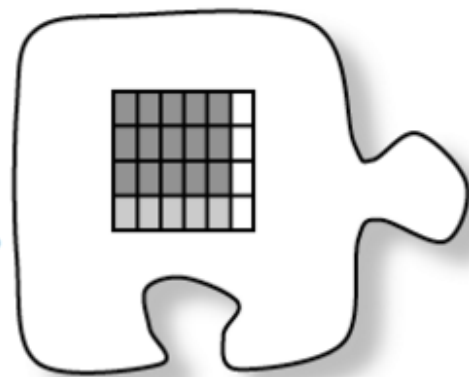


5.1.3 How can I calculate it without drawing?

Calculating Parts of Parts



In the past two lessons, you have been describing and finding parts of parts by using diagrams to represent multiplication. Today you will find strategies for multiplying fractions without needing to draw a diagram. As you work with your team, use the following questions to help focus your discussion.

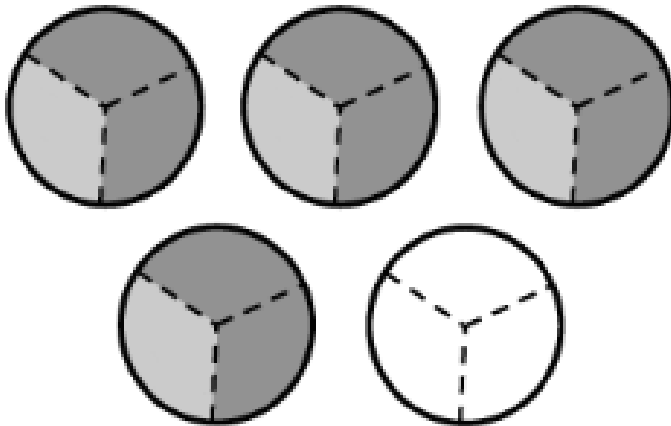
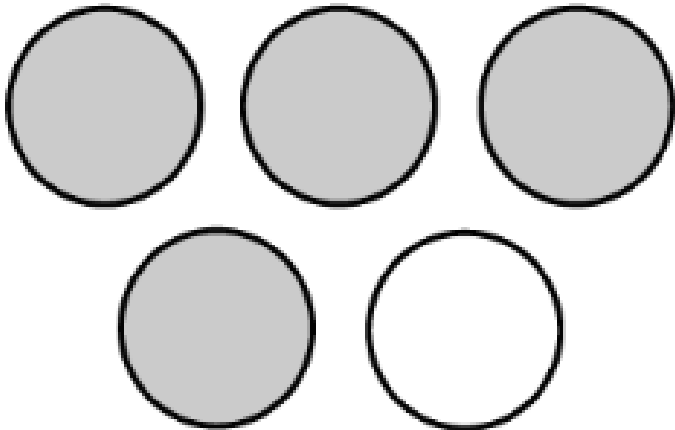
How can we visualize it?

How many parts should there be?

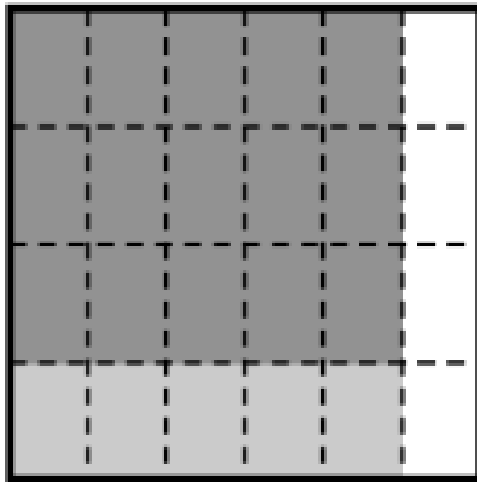
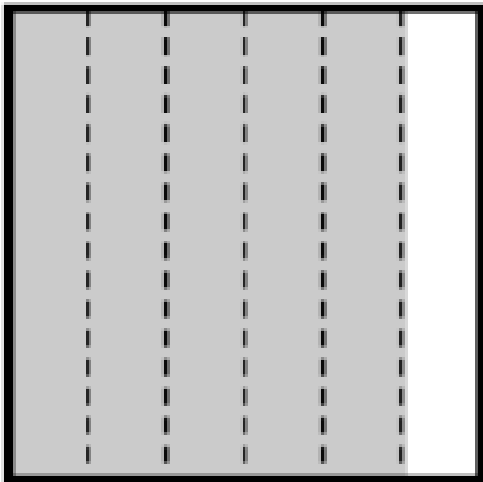
What is the portion of the whole?

