

PART I GET STARTED**Today's Mathematics**

Write, solve, and check multiplication and division equations using inverse operations.

Essential Question

Why can we divide both sides by the same nonzero number?

DO NOW

1. Solve and check $x + 8 = -5$.

2. Solve and check $y - \frac{2}{3} = -\frac{1}{6}$.

3. Evaluate $-18 \div 6$.

4. Evaluate $-\frac{3}{4} \div \frac{1}{2}$.

SEE IT

Three identical bags contain a total of 21 counters. Each bag contains b counters. Sketch equal groups, write an equation, and find b . What operation isolates one bag?

QUICK WRITE | 2 MINUTES

Why does dividing both sides by 3 preserve the equation? Why would dividing by 0 fail?

PART II INVESTIGATE

SCALE BOTH SIDES

For each equation, choose an operation on both sides. Record an equivalent equation, the solution, and a check.

No.	Equation	Operation	Equivalent equation and check
1	$4x = -28$		
2	$-3x = 18$		
3	$\frac{x}{5} = -2$		
4	$-\frac{2}{3}x = 8$		

THINK LIKE A MATHEMATICIAN

1. Compare dividing by $-\frac{2}{3}$ with multiplying by $-\frac{3}{2}$. Why do both undo the coefficient?

2. If $4x = -28$, is multiplying both sides by 0 a useful way to solve? Explain what information is lost.

CREATE OR COMPARE

Write one multiplication equation and one division equation with solution $x = -9$. Check both.

PART III MAKE SENSE AND PRACTICE**WHAT WE CAN CONCLUDE**

Multiply or divide both sides by the same **nonzero** number to keep the same solution. Division undoes multiplication; multiplication undoes division. A fractional coefficient can be undone by its reciprocal. Substitute into the original equation to check.

WORKED MODEL

Solve $-\frac{3}{5}x = 9$: multiply both sides by $-\frac{5}{3}$ to get $x = -15$. Check: $(-\frac{3}{5})(-15) = 9$.

Solve $\frac{m}{-4} = 2.5$: multiply both sides by -4 to get $m = -10$. Check: $-10/(-4) = 2.5$.

TRY IT

1. $7x = -35$

2. $-1.5x = 9$

3. $\frac{x}{-6} = -\frac{7}{3}$

4. A pump removes 2.4 liters each minute at a constant rate. It removes 18 liters in t minutes. Define t , write an equation, and find and check the time.

MATH WRITE | 5 MINUTES

A student solves $-\frac{4}{5}x = 12$ by multiplying both sides by $\frac{5}{4}$ and reports $x = 15$. Explain the error and correct it.

PART IV PUZZLE PRACTICE

Homework

Name _____

Date _____

Solve each item. Check your solutions. Match your result to the answer bank and put its letter in the numbered box. Decode a useful mathematical reminder.

1. $3x = -12$

2. $-2x = 14$

3. $\frac{x}{4} = 2$

4. $-\frac{3}{5}x = -6$

5. $2.5x = -5$

6. $\frac{x}{-3} = -4$

7. $-\frac{7}{4}x = \frac{21}{4}$

8. $\frac{x}{6} = -\frac{3}{2}$

ANSWER BANK

E $x = 12$	E $x = 8$	K $x = -9$	U $x = -4$
C $x = -3$	C $x = 10$	S $x = -7$	H $x = -2$

1

2

3

4

5

6

7

8