

PART I GET STARTED**Today's Mathematics**

We will count fraction-sized groups, find reciprocals, and divide fractions.

Essential Question

How can you divide by a fraction?

DO NOW

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

2. $6 \times \frac{1}{2}$

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

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

SEE IT

A ribbon is 2 feet long. Each small piece is half a foot long. How many pieces can you make? Draw a strip divided into half-foot lengths. Write a division expression.

QUICK WRITE | 2 MINUTES

Why can a 2-foot ribbon make more than two half-foot pieces?

PART II INVESTIGATE

BUILD A MODEL AND LOOK FOR A PATTERN

- How many two-thirds are in 3? Draw three wholes divided into thirds. Circle groups of two third-sized cells. Count complete groups and the fraction of one group left.

Division	Quotient	Multiplication	Product
$4 \div 2$		$4 \times \frac{1}{2}$	
$4 \div 1$		4×1	
$4 \div \frac{1}{2}$		4×2	
$4 \div \frac{1}{4}$		4×4	
$4 \div \frac{1}{8}$		4×8	

COMPARE AND EXPLAIN

What changes from the division column to the multiplication column? What stays the same?

PART III MAKE SENSE AND PRACTICE**WHAT WE CAN CONCLUDE**

Reciprocals have product 1. Keep the first number and multiply by the reciprocal of the divisor. Write whole numbers over 1. Simplify. Zero has no reciprocal. Check: quotient $\times$ divisor = starting amount.

WORKED MODEL

$\frac{3}{4} \div \frac{1}{2} = \frac{3}{4} \times \frac{2}{1} = \frac{3}{2} = 1 \frac{1}{2}$. There is one complete half-cup and half of another. Use parentheses first; multiply and divide left to right; then add or subtract.

MUST DO

1. Reciprocal of $\frac{5}{7}$

2. Reciprocal of 9

3. $\frac{2}{3} \div \frac{1}{6}$

4. $3 \div \frac{3}{4}$

5. $\frac{5}{6} \div 2$

6. You have $\frac{3}{4}$ yard of string. Each piece is $\frac{1}{8}$ yard. How many pieces can you cut?

READY FOR MORE

Evaluate $\frac{1}{3} + \frac{2}{3} \div 4$. Then explain why $\frac{1}{4} \div \frac{1}{2}$ is less than 1 using group size.

PART IV PUZZLE PRACTICE

Why was the gentleman who was selling watches unhappy?

Find each answer. Use the matching answer bank on page 5. Write its letter above the exercise number in the decoder.

1-6. WRITE THE RECIPROCAL

1. 5

2. 12

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

4. $\frac{4}{9}$

5. $\frac{7}{6}$

6. $\frac{1}{8}$

7-16. DIVIDE AND SIMPLIFY

7. $\frac{1}{16} \div \frac{1}{8}$

8. $\frac{6}{7} \div \frac{3}{5}$

9. $14 \div \frac{2}{7}$

10. $\frac{5}{8} \div 10$

11. $\frac{14}{15} \div 7$

12. $\frac{5}{24} \div \frac{5}{6}$

13. $\frac{9}{20} \div \frac{3}{4}$

14. $\frac{1}{4} \div \frac{1}{36}$

15. $\frac{7}{8} \div 28$

16. $3 \div \frac{2}{3}$

Continue on page 5. For 19-24, use order of operations.

PART IV PUZZLE PRACTICE | continued

17. $\frac{3}{14} \div \frac{9}{11}$

18. $18 \div \frac{9}{13}$

19. $\frac{1}{9} \div 9 \div 9$

20. $3 \div \frac{9}{11} + \frac{1}{3}$

21. $\frac{1}{2} + \frac{7}{8} \div \frac{11}{24}$

22. $\frac{5}{12} \times \frac{2}{3} \div \frac{2}{9}$

23. $\frac{8}{21} \div \frac{2}{3} \times \frac{4}{9}$

24. $\frac{9}{16} \div 18 \div 8$

25. There are 3 pieces of pizza left. How many quarter-size pieces can be sliced from those 3 pieces?

ANSWER BANK | 1-6

A: $\frac{6}{7}$ M: $2 \frac{1}{4}$ H: $\frac{1}{5}$ O: 8 N: $1 \frac{1}{2}$ S: $\frac{1}{12}$

ANSWER BANK | 7-25

A: $\frac{11}{42}$ N: $4 \frac{1}{2}$ I: 49 O: $\frac{2}{15}$ H: $\frac{1}{2}$ L: 26
S: 9 I: $\frac{3}{5}$ D: $\frac{1}{16}$ F: $1 \frac{3}{7}$ T: $\frac{1}{32}$ H: $\frac{1}{4}$
O: 12 H: $2 \frac{9}{22}$ E: $\frac{1}{256}$ A: $1 \frac{1}{4}$ E: $\frac{1}{729}$ T: 4
D: $\frac{16}{63}$

DECODER | Read both rows in order

12	24		1	22	10		17		18	25	15		11	8		20	9	4	19	
6	16		21	13	2		7	5	3	23	14									