5-18. Each of the pairs of diagrams below shows a first and a second step that could be used to represent a multiplication problem. For each pair, write the corresponding multiplication problem and its solution. Be prepared to share your ideas with the class.

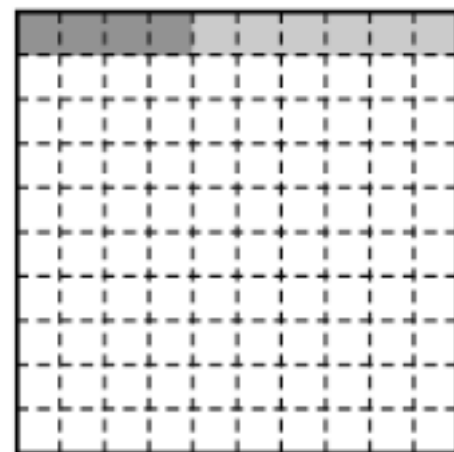
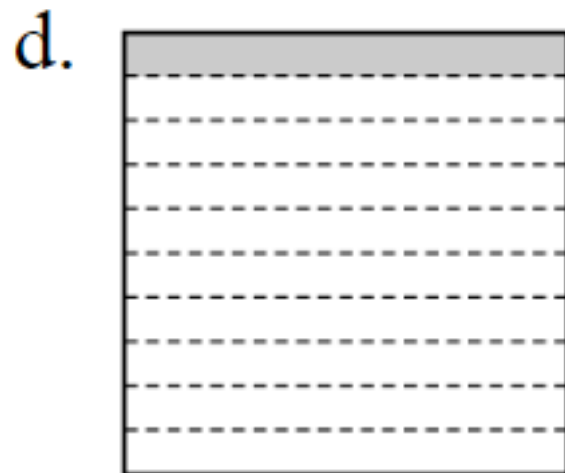
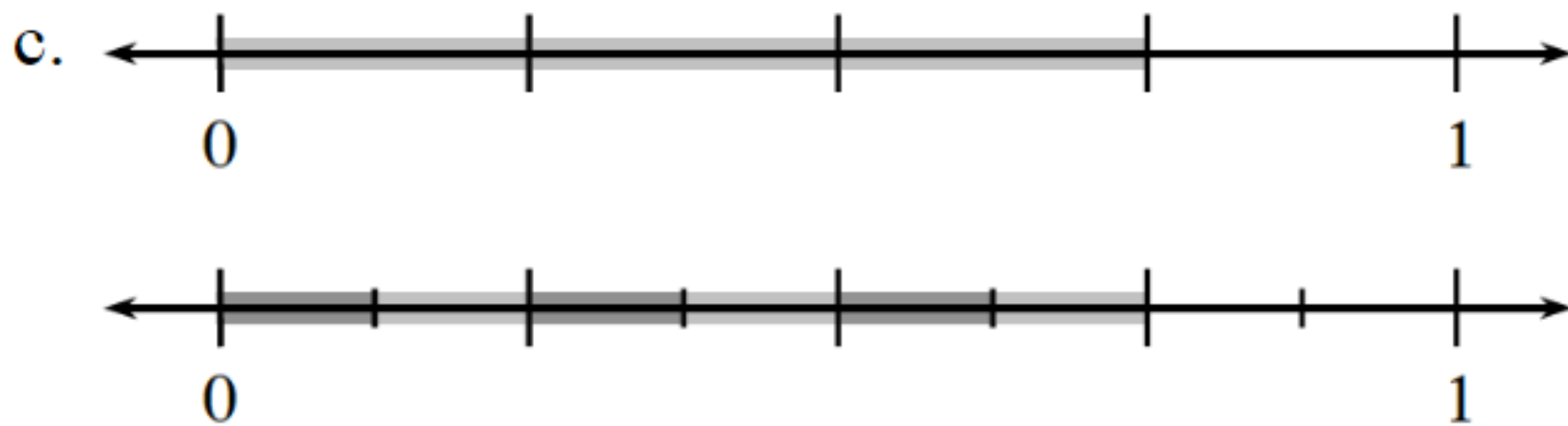
a.



b.



