

## Warm Up Grade 8

Show work and evaluate

a)  $\frac{7}{5}$  of 100

$$\begin{array}{l} \xrightarrow{\times 7} \frac{1}{5} \text{ of } 100 = 20 \\ \frac{7}{5} \text{ of } 100 = \boxed{140} \end{array}$$

b)  $\frac{3}{4}$  of 48

$$\begin{array}{l} \xrightarrow{\times 3} \frac{1}{4} \text{ of } 48 = 12 \\ \frac{3}{4} \text{ of } 48 = \boxed{36} \end{array}$$

## Mental Math - Lesson 29

## Power Builder A

1.  $\frac{1}{4}$  of 12 = 3

2.  $\frac{1}{5}$  of 35 = 7

3.  $\frac{1}{8}$  of 40 = 5

4.  $\frac{1}{3}$  of 45 = 15

5.  $\frac{1}{7}$  of 28 = 4

6.  $\frac{3}{7}$  of 28 =  $3 \times 4$   
= 12

7.  $\frac{1}{5}$  of 45 = 9

8.  $\frac{2}{5}$  of 45 =  $9 \times 2$   
= 18

9.  $\frac{1}{10}$  of 70 = 7

10.  $\frac{3}{10}$  of 70 =  $3 \times 7$   
= 21

11.  $\frac{4}{5}$  of 20

$\frac{1}{5}$  of 20 = 4

$\frac{4}{5}$  of 20 =  $4 \times 4 = 16$

12.  $\frac{3}{7}$  of 42

$\frac{1}{7}$  of 42 = 6

$\frac{3}{7}$  of 42 =  $6 \times 3$   
= 18

13.  $\frac{3}{4}$  of 100

$\frac{1}{4}$  of 100 = 25

$\frac{3}{4}$  of 100 =  $3 \times 25$   
= 75

14.  $\frac{2}{3}$  of 90

$\frac{1}{3}$  of 90 = 30

$\frac{2}{3}$  of 90 = 60

15.  $\frac{3}{5}$  of 100

$\frac{1}{5}$  of 100 = 20

$\frac{3}{5}$  of 100 =  $20 \times 3$   
= 60

16.  $\frac{5}{8}$  of 40

$\frac{1}{8}$  of 40 = 5

$\frac{5}{8}$  of 40 =  $5 \times 5 = 25$

17.  $\frac{2}{3}$  of 600

$\frac{1}{3}$  of 600 = 200

$\frac{2}{3}$  of 600 =  $2 \times 200$   
= 400

18.  $\frac{3}{4}$  of 200

$\frac{1}{4}$  of 200 = 50

$\frac{3}{4}$  of 200 =  $3 \times 50$   
= 150

19.  $\frac{4}{5}$  of 200

$\frac{1}{5}$  of 200 = 40

$\frac{4}{5}$  of 200 =  $4 \times 40$   
= 160

20.  $\frac{2}{3}$  of 450

$\frac{1}{3}$  of 450 = 150

$\frac{2}{3}$  of 450 =  $2 \times 150$   
= 300

 $\frac{1}{4}$   $\frac{1}{4}$   $\frac{1}{4}$ 

4	4	4				
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## Lesson 29 Power Builder B

