Height	5 ft	3.5 ft

Directions: Use equivalent fractions to answer the following.

1. Determine whether any of the ratios below are proportional. What would happen if the third ratio were $\frac{2}{16}$?

$$\frac{8}{64}, \frac{9}{72}, \text{ and } \frac{7.5}{68}$$

2. The table below gives the number of years several people have worked for a company and their salaries. Is the pay proportional to how long they have worked? What if Joe made $6,000/month?

	Years	Salary
Moe	10	$3,005/month
Joe	20	$6,010/month
Bo	30	$9,015/month

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Directions: Use equivalent fractions to answer the following.

1. Determine whether the ratios below are proportional. What would happen if the second ratio were $\frac{30}{18}$?

$$\frac{42}{27}, \frac{28}{18}, \text{ and } \frac{56}{36}$$

2. The table below gives the dimensions of two prisms. Are the prisms in proportion? What if the width in Prism 1 was $3\frac{1}{3}$ in.?

	Prism 1	Prism 2
Length	5 in.	3 in.
Width	3 in.	2 in.
Height	5 in.	3 in.

3. Determine whether the ratios below are proportional. What would happen if the second ratio were $\frac{60}{30}$?

$$\frac{15}{5}, \frac{90}{30}, \frac{45}{15}$$

4. The table below gives the amount of time it took Stan to complete a certain number of math problems each day. Is the number of problems he completes proportional to how long he works? What if he completed 90 problems on Monday and 60 problems on Wednesday?

	Time	# of Problems
Monday	45 min	12
Tuesday	10 min	20
Wednesday	30 min	12

5. Determine whether the ratios below are proportional.

$$\frac{150}{100{,}000}, \frac{75}{50{,}000}, \frac{100}{75{,}000}$$

6. The table below gives the points scored on an exam and study time. Is there a proportional relationship between study time and points earned? Would the results be different if we converted time to hours?

	Study Time	Points
Lenny	2 hrs	75
Benny	1 hr 36 min	60
Denny	2 hrs 24 min	90

Challenge Problems

Directions: Use equivalent fractions to answer the following.

1. Jan and Fran each drove from their houses. Their distances and driving times are shown in the table below. Are their distances proportional to their times driven? What if Fran had driven for 1 hr 40 min?

	Jan	Fran
Time	10 min	2.5 hrs
Distance	15 mi	150 mi

2. The table below gives the amount of spaghetti Lou and Stu made and how much sauce they used. Was the amount of sauce used in proportion to the amount of spaghetti made? Use this to predict how much spaghetti is needed for 1 cup of sauce.

	Spaghetti	Sauce
Lou	5 cups	$\frac{1}{3}$ cup
Stu	10 cups	$\frac{2}{3}$ cup

Extension Activity

* **MP1:** Make sense of the problem and persevere in solving it.
* **MP4:** Apply mathematics in everyday life.

Mollie can read a quarter of a book in half a day, half a book in a whole day, and the whole book in two days. Create a table and show that the amount of the book she can read is proportional to the length of time she reads. Use this to predict how long it would take her to read two books.

Closure

Reaching Consensus

MP3: *Do you agree or disagree with your classmate? Why or why not?*

Student Presentations

MP1: *What steps in the process are you most confident about?*
MP6: *Explain how you might show that your solution answers the problem.*

Closure

Recap today's lesson with one or more of the following questions:

✓MP6: *How could you test your solution to see if it answers the problem?*
✓MP7: *What ideas have we learned before that were useful in solving this problem?*