

Lesson 18

Understand Fraction Multiplication

Name: _____

Prerequisite: What does it mean to multiply numbers?



Study the example shows ways to describe multiplication. Then solve problems 1–8.

Example

Use words and models to show $5 \times 3 = 15$.

5 groups of 3 is 15. 

15 is 5 times as many as 3. 

B 1 Complete the sentences to describe the multiplication that the picture shows.



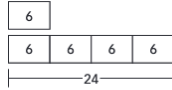
Words: 6 groups of 4 is 24.

Equation: 6 \times 4 = 24

B 2 Use the bar model at the right to complete the sentences.

Words: 24 is 4 times as many as 6.

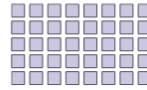
Equation: 4 \times 6 = 24



M 3 How is 6×4 related to 4×6 ? **They are equal. $6 \times 4 = 24$ and $4 \times 6 = 24$.**

Solve.

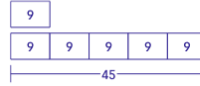
M 4 Complete the sentences to describe the multiplication that the array shows.



5 rows of 8 is 40.

5 \times 8 = 40

M 5 Draw and label a bar model to show 5×9 .



M 6 Nick read 7 books last month. He read twice as many books this month. Draw a bar model that represents the number of books Nick read this month.



M 7 Look at problem 6. Write the multiplication equation that the bar model describes.

2 \times 7 = 14

C 8 Write a word problem that could be modeled by the equation $3 \times 6 = 18$.

Answers will vary. Possible answer: Anna rode her bike 6 miles. Jordan rode his bike three times as far as Anna. How many miles did Jordan ride his bike?

Key

B Basic

M Medium

C Challenge



Lesson 18 Name: _____

Show Multiplying Fractions

Study how the example shows how to multiply fractions. Then solve problems 1–9.

Example

Find $5 \times \frac{3}{4}$.

You can use repeated addition. $\frac{3}{4} + \frac{3}{4} + \frac{3}{4} + \frac{3}{4} + \frac{3}{4} = \frac{15}{4} = 3\frac{3}{4}$

You can draw a model.

$5 \times \frac{3}{4} = \frac{15}{4} = 3\frac{3}{4}$

B 1 Find $6 \times \frac{1}{4}$ using repeated addition.

$$\frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} = \frac{6}{4}$$

B 2 Draw a model to show $6 \times \frac{1}{4}$.

M 3 Use the digits 2 and 3 to complete two different multiplication problems with the same product as $6 \times \frac{1}{4}$.

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

M 4 Look at the model. Tell whether each expression shows the product of $3 \times \frac{5}{8}$.

a. $5 \times \frac{3}{8}$ Yes No

b. $\frac{5}{8} + \frac{5}{8} + \frac{5}{8}$ Yes No

c. $\frac{5}{8} \times \frac{5}{8}$ Yes No

d. $15 \times \frac{1}{8}$ Yes No

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Solve.

M 5 The number line below shows $8 \times \frac{3}{10}$.

M 6 Label the number line below and use it to show $3 \times \frac{3}{4}$.

M 7 Draw a model to show $3 \times \frac{4}{5}$.

M 8 Look at the model you drew in problem 7. Use the digits 2, 3, 4, 5, and 6 to write two different multiplication problems with the same product as $3 \times \frac{4}{5}$.

$6 \times \frac{2}{5}$ $4 \times \frac{3}{5}$ $2 \times \frac{6}{5}$ is also a solution.

C 9 Lisa says that $3 \times \frac{1}{6}$ and $\frac{1}{6} \times \frac{1}{6} \times \frac{1}{6}$ have the same product. Is Lisa's reasoning correct? Explain.

No, Lisa's reasoning is not correct. Possible explanation: $3 \times \frac{1}{6}$ is the same as adding $\frac{1}{6}$ three times: $\frac{1}{6} + \frac{1}{6} + \frac{1}{6}$. $3 \times \frac{1}{6}$ is not the same as multiplying $\frac{1}{6}$ three times. So, $3 \times \frac{1}{6}$ does not have the same product as $\frac{1}{6} \times \frac{1}{6} \times \frac{1}{6}$.

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Reason and Write

Study the example. Underline two parts that you think make it a particularly good answer and a helpful example.

Answers will vary. Note whether students incorporate the features they chose in their answer on the next page.

Example

Describe how you can use the same methods to find the product 4×2 and the product $4 \times \frac{2}{3}$.

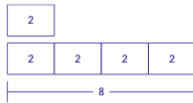
Show your work. Use models, words, and numbers to explain your answer.

I can think of 4×2 as 4 groups of 2.
 $4 \times 2 = 8$. 8 is 4 times as many as 2.

I can think of $4 \times \frac{2}{3}$ as 4 groups of 2 thirds. $4 \times \frac{2}{3} = \frac{8}{3}$.
 $\frac{8}{3}$ is 4 times as many as $\frac{2}{3}$.

I can find both products using repeated addition.
 $2 + 2 + 2 + 2 = 8$
 $\frac{2}{3} + \frac{2}{3} + \frac{2}{3} + \frac{2}{3} = \frac{8}{3}$

I can use a model to show $4 \times 2 = 8$.



I can use a model to show $4 \times \frac{2}{3} = \frac{8}{3}$.



Where does the example ...

- use words to explain?
- use numbers to explain?
- use models to show how the products are alike?



Solve the problem. Use what you learned from the example.

Describe how you can use the same methods to find the product 2×3 and the product $2 \times \frac{3}{4}$.