1.  $\frac{1}{3}$  of 15 = 5

2.  $\frac{1}{5}$  of 25 = 5

3.  $\frac{1}{4}$  of 40 = 10

4.  $\frac{1}{8}$  of 48 = 6

5.  $\frac{1}{7}$  of 35 = 5

6.  $\frac{2}{7}$  of 35 =  $2 \times 5$   
= 10

7.  $\frac{1}{3}$  of 90 = 30

8.  $\frac{2}{3}$  of 90 =  $2 \times 30$   
= 60

9.  $\frac{1}{10}$  of 60 = 6

10.  $\frac{3}{10}$  of 60 =  $3 \times 6$   
= 18

11.  $\frac{3}{4}$  of 20

12.  $\frac{2}{7}$  of 28

$\frac{1}{4}$  of 20 = 5

$\frac{1}{7}$  of 28 = 4

so  $\frac{3}{4}$  of 20 =  $3 \times 5$   
= 15

$\frac{2}{7}$  of 28 =  $2 \times 4$   
= 8

13.  $\frac{4}{5}$  of 100

14.  $\frac{3}{4}$  of 80

$\frac{1}{5}$  of 100 = 20

$\frac{1}{4}$  of 80 = 20

$\frac{4}{5}$  of 100 =  $4 \times 20$   
= 80

$\frac{3}{4}$  of 80 =  $3 \times 20$   
= 60

15.  $\frac{2}{5}$  of 100

16.  $\frac{3}{8}$  of 80

$\frac{1}{5}$  of 100 = 20

$\frac{1}{8}$  of 80 = 10

$\frac{2}{5}$  of 100 =  $2 \times 20$   
= 40

$\frac{3}{8}$  of 80 =  $3 \times 10$   
= 30

17.  $\frac{2}{3}$  of 300

18.  $\frac{3}{4}$  of 100

$\frac{1}{3}$  of 300 = 100

$\frac{1}{4}$  of 100 = 25

$\frac{2}{3}$  of 300 =  $2 \times 100$   
= 200

$\frac{3}{4}$  of 100 =  $3 \times 25$   
= 75

19.  $\frac{4}{5}$  of 200

20.  $\frac{2}{3}$  of 900

$\frac{1}{5}$  of 200 = 40

$\frac{1}{3}$  of 900 = 300

$\frac{4}{5}$  of 200 =  $4 \times 40$   
= 160

$\frac{2}{3}$  of 900 =  $2 \times 300$   
= 600

Recall that multiplication is repeated addition

$$3 + 3 + 3 + 3 + 3 + 3 = 6 \times 3 \text{ Because 3 is repeated 6 times}$$

so

$$\frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} = \frac{1}{5} \times 4 \quad \text{or} \quad 4 \times \frac{1}{5}$$

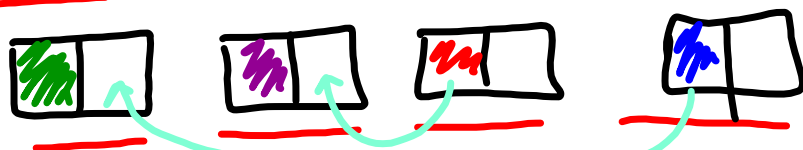
Remember order doesn't matter with multiplication

-commutative law

## Multiplying Whole Numbers and Fractions

What does  $4 \times \frac{1}{2}$  mean?

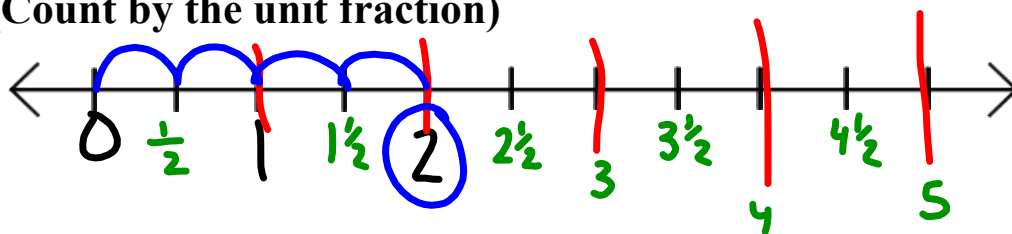
4 groups of  $\frac{1}{2}$ , which we can model using rectangles.



