

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

Write, solve, and check two-step equations, including rational numbers and simplified expressions.

Essential Question

How does reversing the order of operations isolate a variable?

DO NOW

1. Solve and check $-6x = 24$.

2. Solve and check $\frac{y}{5} = -3$.

3. Simplify $7a - 4a + 2$.

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

SEE IT

A club pays a \$5 setup fee and \$3 per badge. The total bill is \$26. Define b as the number of badges. Draw or describe a model for $3b + 5 = 26$. Which part can you undo first?

QUICK WRITE | 2 MINUTES

Why is subtracting 5 before dividing by 3 useful? Could dividing both sides by 3 first also work?

PART II INVESTIGATE

UNDO IN REVERSE ORDER

Use two operations to isolate the variable. Include a substitution check in the last column.

No.	Equation	First operation	Next step and check
1	$2x + 7 = 1$		
2	$-4x + 3 = 15$		
3	$\frac{x}{3} - 2 = -5$		
4	$\frac{1}{2}x + \frac{3}{4} = -\frac{1}{4}$		

THINK LIKE A MATHEMATICIAN

1. Rows 1 and 2 have the same solution. Does this mean their expressions on the left are equal for every value of x ? Explain.

2. Compare distributing in $3(x - 2) = 12$ with dividing both sides by 3 first. Which method is more efficient here?

CREATE OR COMPARE

Create two different two-step equations with solution $x = 4$, including one with a negative coefficient. Check them.

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

First simplify expressions when needed. Undo addition or subtraction, then undo multiplication or division. Another sequence is valid if each operation applies to the entire side. Use the distributive property carefully and check the original equation.

WORKED MODEL

Solve $-\frac{2}{3}x + \frac{1}{2} = \frac{5}{2}$: subtract $\frac{1}{2}$ to get $-\frac{2}{3}x = 2$; multiply by $-\frac{3}{2}$ to get $x = -3$. Check: $2 + \frac{1}{2} = \frac{5}{2}$.

For $4(x - 3) = 20$, divide by 4: $x - 3 = 5$, so $x = 8$. Check: $4(8 - 3) = 20$.

TRY IT

1. $5x - 8 = -18$

2. $\frac{x}{-4} + 3 = \frac{1}{2}$

3. $7x - 3x + 6 = -10$

4. A rectangular garden has perimeter 46 meters and width 8 meters. Use $P = 2L + 2W$ to write and solve an equation for its length. Check with the perimeter.

MATH WRITE | 5 MINUTES

A student changes $\frac{x}{4} + 3 = 8$ to $x + 3 = 32$ by multiplying by 4. Identify the error and solve correctly.

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. $2x + 5 = -1$

2. $-3x + 4 = 19$

3. $\frac{x}{4} - 2 = 1$

4. $5(x - 1) = 10$

5. $-\frac{1}{2}x + 3 = 7$

6. $1.5x - 4 = 5$

7. $7x - 5x + 1 = -1$

8. $\frac{x}{-2} + 1 = -4$

ANSWER BANK

E $x = 6$	E $x = 12$	K $x = 10$	U $x = -3$
C $x = -1$	C $x = 3$	S $x = -5$	H $x = -8$

1

2

3

4

5

6

7

8