

Lecture Notes

Notes

- The **reciprocal** and **multiplicative inverse** of a number mean the same thing.
  - They refer to when the numerator and denominator switch positions.
  - Think of it as “flipping” the fraction upside down.
- Dividing fractions is very similar to multiplying fractions.
- We first convert the problem from division into multiplication.
- That conversion step is called “**Keep Change Flip**” (KCF).

Keep Change Flip (KCF)

- **Step 1: Keep.** “Keep” the *left* fraction the way it is.
- **Step 2: Change.** “Change” the division symbol ‘ ÷ ’ into a multiplication symbol ‘ • ’.
- **Step 3: Flip.** “Flip” the *right* fraction to its reciprocal.

Multiply Next

- After KCF is done, follow the exact same steps that you know from multiplying fractions.
- *Caution:* You **cannot “reduce up front”** while still in *division mode*. You can only “reduce up front” when in *multiplication mode*, after completing KCF.

Example:

$\frac{2}{5} \div \frac{8}{15} \Rightarrow \frac{2}{5} \cdot \frac{15}{8} \Rightarrow \frac{\overset{1}{\cancel{2}}}{5} \cdot \frac{15}{\underset{4}{\cancel{8}}} \Rightarrow \frac{1}{5} \cdot \frac{15}{4} \Rightarrow \frac{1}{\underset{1}{\cancel{5}}} \cdot \frac{\overset{3}{\cancel{15}}}{4} \Rightarrow \frac{1}{1} \cdot \frac{3}{4} \Rightarrow \frac{3}{4}$

- Perform KCF.
- “Reduce up front” (in multiplication mode).
- Multiply across.
- Answer is fully reduced.

Find the reciprocal.

$$\frac{3}{5}$$

The reciprocal of  $\frac{3}{5}$  is  $\frac{5}{3}$ .  
(Type a whole number or a fraction.)

- To find the reciprocal, “flip” the fraction upside down.

Find the reciprocal of 4.

The reciprocal of 4 is  $\frac{1}{4}$ .  
(Simplify your answer.)

- To find the reciprocal of a whole number, first place a ‘1’ under it to make ‘1’ the denominator.
- This converts the whole number into a fraction.
- Now flip the fraction.

Find the reciprocal.

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

The reciprocal of  $\frac{1}{4}$  is 4.  
(Simplify your answer.)

- Perform the flip.
- Now we have  $\frac{4}{1}$
- But we cannot leave a ‘1’ in the denominator of a fraction because a fraction means division, right? And 4 divided by 1 is **4**.

Divide. Write the answer in lowest terms and as a whole or mixed number if possible.

$$\frac{5}{14} \div \frac{7}{5}$$

$$\frac{5}{14} \div \frac{7}{5} = \frac{25}{98}$$

- Perform KCF.
- “Reduce up front” (in multiplication mode).
- Multiply across.
- Answer is fully reduced.

Divide. Write the answer in lowest terms and as a whole or mixed number if possible.

$$\frac{1}{6} \div \frac{17}{4}$$

Select the correct choice below and fill in any answer boxes in your choice.

A.  $\frac{1}{6} \div \frac{17}{4} = \frac{2}{51}$

B. The answer is undefined.

Divide. Write the answer in lowest terms and as a whole or mixed number if possible.

$$\frac{9}{2} \div \frac{3}{10}$$

$$\frac{9}{2} \div \frac{3}{10} = 15$$

Divide. Write the answer in lowest terms and as a whole or mixed number where possible.

$$77 \div \frac{11}{13}$$

$$77 \div \frac{11}{13} = 91$$

- When dividing a whole number and a fraction, write a ‘1’ under the whole number to make it into a fraction.
  - Putting a ‘1’ under any number does not change its value.
- Perform KCF.
- “Reduce up front” (in multiplication mode).
- Multiply across.
- Answer is fully reduced.

Divide and simplify.

$$\frac{3}{8} \div \frac{27}{8} = ?$$

$$\frac{3}{8} \div \frac{27}{8} = \frac{1}{9}$$

(Simplify your answer. Type a fraction.)

Divide and simplify.

$$\frac{5}{8} \div \frac{1}{8} = ?$$

$$\frac{5}{8} \div \frac{1}{8} = 5$$

Divide and simplify.

$$\frac{1}{5} \div \frac{1}{20}$$

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