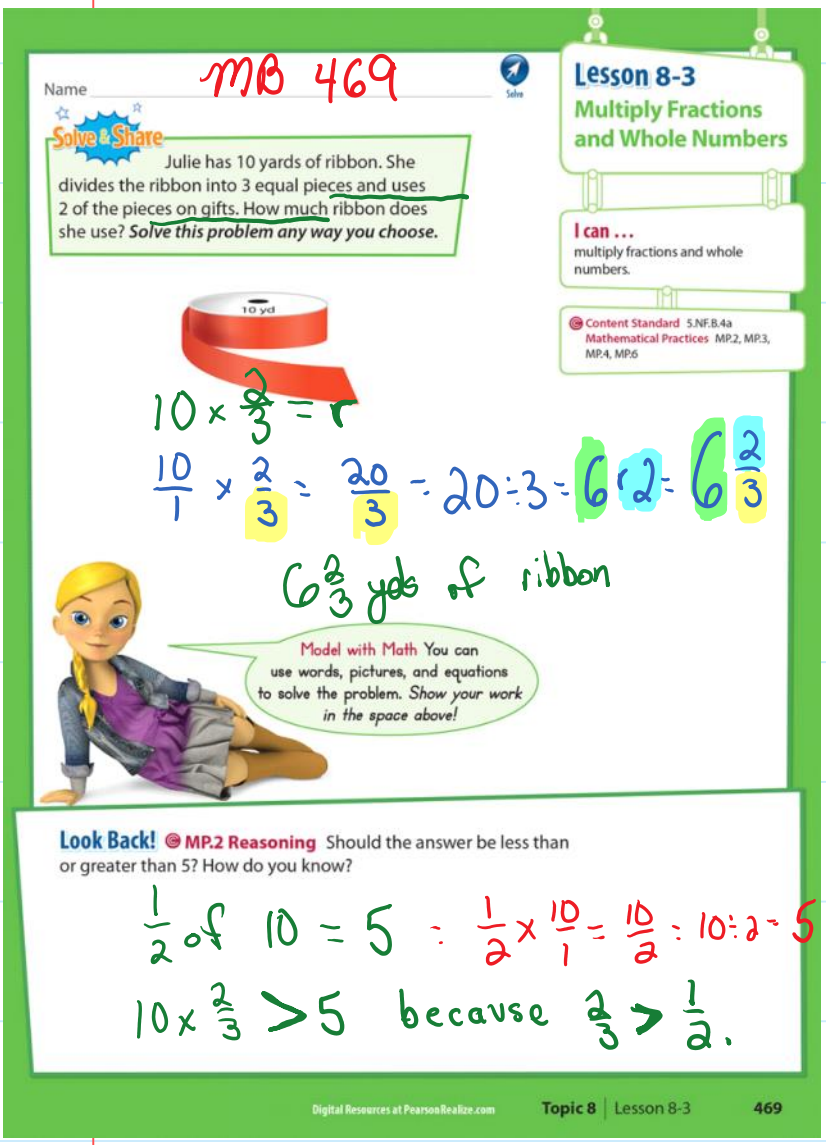
Lesson 8-3

Thursday, January 2, 2020 1:37 PM



Name MB 469

Lesson 8-3
Multiply Fractions and Whole Numbers

I can ...
multiply fractions and whole numbers.

Content Standard 5.NF.B.4a
Mathematical Practices MP.2, MP.3, MP.4, MP.6

Solve & Share
Julie has 10 yards of ribbon. She divides the ribbon into 3 equal pieces and uses 2 of the pieces on gifts. How much ribbon does she use? *Solve this problem any way you choose.*

10 yd

$10 \times \frac{2}{3} = r$

$\frac{10}{1} \times \frac{2}{3} = \frac{20}{3} = 20 \div 3 = 6 \text{ r } 2 = 6\frac{2}{3}$

$6\frac{2}{3}$ yds of ribbon

Model with Math You can use words, pictures, and equations to solve the problem. *Show your work in the space above!*

Look Back! MP.2 Reasoning Should the answer be less than or greater than 5? How do you know?

$\frac{1}{2}$ of $10 = 5 \quad \frac{1}{2} \times \frac{10}{1} = \frac{10}{2} = 10 \div 2 = 5$

$10 \times \frac{2}{3} > 5$ because $\frac{2}{3} > \frac{1}{2}$.

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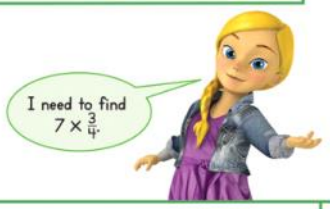
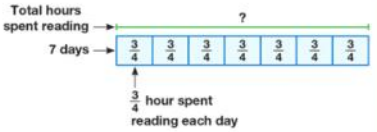
Essential Question: How Can You Multiply Fractions and Whole Numbers?

A

Hal spent $\frac{3}{4}$ hour reading each day for 7 days. How much total time did he spend reading?





B One Way

Multiply to find the number of fourths.

$7 \times \frac{3}{4} = 7 \times 3 \times \frac{1}{4}$

$= 21 \times \frac{1}{4}$

$= \frac{21}{4}$

To rename $\frac{21}{4}$, divide the numerator by the denominator.

Rewrite as a mixed number.

$\frac{21}{4} = 5\frac{1}{4}$

Hal spent $5\frac{1}{4}$ hours reading.

C Another Way

Rename the whole number as a fraction. Multiply the numerators, multiply the denominators, and then write the product as a mixed number.

