

# Dividing Integers and Rational Numbers

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Score: \_\_\_\_\_ / 17

You already have all the tools you need for this! Combine the sign rules from Chapter 1 with the **Keep · Change · Flip** rule and every rational-number division becomes a multiplication problem. First, decide the sign of the quotient (same signs → positive, different signs → negative). Then flip the second number, multiply, and simplify. A great final check: multiply your answer by the divisor—if you get the original dividend back, you nailed it!

## Key Concepts & Quick Review

**Step 1 — Sign:** same signs ⇒ +; different signs ⇒ −

**Step 2 — KCF on absolute values:**  $n \div \frac{a}{b} = \frac{n}{1} \times \frac{b}{a}$  **Example:**  $(-6) \div \frac{3}{4}$  : different signs ⇒ −;  
 $6 \times \frac{4}{3} = 8$ ; result: −8

## Examples

① Find  $\left(-\frac{3}{4}\right) \div \left(-\frac{3}{8}\right)$ .

**Think It Through:** Start with the sign. A negative divided by a negative is positive, so the answer will be positive. Now ignore the signs for a moment and use Keep, Change, Flip:  $\frac{3}{4} \div \frac{3}{8} = \frac{3}{4} \times \frac{8}{3}$ . The 3s cancel, and 8 and 4 simplify to 2 and 1, so the result is 2. Then bring back the positive sign. This is why separating the sign step from the fraction step makes division easier.

 **Answer:** 2

② A diver descends at a constant rate of  $-\frac{3}{4}$  foot per second. The diver needs to reach a depth of −6 feet. How many seconds does the dive take?

**Think It Through:** Time is found by dividing the total depth change by the rate:  $(-6) \div \left(-\frac{3}{4}\right)$ . Because both numbers are negative, the quotient is positive. Now use Keep, Change, Flip on the numbers:  $6 \div \frac{3}{4} = 6 \times \frac{4}{3} = \frac{24}{3} = 8$ . So the dive takes 8 seconds. That makes sense, because time should come out positive even though the diver is moving downward.

 **Answer:** 8 s

## Practice Problems

Divide. Determine the sign first, then apply Keep · Change · Flip. Simplify.

1.  $(-6) \div \frac{3}{4} =$  \_\_\_\_\_

3.  $\left(-\frac{2}{3}\right) \div \left(-\frac{4}{9}\right) =$  \_\_\_\_\_




2.  $\frac{5}{8} \div (-4) =$  \_\_\_\_\_

4.  $(-10) \div \frac{5}{6} =$  \_\_\_\_\_



5. $\frac{3}{4} \div (-6) =$	_____	10. $\left(-\frac{4}{5}\right) \div (-8) =$	_____
6. $\left(-\frac{7}{8}\right) \div \frac{7}{4} =$	_____	11. $(-2) \div (-1\frac{1}{2}) =$	_____
7. $(-9) \div \left(-\frac{3}{4}\right) =$	_____	12. $3 \div (-1\frac{1}{2}) =$	_____
8. $\frac{5}{6} \div \left(-\frac{10}{3}\right) =$	_____	13. $(-2\frac{1}{4}) \div \frac{3}{4} =$	_____
9. $(-15) \div \frac{3}{5} =$	_____	14. $(-3\frac{1}{3}) \div (-1\frac{2}{3}) =$	_____
		15. $5\frac{1}{2} \div (-2\frac{3}{4}) =$	_____

### Study Tips

-  The sign of the quotient is determined *before* you flip anything — flip only affects the magnitude.
-  Verify answers by multiplying back: quotient  $\times$  divisor should equal the dividend.
-  For decimal divisors, convert to fractions first (e.g.,  $2.5 = \frac{5}{2}$ ) if cross-cancelling would simplify the work.

### Word Problems

16. The temperature in a freezer drops at a constant rate. Over  $3\frac{1}{2}$  hours the total temperature change is  $-10\frac{1}{2}$  degrees Fahrenheit. Write a division expression to find the rate of change per hour and evaluate it. If the freezer started at  $-5^\circ\text{F}$ , what is the temperature after  $3\frac{1}{2}$  hours? \_\_\_\_\_

17. A pipe drains water from a tank at  $-\frac{5}{6}$  gal per minute. How many minutes does it take to drain 10 gal? If a second pipe simultaneously fills the tank at  $\frac{2}{5}$  gal per minute, what is the combined rate of change per minute? At the combined rate, how long does it take to drain the full 10 gal? \_\_\_\_\_



## Answer Keys

- 1) -8
- 2)  $-\frac{5}{32}$
- 3)  $\frac{3}{2}$
- 4) -12
- 5)  $-\frac{1}{8}$
- 6)  $-\frac{1}{2}$
- 7) 12
- 8)  $-\frac{1}{4}$
- 9) -25

- 10)  $\frac{1}{10}$
- 11)  $\frac{4}{3}$
- 12) -2
- 13) -3
- 14) 2
- 15) -2
- 16) Rate  $-3^{\circ}\text{F/hr}$ ; final temperature  $-15.5^{\circ}\text{F}$
- 17) Drain alone: 12 min; combined rate:  $-\frac{13}{30}$  gal/min; combined time:  $\approx 23.1$  min.

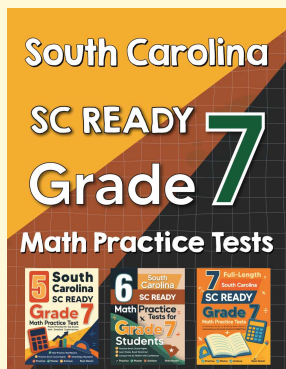
### Step-by-Step Explanations

*Tutoring notes not found for this topic.*



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