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 $\Rightarrow +$; different signs $\Rightarrow -$

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 $\Rightarrow -$; $6 \times \frac{4}{3} = 8$; 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. $(-6) \div \frac{3}{4} =$ _____

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

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

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

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5. $\frac{3}{4} \div (-6) =$ _____

6. $\left(-\frac{7}{8}\right) \div \frac{7}{4} =$ _____

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

8. $\frac{5}{6} \div \left(-\frac{10}{3}\right) =$ _____

9. $(-15) \div \frac{3}{5} =$ _____

10. $\left(-\frac{4}{5}\right) \div (-8) =$ _____

11. $(-2) \div \left(-1\frac{1}{2}\right) =$ _____

12. $3 \div \left(-1\frac{1}{2}\right) =$ _____

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

14. $\left(-3\frac{1}{3}\right) \div \left(-1\frac{2}{3}\right) =$ _____

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

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 $-5°$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 $-3°$F/hr; final temperature $-15.5°$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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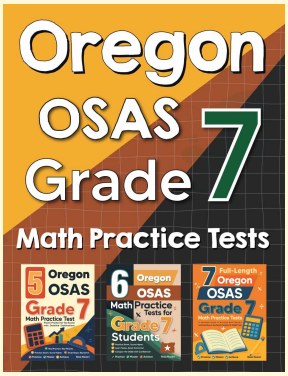

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