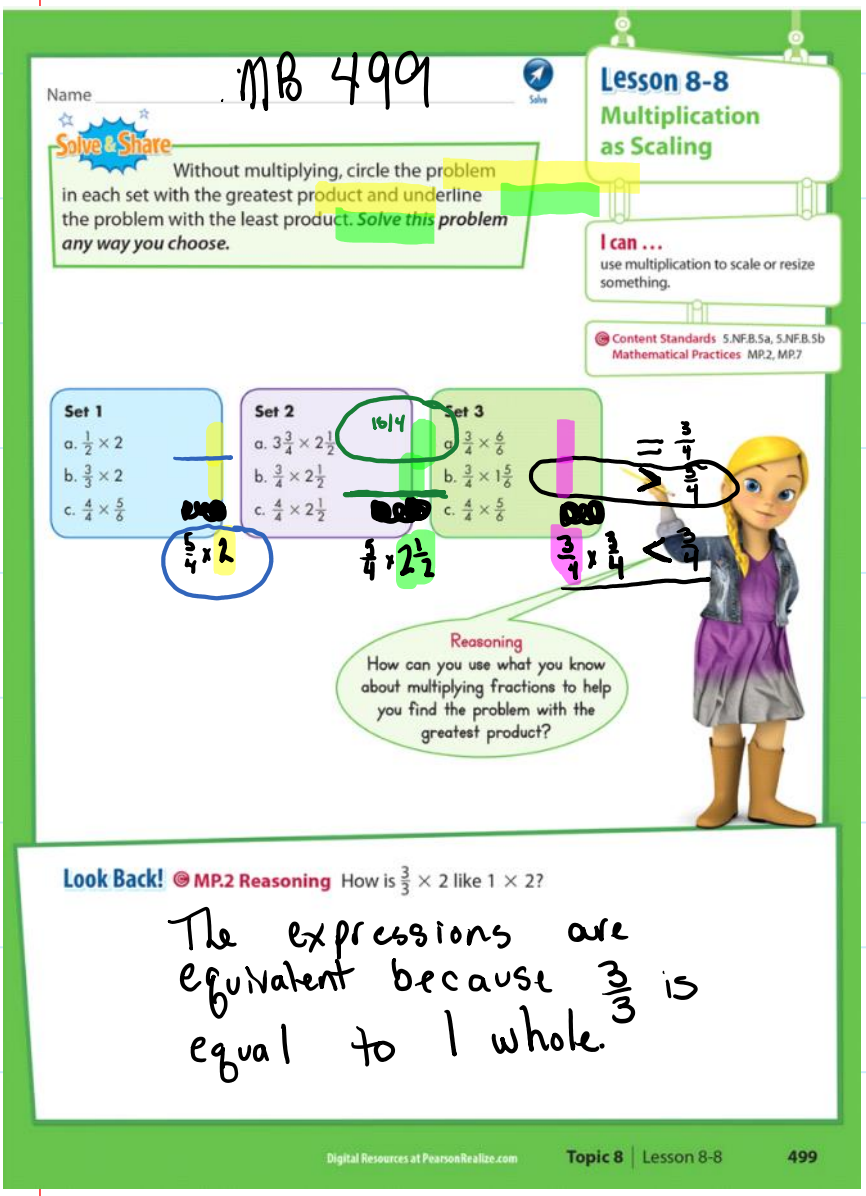
Lesson 8-8

Thursday, January 2, 2020 1:38 PM



Name MB 499

Solve & Share

Without multiplying, circle the problem in each set with the greatest product and underline the problem with the least product. *Solve this problem any way you choose.*

Lesson 8-8
Multiplication as Scaling

I can ...
use multiplication to scale or resize something.

Content Standards 5.NF.B.5a, 5.NF.B.5b
Mathematical Practices MP.2, MP.7

Set 1
a. $\frac{1}{2} \times 2$
b. $\frac{3}{3} \times 2$
c. $\frac{4}{4} \times \frac{5}{6}$

Set 2
a. $3\frac{3}{4} \times 2\frac{1}{2}$
b. $\frac{3}{4} \times 2\frac{1}{2}$
c. $\frac{4}{4} \times 2\frac{1}{2}$

Set 3
a. $\frac{3}{4} \times \frac{6}{6}$
b. $\frac{3}{4} \times 1\frac{5}{6}$
c. $\frac{4}{4} \times \frac{5}{6}$

Reasoning
How can you use what you know about multiplying fractions to help you find the problem with the greatest product?