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

$$4 \times \frac{1}{2} = 4 \text{ jumps of size } \frac{1}{2}$$

You can also use number line  
(Count by the unit fraction)

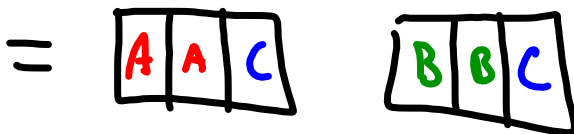
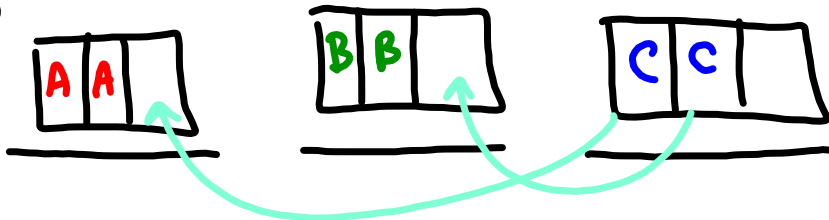


$$4 \times \frac{1}{2} = 2$$

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

Try  $3 \times \frac{2}{3}$  Model with a) rectangles  
b) number lines

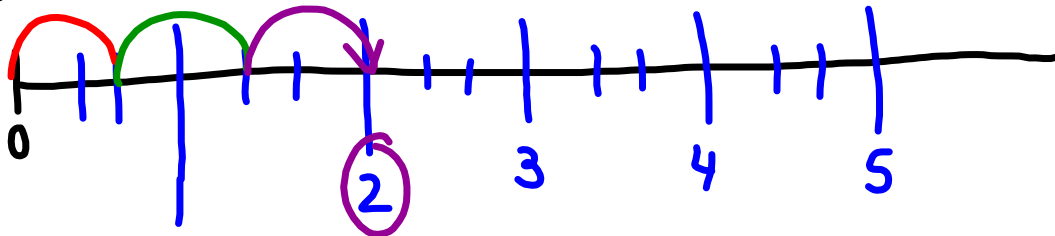
# of groups  
 ← box cut in to

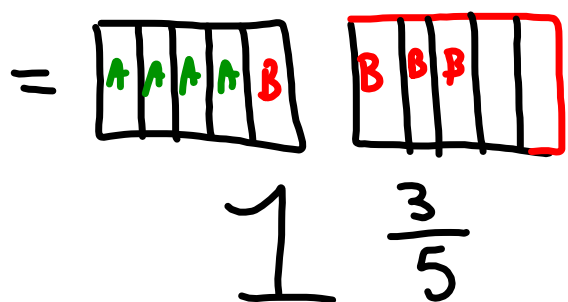
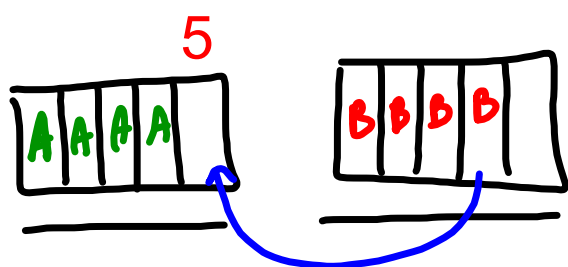


$$3 \times \frac{2}{3} = 2$$

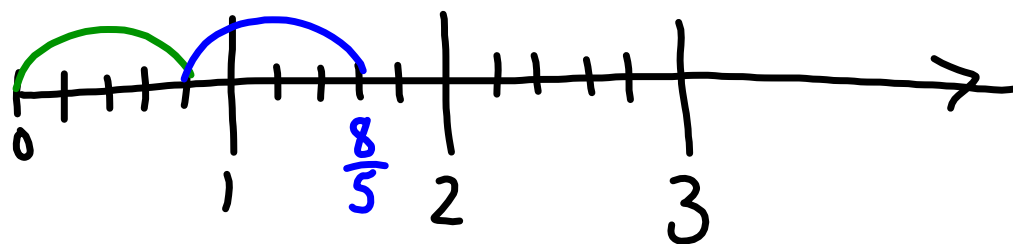
# jumps

Number line



Try  $2 \times \underline{4}$ 

$$2 \times \frac{4}{5}$$



$$2 \times \frac{4}{5} = \frac{8}{5} = 1 \frac{3}{5}$$

When it ask the following...