5-18. Each of the pairs of diagrams below shows a first and a second step that could be used to represent a multiplication problem. For each pair, write the corresponding multiplication problem and its solution. Be prepared to share your ideas with the class.



5-19. How can you figure out the size of a part of a part without having to draw a diagram? Work with your team or your class to explore this question as you consider the example of $\frac{2}{3} \cdot \frac{4}{5}$.

- a. Describe how you could draw a diagram to make this calculation.
- b. If you completed the diagram, how many parts would there be in all? How do you know?
- c. How many of the parts would be counted for the numerator of your result? Again, describe how you know.
- d. How can you know what the numerator and denominator of a product will be without having to draw or envision a diagram each time? Discuss this with your team and be prepared to explain your ideas to the class.

5-20. PARTS OF PARTS, Part 2

Work with your team to find each of the following parts of parts *without drawing a diagram*. For each problem, explain clearly why your answer makes sense.

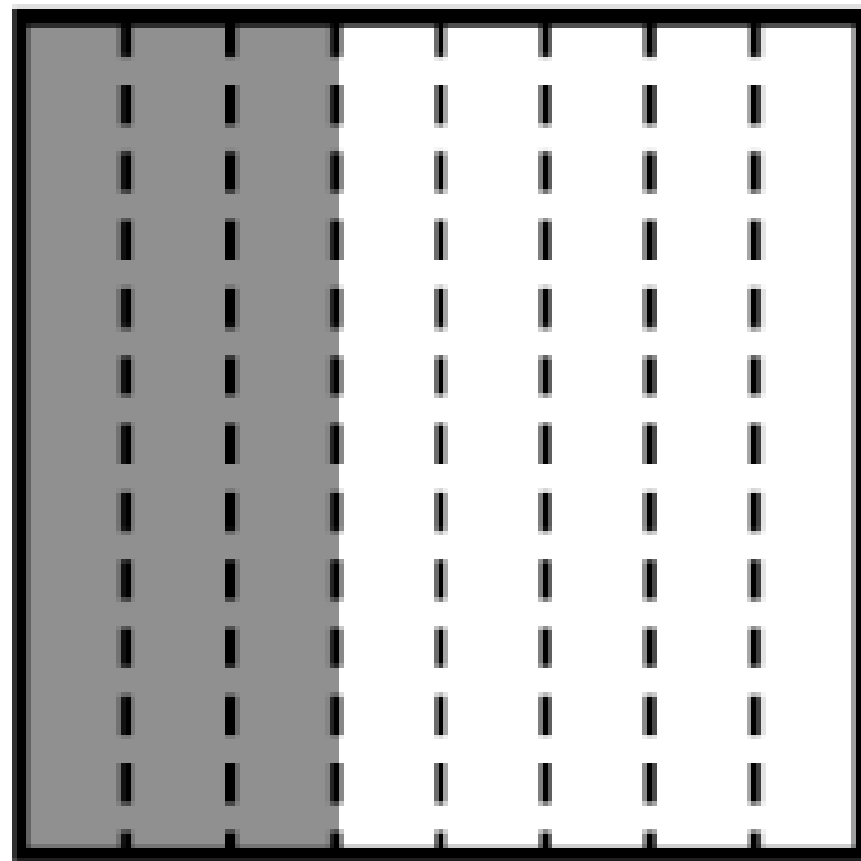
a. $\frac{2}{3}$ of $\frac{2}{7}$

b. $\frac{6}{11} \cdot \frac{2}{7}$

5-21. Andy and Bill were working on finding $\frac{1}{3}$ of $\frac{3}{8}$. They started by drawing the diagram at right. Suddenly Andy had an idea. “*Wait!*” he said, “*I can see the answer in this diagram without having to draw anything else.*”

a. Discuss with your team what Andy might have been talking about. Be prepared to share your ideas with the class.


b. Use your diagram to find $\frac{1}{3}$ of $\frac{3}{8}$ and $\frac{2}{3}$ of $\frac{3}{8}$.



5-23. LEARNING LOG

In your Learning Log, describe a strategy for multiplying fractions without having to draw a diagram. Use examples and diagrams to explain why this strategy makes sense. Title this entry “Multiplying Fractions” and label it with today’s date.