Look Back! MP.2 Reasoning How is $\frac{3}{3} \times 2$ like 1×2?

The expressions are equivalent because $\frac{3}{3}$ is equal to 1 whole.

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Essential Question: How Can You Use Number Sense to Evaluate the Size of a Product?

Sue knitted scarves that are 4 feet long for herself and her friends Joe and Alan. After a month, they compared the lengths of their scarves. Some scarves had stretched and some had shrunk. The results are shown in the chart. How had the lengths of Joe's and Alan's scarves changed?

DATA

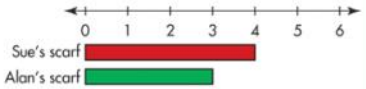
Sue	4
Joe	$1\frac{1}{2} \times 4$
Alan	$\frac{3}{4} \times 4$

B Alan's scarf

Alan's scarf shrunk.

$\frac{3}{4} \times 4 < 4$

Multiplying a number by a fraction less than 1 results in a product less than the given number.

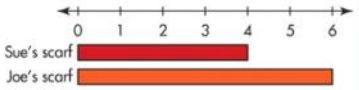


C Joe's scarf

Joe's scarf stretched.

$1\frac{1}{2} \times 4 > 4$

Multiplying a number by a fraction greater than 1 results in a product greater than the starting number.



Convince Me! MP.7 Use Structure Sue knitted a scarf for her friend June that was also 4 feet long. After a month, the length of June's scarf could be represented by the expression $\frac{3}{3} \times 4$. How did the length of June's scarf change? Explain.

June's scarf stayed the same.
$\frac{3}{3}$ = 1 whole and $4 \times 1 = 4$.
The scarf is still 4ft long.

Name

Guided Practice

Do You Understand?

1. MP.2 Reasoning Why does multiplying a number by $3\frac{1}{2}$ increase its value?

$3\frac{1}{2}$ is greater than 1.

2. Does the scaling factor always have to be the first factor in an expression?

No it can be either factor.

Do You Know How?

In **3–5**, without multiplying decide which symbol belongs in the box: <, >, or =.

3. $3\frac{1}{2} \times 2\frac{2}{3} \square 2\frac{2}{3}$ > $3\frac{1}{2} > 1$
4. $\frac{4}{5} \times 2\frac{2}{3} \square 2\frac{2}{3}$ < $\frac{4}{5} < 1$
5. $4\frac{3}{5} \times \frac{4}{4} \square 4\frac{3}{5}$ = $\frac{4}{4} = 1$

Complete # 15, 16, 17, 20, 25 & 27

Independent Practice

In **6–17**, without multiplying, decide which symbol belongs in the box: <, >, or =.

6. $2\frac{1}{2} \times 1\frac{2}{3} \square 1\frac{2}{3}$
7. $\frac{3}{5} \times 4\frac{4}{5} \square 4\frac{4}{5}$
8. $1\frac{2}{7} \times \frac{5}{5} \square 1\frac{2}{7}$
9. $\frac{1}{3} \times 2\frac{2}{5} \square 2\frac{2}{5}$
10. $3\frac{3}{5} \times \frac{2}{2} \square 3\frac{3}{5}$
11. $4\frac{1}{3} \times 2\frac{2}{7} \square 2\frac{2}{7}$
12. $2\frac{1}{5} \times \frac{1}{10} \square 2\frac{1}{5}$
13. $\frac{1}{2} \times 1\frac{2}{5} \square 1\frac{2}{5}$
14. $4\frac{3}{4} \times 3\frac{1}{4} \square 4\frac{3}{4}$
15. $1\frac{1}{12} \times 1\frac{3}{4} > 1\frac{3}{4}$ ($1\frac{1}{12} > 1$)
16. $5\frac{1}{3} \times \frac{5}{6} < 5\frac{1}{3}$ ($\frac{5}{6} < 1$)
17. $\frac{5}{5} \times 4\frac{2}{3} = 4\frac{2}{3}$ ($\frac{5}{5} = 1$)

In **18** and **19**, without multiplying, order the following products from least to greatest.