"Write each statement as multiplication statements in two ways."

$$\frac{5}{9} \text{ of } 45$$

First way

$$\frac{5}{9} \times 45$$

Second way

$$45 \times \frac{5}{9}$$

$$\frac{1}{9} \text{ of } 45 = 5$$

$$\frac{5}{9} \text{ of } 45 = 5 \times 5 \\ = 25$$



# Jumps x Jump size = Stop  
(frac)

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use fraction rectangles since they are easier to draw

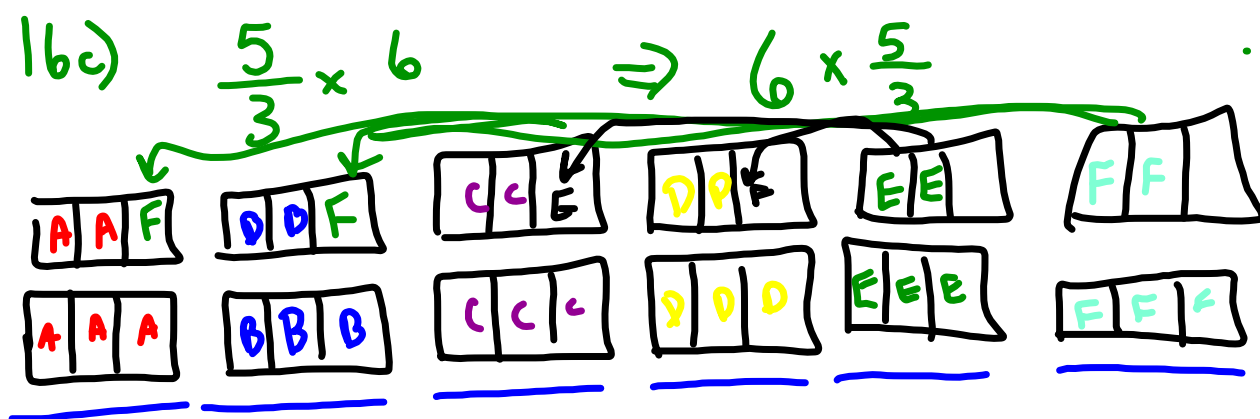
# 6, #7, #8a, #9(a,b), #10(~~3~~,b), #11(a,b,~~5~~)  
#14(a,~~5~~), #15(a,c), #16(a,c,f), #17

↓  
model  
with number line  
OR  
rectangles  
NOT BOTH

↓  
don't model  
just answer

↘ 16) Top x Top  
Bot x Bot

$\frac{3}{1} \times \frac{4}{5} \Rightarrow \frac{3}{1} \times \frac{4}{5} = \frac{12}{5}$



$$\frac{6}{1} \times \frac{5}{3} = \frac{30}{3} = 10$$

1b c)

**Check**

5. Write each statement as a multiplication statement in two ways.

a)  $\frac{5}{9}$  of 45      b)  $\frac{3}{8}$  of 32

c)  $\frac{1}{12}$  of 36      d)  $\frac{4}{5}$  of 25

6. Write each repeated addition as a multiplication statement in two ways.

a)  $\frac{1}{4} + \frac{1}{4} + \frac{1}{4}$

b)  $\frac{2}{5} + \frac{2}{5} + \frac{2}{5} + \frac{2}{5} + \frac{2}{5} + \frac{2}{5} + \frac{2}{5}$

c)  $\frac{3}{10} + \frac{3}{10} + \frac{3}{10} + \frac{3}{10}$

7. Use fraction circles to find:  $\frac{2}{3} \times 6$

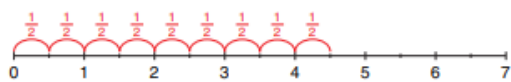
- a) Write the multiplication as repeated addition.
- b) Use fraction circles to find the sum.
- c) Sketch the fraction circles.
- d) Write the multiplication equation the fraction circles represent.

