Name & Surname: _____ Class: _____ Date: _____

DIVIDING FRACTIONS

Find quotients with models and reciprocals



About 50 minutes Level ★★★☆☆

DIVIDING FRACTIONS

Division asks how many times the **divisor** fits into the **dividend**. Use a bar model to see it, then compute with the **reciprocal**.

- **Keep** the first fraction as it is.
- **Change** ÷ to × and **flip** the second fraction to its reciprocal.
- **Multiply** across, then simplify to lowest terms.
- **Check**: quotient × divisor should equal the dividend.

KEY WORDS

quotient: the answer to a division problem

dividend: the number being divided

divisor: the number you divide by

reciprocal: a fraction flipped upside down

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DIVIDING FRACTIONS

TASK A

/12

Find each quotient. Simplify and check with multiplication.

WARM UP

1 Find the **quotient**: $\frac{1}{2} \div \frac{1}{4}$

Answer: _____

2 Find the **quotient**: $\frac{3}{4} \div \frac{1}{2}$

Answer: _____

3 Find the **quotient**: $\frac{2}{3} \div \frac{1}{3}$

Answer: _____

4 Find the **quotient**: $\frac{5}{6} \div \frac{1}{6}$

Answer: _____

PRACTISE

5 Use the **reciprocal** to find: $\frac{2}{3} \div \frac{3}{4}$

Answer: _____

6 Use the **reciprocal** to find: $\frac{3}{5} \div \frac{2}{3}$

Answer: _____

7 Use the **reciprocal** to find: $\frac{7}{8} \div \frac{7}{16}$

Answer: _____

8 Use the **reciprocal** to find: $\frac{4}{5} \div \frac{8}{15}$

Answer: _____

PROBLEM SOLVING

9 A student has $\frac{3}{4}$ yard of **string**. Pieces $\frac{1}{8}$ yard long are cut. How many **pieces** can be cut?

Answer: _____

10 A jug holds $\frac{2}{3}$ gallon of **water**. Cups hold $\frac{1}{6}$ gallon each. How many **cups** can be filled?

Answer: _____

11 Explain how you know that $\frac{3}{4} \div \frac{1}{2} = 1\frac{1}{2}$ using **multiplication**.

Answer: _____

12 A student says $\frac{1}{2} \div \frac{1}{4} = \frac{1}{8}$. Explain how you know this is **wrong**.

Answer: _____

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DIVIDE WITH CONFIDENCE

Keep practicing with harder fractions and mixed numbers.

TASK B

/12

Solve each division. Show the reciprocal step and simplify.

WARM UP

1 Find the **quotient**: $\frac{1}{3} \div \frac{2}{3}$

Answer: _____

2 Find the **quotient**: $\frac{4}{9} \div \frac{2}{3}$

Answer: _____

3 Find the **quotient**: $\frac{5}{8} \div \frac{1}{4}$

Answer: _____

4 Find the **quotient**: $\frac{9}{10} \div \frac{3}{5}$

Answer: _____

PRACTISE

5 Use the **reciprocal** to find: $1\frac{1}{2} \div \frac{1}{2}$

Answer: _____

6 Use the **reciprocal** to find: $2\frac{1}{4} \div \frac{3}{4}$

Answer: _____

7 Use the **reciprocal** to find: $\frac{3}{4} \div \frac{9}{10}$

Answer: _____

8 Use the **reciprocal** to find: $\frac{5}{6} \div \frac{5}{12}$

Answer: _____

PROBLEM SOLVING

9 A roll has $\frac{7}{8}$ yard of **ribbon**. Pieces $\frac{1}{8}$ yard long are cut. How many **pieces** are there?

Answer: _____

10 A cook has $\frac{5}{2}$ cups of **flour**. Each batch uses $\frac{5}{8}$ cup. How many **batches** can be made?

Answer: _____

11 A crew paints $\frac{4}{5}$ mile in sections $\frac{2}{15}$ mile long. How many **sections** are painted?

Answer: _____

12 A student says dividing by $\frac{1}{2}$ always doubles. Explain how you know this is **correct**.

Answer: _____

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WORDS AND PICTURES

Connect vocabulary and visual models for division.

TASK C

/4

Complete the map for the key word reciprocal.

Definition (in my own words)

Characteristics

reciprocal

Examples

4/3 is the reciprocal of 3/4

Non-examples

3/4 is not the reciprocal of 3/4

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DIVIDING FRACTIONS

TASK D

/4

Shade, name and compare to see fraction sizes.

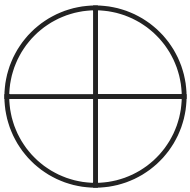
1



Fraction shaded: $\frac{\square}{\square}$

2

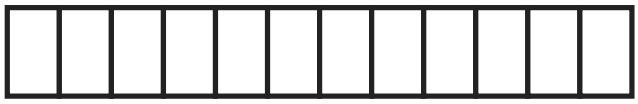
Shade $\frac{3}{4}$



3

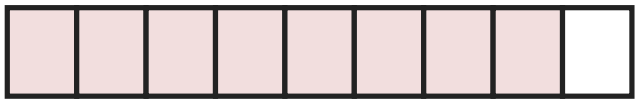


$= \frac{2}{3}$



$= \frac{\square}{12}$

4



$\frac{8}{9}$



$\frac{2}{3}$

$\frac{8}{9}$ $\square$ $\frac{2}{3}$ Write <, > or =

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SHOW YOUR STEPS

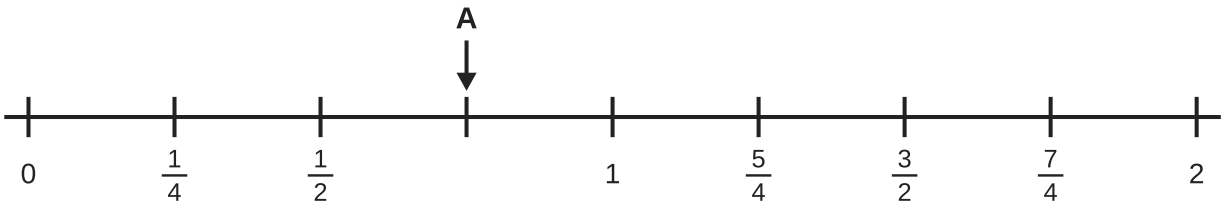
Follow worked steps and see division on number lines.