$2 < 2\frac{1}{4}$; $\frac{3}{4} < 1$; $\frac{5}{5} = 1$; $\frac{3}{4} \times \frac{3}{5}$, $\frac{5}{5} \times \frac{3}{6}$, $2 \times \frac{3}{5}$, $2\frac{1}{4} \times \frac{3}{5}$

18. $2 \times \frac{3}{5}$ $2\frac{1}{4} \times \frac{3}{5}$ $\frac{3}{4} \times \frac{3}{5}$ $\frac{5}{5} \times \frac{3}{6}$
19. $\frac{1}{5} \times \frac{2}{3}$ $4\frac{1}{2} \times \frac{2}{3}$ $\frac{1}{3} \times \frac{2}{3}$ $4 \times \frac{2}{3}$

In **20** and **21**, without multiplying, order the following products from greatest to least.

$\frac{3}{4} < 1$; $3 > 1\frac{1}{4}$; $\frac{4}{4} = 1$; $3 \times \frac{3}{4}$, $1\frac{1}{4} \times \frac{3}{4}$, $\frac{4}{4} \times \frac{3}{4}$, $\frac{2}{3} \times \frac{3}{4}$

20. $3 \times \frac{3}{4}$ $\frac{2}{3} \times \frac{3}{4}$ $1\frac{1}{4} \times \frac{3}{4}$ $\frac{4}{4} \times \frac{3}{4}$
21. $\frac{3}{3} \times \frac{1}{3}$ $4 \times \frac{1}{3}$ $2\frac{2}{3} \times \frac{1}{3}$ $2\frac{1}{3} \times \frac{1}{3}$

*For another example, see Set G on page 516.

Math Practices and Problem Solving

22. Who ran farther by the end of the week? How much farther? Use the table below that shows the distances in miles.

DATA

	Monday	Tuesday	Wednesday	Thursday	Friday
Holly	$1\frac{1}{2}$	$\frac{1}{2}$	$2\frac{1}{4}$	$\frac{3}{4}$	$1\frac{1}{2}$
Yu	$1\frac{3}{4}$	$1\frac{1}{2}$	$2\frac{3}{4}$	$1\frac{1}{4}$	$\frac{1}{2}$

23. **MP.2 Reasoning** Ethan took a quiz with 15 questions. If he answered $\frac{3}{5}$ of the questions correctly, how many did he get wrong?

24. At a taffy pull, George stretched the taffy to 3 feet. Jose stretched it $1\frac{1}{3}$ times as far as George. Maria stretched it $\frac{2}{3}$ as far as George. Sally stretched it $\frac{6}{6}$ as far. Who stretched it the farthest? the least?

G = 3 J $1\frac{1}{3} \times 3$ M $\frac{2}{3} \times 3$ S $\frac{6}{6} \times 3$

Jose farthest Maria least

25. **Higher Order Thinking** Without multiplying, decide which symbol belongs in the box: <, >, or =. Explain how you decided.

$4\frac{3}{4} \times 3\frac{1}{4} > 4\frac{1}{2}$

$4\frac{3}{4}$ is greater than $4\frac{1}{2}$. Multiplying $4\frac{3}{4}$ by a number greater than 1 is still greater than $4\frac{1}{2}$.

26. Write two decimals with a product close to 6.3.

__.__ × __.__ ≈ 6.3

≈ is a symbol that means *is approximately equal to.*

Common Core Assessment

27. Write each expression in the correct

28. Write each expression in the correct

than $4\frac{1}{2}$.

Common Core Assessment

27. Write each expression in the correct answer space to show products less than $4\frac{1}{2}$ and those greater than $4\frac{1}{2}$.

Less than $4\frac{1}{2}$	Greater than $4\frac{1}{2}$
$4\frac{1}{2} \times \frac{3}{4}$, $\frac{4}{5} \times 4\frac{1}{2}$	$4 \times 4\frac{1}{2}$, $1\frac{1}{12} \times 4\frac{1}{2}$

$4 \times 4\frac{1}{2}$ $\quad 1\frac{1}{12} \times 4\frac{1}{2}$ $\quad 4\frac{1}{2} \times \frac{3}{4}$ $\quad \frac{4}{5} \times 4\frac{1}{2}$

$4 > 1$ $\quad 1\frac{1}{12} > 1$ $\quad \frac{3}{4} < 1$ $\quad \frac{4}{5} < 1$

28. Write each expression in the correct answer space to show products less than $1\frac{3}{4}$ and those greater than $1\frac{3}{4}$.

Less than $1\frac{3}{4}$	Greater than $1\frac{3}{4}$

$1\frac{3}{4} \times 1\frac{3}{4}$ $\quad \frac{9}{10} \times 1\frac{3}{4}$ $\quad 1\frac{3}{4} \times \frac{1}{2}$ $\quad 5\frac{1}{6} \times 1\frac{3}{4}$