8. Write the two multiplication equations each number line represents.

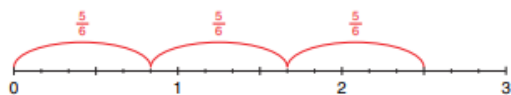
a)



b)

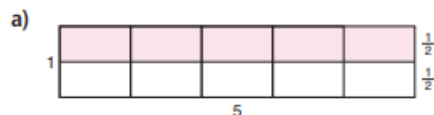


c)



**Apply**

9. For each diagram below, state the product the shaded area represents.



10. Write the two multiplication statements each set of fraction circles represents. Then find each product.



11. Use fraction circles to find each product. Sketch the fraction circles. Write a multiplication equation each time.

a)  $5 \times \frac{1}{8}$     b)  $\frac{2}{5} \times 3$     c)  $4 \times \frac{5}{12}$

12. Use counters to help you find each product.

a)  $\frac{1}{2} \times 24$     b)  $\frac{1}{3} \times 24$     c)  $\frac{1}{4} \times 24$   
 d)  $\frac{1}{6} \times 24$     e)  $\frac{1}{8} \times 24$     f)  $\frac{1}{12} \times 24$

13. Use the results in question 12 to find each product.

a)  $\frac{2}{2} \times 24$     b)  $\frac{2}{3} \times 24$     c)  $\frac{3}{4} \times 24$   
 d)  $\frac{5}{6} \times 24$     e)  $\frac{3}{8} \times 24$     f)  $\frac{5}{12} \times 24$

- 14.** Multiply. Draw a picture or number line to show each product.

a)  $3 \times \frac{4}{7}$       b)  $\frac{2}{15} \times 10$   
 c)  $4 \times \frac{9}{4}$       d)  $\frac{2}{5} \times 7$

- 15.** Draw and shade rectangles to find each product.

a)  $\frac{1}{3} \times 12$       b)  $\frac{1}{5} \times 15$   
 c)  $\frac{3}{5} \times 15$       d)  $\frac{3}{8} \times 16$

- 16.** Multiply.

a)  $3 \times \frac{4}{5}$     b)  $5 \times \frac{7}{9}$     c)  $\frac{5}{3} \times 6$   
 d)  $\frac{1}{2} \times 5$     e)  $12 \times \frac{7}{8}$     f)  $\frac{2}{4} \times 9$

- 17.** It takes  $\frac{2}{3}$  h to pick all the apples on one tree at Springwater Farms. There are 24 trees. How long will it take to pick all the apples? Show your work.

**18. Assessment Focus**

- a) Describe a situation that could be represented by  $5 \times \frac{3}{8}$ .  
 b) Draw a picture to show  $5 \times \frac{3}{8}$ .  
 c) What meaning can you give to  $\frac{3}{8} \times 5$ ?  
 Draw a picture to show your thinking.

- 19.** Parri used the expression  $\frac{5}{8} \times 16$  to solve a word problem. What might the word problem be? Solve the problem.

- 20.** Naruko went to the West Edmonton Mall. She took \$28 with her. She spent  $\frac{4}{7}$  of her money on rides. How much money did Naruko spend on rides? Use a model to show your answer.



**21. Take It Further**

- a) Use models. Multiply.

i)  $2 \times \frac{1}{2}$       ii)  $3 \times \frac{1}{3}$   
 iii)  $4 \times \frac{1}{4}$       iv)  $5 \times \frac{1}{5}$

- b) Look at your answers to part a. What do you notice? How can you explain your findings?  
 c) Write two different multiplication statements with the same product as in part a.

- 22. Take It Further** Jacques takes  $\frac{3}{4}$  h to fill one shelf at the supermarket. Henri can fill the shelves in two-thirds Jacques' time. There are 15 shelves. Henri and Jacques work together. How long will it take to fill the shelves? Justify your answer.