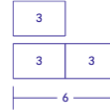
Show your work. Use words, models, and numbers to explain your answer.

Possible student answer: I can think of 2×3 as 2 groups of 3. $2 \times 3 = 6$. 6 is 2 times as many as 3.

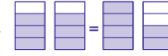
I can think of $2 \times \frac{3}{4}$ as 2 groups of 3 fourths. $2 \times \frac{3}{4} = \frac{6}{4}$.
 $\frac{6}{4}$ is 2 times as many as $\frac{3}{4}$.

I can find both products using repeated addition.
 $3 + 3 = 6$
 $\frac{3}{4} + \frac{3}{4} = \frac{6}{4}$

I can use a model to show $2 \times 3 = 6$.



I can use a model to show $2 \times \frac{3}{4} = \frac{6}{4}$.



Did you ...

- use words to explain?
- use numbers to explain?
- use models to show how the products are alike?





Name: _____

Multi-Digit Subtraction—Skills Practice

Name: _____

Subtract within 100,000.

1
$$\begin{array}{r} 47,863 \\ - 251 \\ \hline 47,612 \end{array}$$

2
$$\begin{array}{r} 19,038 \\ - 11,018 \\ \hline 8,020 \end{array}$$

3
$$\begin{array}{r} 76,429 \\ - 20,306 \\ \hline 56,123 \end{array}$$

4
$$\begin{array}{r} 81,235 \\ - 20,017 \\ \hline 61,218 \end{array}$$

5
$$\begin{array}{r} 36,725 \\ - 1,582 \\ \hline 35,143 \end{array}$$

6
$$\begin{array}{r} 94,130 \\ - 20,125 \\ \hline 74,005 \end{array}$$

7
$$\begin{array}{r} 64,278 \\ - 3,014 \\ \hline 60,814 \end{array}$$

8
$$\begin{array}{r} 20,236 \\ - 8,915 \\ \hline 19,321 \end{array}$$

9
$$\begin{array}{r} 58,623 \\ - 26,374 \\ \hline 32,249 \end{array}$$

10
$$\begin{array}{r} 72,160 \\ - 2,087 \\ \hline 70,073 \end{array}$$

11
$$\begin{array}{r} 30,412 \\ - 25,651 \\ \hline 12,761 \end{array}$$

12
$$\begin{array}{r} 34,710 \\ - 8,105 \\ \hline 26,105 \end{array}$$

13
$$\begin{array}{r} 10,714 \\ - 9,656 \\ \hline 1,258 \end{array}$$

14
$$\begin{array}{r} 63,258 \\ - 21,399 \\ \hline 41,859 \end{array}$$

15
$$\begin{array}{r} 40,805 \\ - 15,912 \\ \hline 24,893 \end{array}$$

16
$$\begin{array}{r} 53,126 \\ - 45,828 \\ \hline 7,198 \end{array}$$

17
$$\begin{array}{r} 80,052 \\ - 71,963 \\ \hline 8,089 \end{array}$$

18
$$\begin{array}{r} 24,350 \\ - 9,582 \\ \hline 14,768 \end{array}$$

19
$$\begin{array}{r} 100,000 \\ - 86,932 \\ \hline 13,068 \end{array}$$

Subtract within 100,000.

1
$$\begin{array}{r} 53,641 \\ - 1,320 \\ \hline 52,321 \end{array}$$

2
$$\begin{array}{r} 85,472 \\ - 82,302 \\ \hline 3,170 \end{array}$$

3
$$\begin{array}{r} 93,245 \\ - 32,025 \\ \hline 61,220 \end{array}$$

4
$$\begin{array}{r} 30,582 \\ - 156 \\ \hline 30,426 \end{array}$$

5
$$\begin{array}{r} 12,987 \\ - 2,793 \\ \hline 10,194 \end{array}$$

6
$$\begin{array}{r} 82,056 \\ - 50,330 \\ \hline 31,726 \end{array}$$

7
$$\begin{array}{r} 27,810 \\ - 15,675 \\ \hline 12,135 \end{array}$$

8
$$\begin{array}{r} 94,321 \\ - 4,255 \\ \hline 90,066 \end{array}$$

9
$$\begin{array}{r} 65,852 \\ - 23,890 \\ \hline 41,962 \end{array}$$

10
$$\begin{array}{r} 15,008 \\ - 2,499 \\ \hline 12,509 \end{array}$$

11
$$\begin{array}{r} 20,530 \\ - 19,790 \\ \hline 740 \end{array}$$

12
$$\begin{array}{r} 90,325 \\ - 38,547 \\ \hline 60,778 \end{array}$$

13
$$\begin{array}{r} 36,825 \\ - 28,967 \\ \hline 7,858 \end{array}$$

14
$$\begin{array}{r} 38,972 \\ - 19,999 \\ \hline 18,973 \end{array}$$

15
$$\begin{array}{r} 45,000 \\ - 37,955 \\ \hline 7,045 \end{array}$$

Form B

1
$$\begin{array}{r} 43,619 \\ - 20,301 \\ \hline 23,318 \end{array}$$

2
$$\begin{array}{r} 71,542 \\ - 25,002 \\ \hline 46,140 \end{array}$$

3
$$\begin{array}{r} 18,376 \\ - 8,953 \\ \hline 9,423 \end{array}$$

4
$$\begin{array}{r} 50,364 \\ - 37,148 \\ \hline 13,216 \end{array}$$

5
$$\begin{array}{r} 100,000 \\ - 23,871 \\ \hline 76,129 \end{array}$$