

PART I GET STARTED

Today's Mathematics

We will use multiplication fact families to explain integer quotients and distinguish zero quotients from undefined division.

Essential Question

How are the sign rules for division connected to multiplication?

DO NOW

Multiply. Determine the sign before calculating.

1. $(-7)(8)$

2. $(-9)(-6)$

3. $4(-3)(-2)$

4. Determine the sign of $(-2)(5)(-4)(-1)$.

SEE IT

Use the multiplication fact $(-6)(4) = -24$.

1. Write a division fact with quotient -6.

2. Write a division fact with quotient 4.

3. What do the signs suggest about dividing integers?

QUICK WRITE | 2 MINUTES

Explain how a multiplication fact can verify both the sign and value of a quotient.

PART II INVESTIGATE

FACT FAMILIES AND QUOTIENTS

Complete each multiplication fact family. Record the sign pattern you notice.

Multiplication fact	Division fact 1	Division fact 2	Sign pattern
$(-6)(4) = -24$			
$(-7)(-5) = 35$			
$9(-3) = -27$			
$0(8) = 0$			

THINK LIKE A MATHEMATICIAN

1. Explain why $0 \div 8 = 0$.
2. Explain why $8 \div 0$ cannot be checked with multiplication.
3. Is $0 \div 0$ equal to zero? Explain why no single quotient works.

COMPARE

How are the sign rules for multiplication and division alike?

PART III MAKE SENSE AND PRACTICE

WHAT WE CAN CONCLUDE

1. Same signs produce a positive quotient; different signs produce a negative quotient. 2. Zero divided by a nonzero integer is zero. 3. Division by zero is undefined. 4. A related multiplication fact can verify every defined quotient.

WORKED MODEL

Evaluate $-96 \div (-12)$ and check. $-96 \div (-12) = 8$ because $8(-12) = -96$

FOCUSED PRACTICE

1. Evaluate $-72 \div 8$, $0 \div (-15)$, and $-45 \div 0$.
2. A team score changes by -42 points over 6 equal rounds. Find and interpret the mean change per round.

MATH WRITE | 5 MINUTES

Explain why $0 \div 8$ is zero but $8 \div 0$ is undefined. Use multiplication to support both claims.

PART IV PUZZLE PRACTICE

Homework

Name _____ Date _____

WHAT DID THE BASEBALL MITT SAY TO THE BALL?

Circle the letter of each correct answer in the boxes below. The circled letters will spell out the answer to the riddle.

DIVIDE AND EVALUATE.

1. $6 \div (-3)$

2. $-52 \div (-4)$
3. $-27 \div 3$

4. $-36 \div 2$
5. $56 \div (-8)$

6. $-24 \div (-3)$
7. $-18 \div 6$

8. $25 \div (-5)$
9. $-16 \div (-4)$

10. $-66 \div 11$
11. $32 \div (-2) + (-25) \div 5$

12. $4(-3) + 12 \div (-4)$
13. Your running time decreases by 5 seconds in week one, 3 seconds in week two, and 4 seconds in week three. What is the average weekly change?

B	C	A	R	T	S	C	H	E	Y	D	O	U	N	L	A	S	T	E	O	R
14	-21	4	12	13	2	8	-9	20	-7	15	-15	-3	9	-6	-18	-8	-2	-5	-13	-4