$\frac{7}{1} \times \frac{3}{4} = \frac{7 \times 3}{1 \times 4} = \frac{21}{4} = 5\frac{1}{4}$

Hal spent $5\frac{1}{4}$ hours reading.

Convince Me! MP.6 Be Precise Find $6 \times \frac{4}{9}$. Then use repeated addition to justify your answer.

$6 \times \frac{4}{9} = \frac{6 \times 4}{9} = \frac{24}{9} = 24 \div 9 = 2.6 = 2\frac{6 \div 3}{9 \div 3} = 2\frac{2}{3}$

$\frac{4}{9} + \frac{4}{9} + \frac{4}{9} + \frac{4}{9} + \frac{4}{9} + \frac{4}{9} = \frac{24}{9} = 2\frac{6 \div 3}{9 \div 3} = 2\frac{2}{3}$

Name _____

Guided Practice*

Do You Understand?

1. **MP.2 Reasoning** In the example at the top of the previous page, how can finding $\frac{1}{4}$ of 7 help you find $\frac{3}{4}$ of 7?

$\frac{3}{4}$ is 3 times $\frac{1}{4}$

2. If Hal spent $\frac{2}{3}$ of an hour reading each day for 7 days, how much time, in all, did he spend reading? Show how you found your answer.

$\frac{2}{3} \times 7 = \frac{2}{3} \times \frac{7}{1} = \frac{14}{3} = 14 \div 3 =$
$4 \text{ r } 2 = 4\frac{2}{3}$ hrs.

Do You Know How?

In **3–5**, find each product. Write the product as a mixed number.

3. $\frac{3}{8} \times 4 = \frac{\square \times \square}{\square} = \frac{3}{8} \times \frac{4}{1} = \frac{12}{8} = 1\frac{4}{8} = 1\frac{1}{2}$

4. $8 \times \frac{5}{6} = \frac{\square \times \square}{\square} = \frac{8}{1} \times \frac{5}{6} = \frac{40}{6} = 6\frac{4}{6} = 6\frac{2}{3}$

5. $5 \times \frac{4}{7} = \frac{\square \times \square}{\square} = \frac{5}{1} \times \frac{4}{7} = \frac{20}{7} = 2\frac{6}{7}$

Independent Practice

Leveled Practice In **6–16**, find each product. Write the product as a mixed number.

Remember: You can use division to rename a fraction as a mixed number.

6. $\frac{3}{4} \times 14 = \frac{\square \times \square}{\square} = \frac{\square}{\square} = \square\frac{\square}{\square} = \square\frac{\square}{\square}$

7. $600 \times \frac{2}{3} = \frac{\square \times \square}{\square} = \frac{\square}{\square} = \square$

8. $\frac{5}{9} \times 37 = \frac{\square \times \square}{\square} = \frac{\square}{\square} = \square\frac{\square}{\square}$

9. $\frac{4}{5} \times 500$

10. $5 \times \frac{2}{3}$

11. $17 \times \frac{6}{8}$

$17 \times 6 = 102$
$102 \div 8 = 12 \text{ r } 6$
$\frac{17 \times 6}{8} = \frac{102}{8} = 12\frac{6}{8} = 12\frac{3}{4}$

12. $\frac{9}{10} \times 25$

13. $\frac{7}{8} \times 320$

14. $28 \times \frac{7}{12}$

15. $\frac{2}{3} \times 1{,}287$

16. $900 \times \frac{2}{9}$

$\frac{900 \times 2}{9} = \frac{1800}{9} = 200$

$9 \overline{)1800}$ → 200, -9, 00, -0, 00, -0, 0

*For another example, see Set B on page 513.

Complete
11, 16, 21, 24

Math Practices and Problem Solving

17. About 0.6 of the human body is made up of water. If a person has a mass of 75 kilograms, what is the mass of the water in this person's body?

18. **Number Sense** How can you use mental math to find $25 \times \frac{3}{10}$?

19. During a nature walk, Jill identified 20 species of animals and plants.

a **MP.3 Construct Arguments** Jill said that $\frac{1}{3}$ of the species she identified were animals. Can this be correct? Explain.

b If $\frac{3}{5}$ of the species Jill identified were animals, how many plants did Jill identify?

20. A rectangular painting is 2 feet long and $\frac{5}{6}$ foot wide. What is the area of the painting?

21. **Higher Order Thinking** An art teacher makes a batch of purple paint by mixing $\frac{3}{4}$ cup red paint with $\frac{3}{4}$ cup blue paint. If she mixes 13 batches, how many cups of purple paint will she have?

$\frac{3}{4} + \frac{3}{4} = \frac{6}{4}$ $\quad \frac{6}{4} \times 13 = \frac{6 \times 13}{4} = \frac{78}{4} = 19\frac{2}{4}$ cups ~ $19\frac{1}{2}$ cups

22. **Math and Science** A water molecule is made up of 3 atoms. One third of the atoms are oxygen and the remaining atoms are hydrogen. If there are 114 water molecules, how many hydrogen atoms are there? Show your work.

Common Core Assessment

23. Which is the product of 14 and $\frac{3}{7}$?

Ⓐ $2\frac{3}{7}$
Ⓑ 5
Ⓒ 6
Ⓓ $32\frac{2}{3}$

24. Which is the product of $\frac{11}{12}$ and 4?

Ⓐ $1\frac{1}{4}$
Ⓑ $3\frac{2}{3}$
Ⓒ $4\frac{1}{3}$
Ⓓ 33

$\frac{11 \times 4}{12} = \frac{44}{12} = 3\frac{8}{12} \div 4 = 3\frac{2}{3}$ Ⓑ