

WORKSHEET 2.10: MULTIPLYING AND DIVIDING RATIONAL NUMBERS

To multiply and divide rational numbers, follow the steps below:

1. Write any mixed or whole numbers as improper fractions.
2. Rewrite a division problem by multiplying by the reciprocal of the number after the division sign.
3. Rewrite all fractions so that the denominators are positive.
4. Multiply the numerators following the rules for multiplying integers.
 - The product of two positive or two negative integers is positive.
 - The product of a negative and positive integer is negative.
 - The product of a number and zero is zero.
5. Multiply the denominators.
6. Simplify the answer either before you multiply or after you multiply.

EXAMPLES

$$-1\frac{1}{8} \cdot 2\frac{3}{5} = \frac{-9}{8} \cdot \frac{13}{5} = \frac{-117}{40} = -2\frac{37}{40}$$

$$-1\frac{3}{4} \div \left(-\frac{5}{8}\right) = -\frac{7}{4} \div \left(-\frac{5}{8}\right) = \frac{-7}{4} \cdot \frac{-8}{5} = \frac{56}{20} = 2\frac{16}{20} = 2\frac{4}{5}$$

DIRECTIONS: Find each product or quotient.

1. $-\frac{5}{6} \cdot \left(-\frac{2}{3}\right)$

2. $-4\frac{1}{2} \div \left(-\frac{3}{5}\right)$

3. $-2\frac{3}{4} \cdot 1\frac{3}{8}$

4. $-4 \div 5\frac{1}{2}$

5. $-\frac{3}{8} \div \frac{0}{4}$



CHALLENGE: Sarah may have found a new way for dividing fractions! Instead of rewriting the division problem by multiplying by the reciprocal of the number after the division sign, she simply multiplied the fractions. Then she found the reciprocal of her answer. Is this correct? Explain your answer and provide an example.

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DIRECTIONS: Find each product or quotient.

1. $-\frac{5}{6} \cdot \left(-\frac{2}{3}\right) = \frac{5}{9}$

2. $-4\frac{1}{2} \div \left(-\frac{3}{5}\right) = 7\frac{1}{2}$ OR $\frac{15}{2}$

3. $-2\frac{3}{4} \cdot 1\frac{3}{8} = -3\frac{25}{32}$ OR $-\frac{121}{32}$

4. $-4 \div 5\frac{1}{2} = -\frac{8}{11}$

5. $-\frac{3}{8} \div \frac{0}{4}$ Undefined



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Sarah thinks...

She is NOT correct! $\frac{3}{4} \div \frac{1}{2} \rightarrow \frac{3}{4} \cdot \frac{1}{2} = \frac{3}{8}$ WRONG!
 You can not just replace the division sign with a multiplication sign; the answers are different
 $\frac{3}{4} \div \frac{1}{2} \rightarrow \frac{3}{4} \cdot \frac{2}{1} = \frac{6}{4} = 1\frac{1}{2}$ CORRECT