LESSON MAKER PRO

Signs in Division

Divide signed numbers and make sense of the result.

GRADE 7 · 7.NOS.A.2.b

7.NOS.A.2.b "Interpret quotients of rational numbers in context and represent division of signed numbers in different forms, such as −(p/q) = (−p)/q = p/(−q) when the divisor is not zero."

NAME _____ DATE _____

THE BIG IDEA

A quotient is negative when the numbers have different signs and positive when they have the same sign. To divide by a nonzero fraction, multiply by its reciprocal. In a negative fraction, the minus sign can go in front, in the numerator, or in the denominator.

WORKED EXAMPLE

Find (-18/11) ÷ (6/7). Show another way to write the negative quotient.

1. Multiply by the reciprocal: (-18/11) × (7/6).
2. Cancel 18 and 6: (-3 × 7)/11.
3. Multiply and move the minus sign: -21/11 = 21/(-11).

Answer: -21/11, or 21/(-11)

PRACTICE 6 problems

1 Find (-3/4) ÷ (9/16).

ANSWER _____

2 Find (-20/9) ÷ (-5/3).

ANSWER _____

3 Write -(23/17) in two other equivalent fraction forms.

ANSWER _____

_____

4 Find 15 ÷ (-12). Simplify your answer and put the minus sign in the denominator.

ANSWER _____

5 Which has the same value as (-27)/14: 27/(-14) or (-27)/(-14)? Explain using signs.

ANSWER _____

_____

6 Find (-28) ÷ (-35). Write your answer in simplest form.

ANSWER _____

APPLY IT Show your work

1 In a game, a player's energy changes by -30 points after 5 equal hits. What is the signed energy change per hit? Write a division equation and explain what the sign means.

WORK SPACE

ANSWER _____

2 A group orders $48 of snacks. Each payment changes the amount owed by -$12. The total change needed to pay it off is -$48. How many payments will the group make? Write a division equation and explain why the quotient is positive.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Find the nonzero value of x if (-3/4) ÷ x = 9/10. Write x in three equivalent fraction forms with the minus sign in front, in the numerator, and in the denominator. Explain why x is negative.

WORK SPACE AND ANSWER

ANSWER KEY

Signs in Division

GRADE 7 · 7.NOS.A.2.b

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find (-3/4) ÷ (9/16).	**-4/3**
2	Find (-20/9) ÷ (-5/3).	**4/3**
3	Write -(23/17) in two other equivalent fraction forms.	**(-23)/17 and 23/(-17)**
4	Find 15 ÷ (-12). Simplify your answer and put the minus sign in the denominator.	**5/(-4)**
5	Which has the same value as (-27)/14: 27/(-14) or (-27)/(-14)? Explain using signs.	**27/(-14). It has one negative sign, so its value is negative.**
6	Find (-28) ÷ (-35). Write your answer in simplest form.	**4/5**

PART 2 · APPLY IT

1. **-30 ÷ 5 = -6 points per hit. The negative sign means each hit lowers the player's energy.** Divide the total change by the number of hits. A negative total divided among a positive number of hits gives a negative change per hit.
2. **(-48) ÷ (-12) = 4 payments. The quotient is positive because both changes are negative.** Divide the total change in the amount owed by the change from one payment. The quotient counts the payments.

CHALLENGE

x = -(5/6) = (-5)/6 = 5/(-6). Since the quotient is positive and the number being divided is negative, x must be negative.

Check that students follow the requested sign placement in problems 3 and 4 and in the challenge. In the word problems, require both a division equation and an interpretation of the sign.