

Solving an Equation with one variable (x):
Standard 8.EE.C.7

Solve each equation with one variable on one side:

Worked	Quiz
1. $2.5x + 100 = 600$	1. $10 = 2x - 4$
2. $\frac{1}{3}x + 30 = 90$	2. $\frac{1}{4}x + 5 = 30$
3. $3.52x + 90 = 160.4$	3. $1.2x - 8 = 4$

Properties of Equality

Properties of Equality	For all numbers a, b, and c
Addition Property of Equality	If $a = b$, then $a + c = b + c$
Subtraction Property of Equality	If $a = b$, then $a - c = b - c$
Multiplication Property of Equality	If $a = b$, then $ac = bc$
Division Property of Equality	If $a = b$ and $c \neq 0$, then $a / c = b / c$

Rewrite the following expressions to make them follow the properties of Equality:

Worked

1. $5 + ? = 6$	2. $8 - 3 = 8 + ?$
3. $5x = 5(2)$; $x = ?$	4. $3 / 2 = ? / 2$

Quiz Problems

Q4. $5/3 = 5/?$	Q5. $2 - 4 = 2 + ?$
-----------------	---------------------

Solving linear equations with one variable on both sides

Two Ways to Solve

Jesse	Jaime
$5x + 3 = 2x + 5$ <p>Subtract 5x from both sides -5x -5x</p> <hr/> $+3 = -3x + 5$ <p>Subtract 5 from both sides -5 -5</p> <p>To isolate the x term</p> <hr/> $\frac{-2}{-3} = \frac{-3x}{-3}$ <p>Divide both sides by -3 -3 -3</p> <p>To get the final solution of x</p> <hr/> <p>The -3/-3 cancels out, Then change the signs for $\frac{2}{3}$ $\frac{2}{3} = x$</p> <hr/> <p>Check for accuracy:</p> $5(\frac{2}{3}) + 3 = 2(\frac{2}{3}) + 5$ <hr/> $10/3 + 3 = 4/3 + 5$ <p>Turn the fraction into a compound fraction</p> $3 \frac{1}{3} + 3 = 1 \frac{1}{3} + 5$ <hr/> $6 \frac{1}{3} = 6 \frac{1}{3}$ <p>When $x = \frac{2}{3}$ y is $6 \frac{1}{3}$</p>	$5x + 3 = 2x + 5$ <p>Subtract 2x from both sides -2x -2x</p> <hr/> $3x + 3 = 5$ <p>Subtract 3 from both sides -3 -3</p> <p>To isolate the x term</p> <hr/> $\frac{3x}{3} = \frac{2}{3}$ <p>Divide both sides by 3 $\frac{3x}{3} = \frac{2}{3}$</p> <p>To get the final solution of x 3 3</p> <hr/> <p>$x = \frac{2}{3}$</p> <hr/> <p>Check for accuracy:</p> $5(\frac{2}{3}) + 3 = 2(\frac{2}{3}) + 5$ <hr/> $10/3 + 3 = 4/3 + 5$ <p>Turn the fraction into a compound fraction</p> $3 \frac{1}{3} + 3 = 1 \frac{1}{3} + 5$ <hr/> $6 \frac{1}{3} = 6 \frac{1}{3}$ <p>When $x = \frac{2}{3}$ y is $6 \frac{1}{3}$</p>

Q6. Which strategy do you prefer and why?

Solve for each problem (worked):

1. $x - 6 = 5x + 10$	2. $2x - 7 = -5x + 14$
----------------------	------------------------

Solve the following problem (quiz):

Q7. $3x + 15 = -6x + 12$

Two More Ways to Solve

Student 1	Student 2
$\frac{3x + 9 = 6x - 30}{3}$ <p>Divide both sides by 3 3 is a common factor of all Coefficients (3, 9, 6, 30)</p> <hr/> $\frac{x + 3 = 2x - 10}{-1x \quad -1x}$ <p>Subtract 1x from both sides</p> <hr/> $\frac{3 = 1x - 10}{+10 \quad +10}$ <p>Add +10 to both sides</p> <hr/> $+13 = 1x$ <p>$x = +13$</p>	$\frac{-x - 2 = -4x - 1}{-1 \quad -1}$ <p>Divide both sides by -1 This is the common factor That avoids fractions and Changes signs</p> <hr/> $\frac{x + 2 = 4x + 1}{-x \quad -x}$ <p>Subtract x from both sides</p> <hr/> $\frac{2 = 3x + 1}{-1 \quad -1}$ <p>Subtract 1 from both sides</p> <hr/> $\frac{1 = 3x}{3}$ <p>Divide both sides by 3 To isolate for the solution of x</p> <p>$x = \frac{1}{3}$</p>

Solve Each Equation (Worked)

1. $-4x + 8 = 2x + 10$	2. $-42x = -4x - 1$
------------------------	---------------------

Solve the Equation (Quiz)

Q8. $3x + 6 = 9x + 15$