5-24. Write each of the mixed numbers below as a fraction greater than one, and write each of the fractions greater than one as a mixed number. Include a diagram to explain each answer. [Homework Help](#) 

a. $4\frac{1}{3}$

b. $\frac{15}{4}$

c. $3\frac{1}{2}$

d. $\frac{15}{8}$

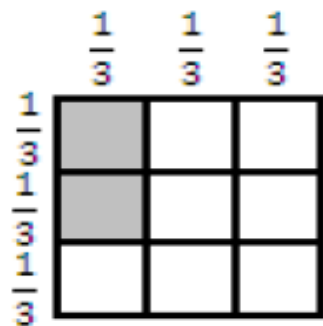
5-25. Calculate each of the following parts of parts.

Homework Help 

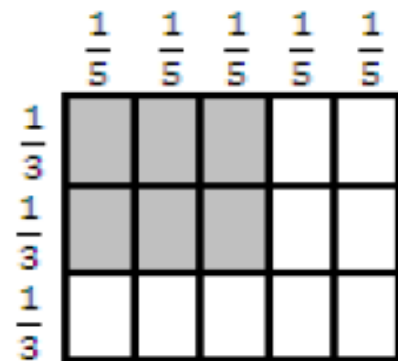
Find the answer and draw a diagram that supports your answer.

a. $\frac{2}{3}$ of $\frac{3}{7}$

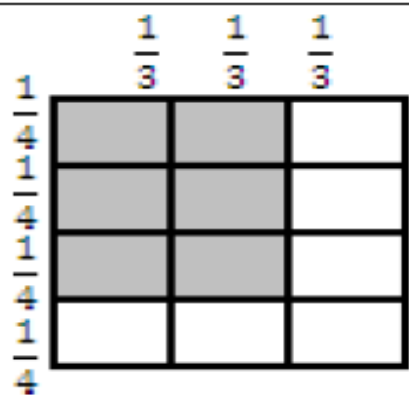
b. $\frac{1}{2}$ of $\frac{3}{5}$



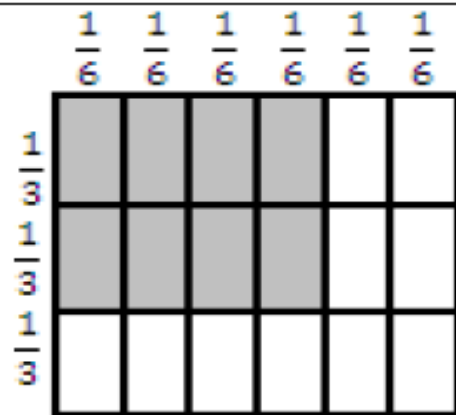
$$\frac{\square}{\square} \times \frac{\square}{\square} = \frac{\square}{\square}$$



$$\frac{\square}{\square} \times \frac{\square}{\square} = \frac{\square}{\square}$$

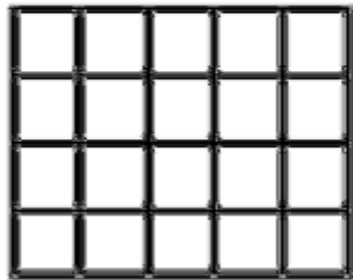


$$\frac{\square}{\square} \times \frac{\square}{\square} = \frac{\square}{\square}$$

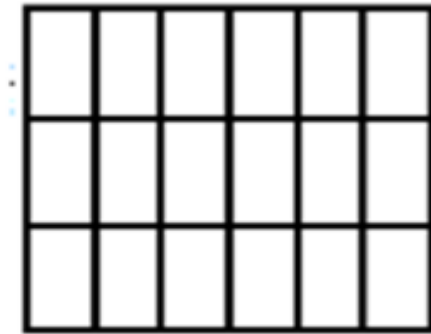


$$\frac{\square}{\square} \times \frac{\square}{\square} = \frac{\square}{\square}$$

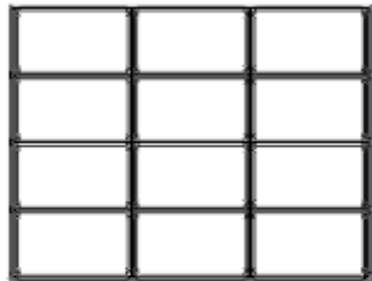
$$\frac{3}{4} \times \frac{4}{5} = \frac{\boxed{}}{\boxed{}}$$



$$\frac{2}{3} \times \frac{4}{6} = \frac{\boxed{}}{\boxed{}}$$



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



$$\frac{1}{3} \times \frac{1}{2} = \frac{\boxed{}}{\boxed{}}$$