↑↓ TASK E

/4

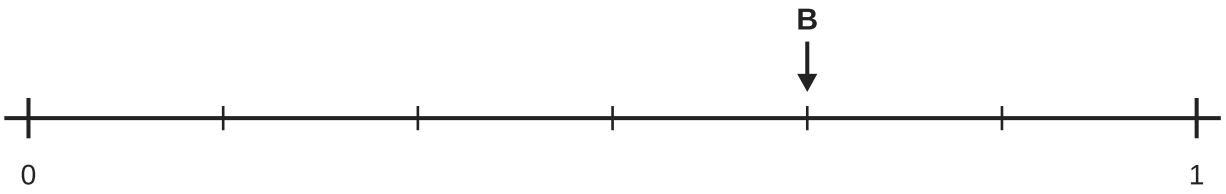
Count jumps of the divisor to find the quotient.

1



A = ☐ Draw an arrow to show: $\frac{3}{2}$

2



B = ☐ Draw an arrow to show: $\frac{5}{6}$

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DIVIDING FRACTIONS

TASK F

/2

Study each worked example, then try the matching problem with the reciprocal method.

WORKED EXAMPLE

Work out $\frac{2}{3} \div \frac{1}{6}$ to find the quotient

1. Keep $\frac{2}{3}$ as it is
2. Change ÷ to × and flip $\frac{1}{6}$ to $\frac{6}{1}$
3. Multiply: $\frac{2}{3} \times \frac{6}{1} = \frac{12}{3} = 4$
4. Check: $4 \times \frac{1}{6} = \frac{4}{6} = \frac{2}{3}$

Answer: 4

YOUR TURN

Work out $\frac{3}{4} \div \frac{1}{8}$ to find the quotient

Answer: _____

WORKED EXAMPLE

Work out $2\frac{1}{2} \div \frac{1}{2}$ to find the quotient

1. Write $2\frac{1}{2}$ as $\frac{5}{2}$
2. Change ÷ to × and flip $\frac{1}{2}$ to $\frac{2}{1}$: $\frac{5}{2} \times \frac{2}{1}$
3. Multiply: $\frac{5}{2} \times \frac{2}{1} = \frac{10}{2} = 5$
4. Check: $5 \times \frac{1}{2} = \frac{5}{2} = 2\frac{1}{2}$

Answer: 5

YOUR TURN

Work out $3\frac{1}{3} \div \frac{2}{3}$ to find the quotient

Answer: _____

HOW DID I DO?

Circle a face for each line.

I can divide fractions by fractions using reciprocals.	☹	😐	☺
I can use visual models to show quotients.	☹	😐	☺
I can solve word problems with fraction division.	☹	😐	☺

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Answer sheet: Dividing Fractions

Task A

1. 2
2. $1\frac{1}{2}$
3. 2
4. 5
5. $\frac{8}{9}$
6. $\frac{9}{10}$
7. 2
8. $1\frac{1}{2}$
9. 6
10. 4
11. Because $1\frac{1}{2} \times \frac{1}{2} = \frac{3}{4}$, so the quotient checks.
12. Because $\frac{1}{2} \div \frac{1}{4} = 2$ and $2 \times \frac{1}{4} = \frac{1}{2}$, not $\frac{1}{8}$.

Task B

1. $\frac{1}{2}$
2. $\frac{2}{3}$
3. $2\frac{1}{2}$
4. $1\frac{1}{2}$
5. 3
6. 3
7. $\frac{5}{6}$
8. 2
9. 7
10. 4
11. 6
12. Dividing by $\frac{1}{2}$ is the same as multiplying by 2, so the result is twice as large.

Task C

Definition: The reciprocal of a number is 1 divided by that number, or the fraction flipped upside down.

Characteristics: A number times its reciprocal equals 1, Switch the numerator and denominator to find it, The reciprocal of a/b is b/a

Examples: $\frac{4}{3}$ is the reciprocal of $\frac{3}{4}$, $\frac{1}{2}$ is the reciprocal of 2, 5 is the reciprocal of $\frac{1}{5}$

Non-examples: $\frac{3}{4}$ is not the reciprocal of $\frac{3}{4}$, $\frac{2}{5}$ is not the reciprocal of $\frac{3}{5}$, $\frac{3}{2}$ is not the reciprocal of $\frac{3}{2}$

Task D

1. $\frac{2}{3}$
2. Shade 3 of the 4 equal parts ($\frac{3}{4}$).
3. $\frac{2}{3} = \frac{8}{12}$ (shade 8 parts)
4. $\frac{8}{9} > \frac{2}{3}$

Task E

1. A = $\frac{3}{4}$; arrows at $\frac{3}{2}$
2. B = $\frac{2}{3}$; arrows at $\frac{5}{6}$

Task F

1. 6
2. 5

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