

Unit 6 Solving Equations using Algebra

When we solve equations using algebra, the first thing we want to do is to "isolate" the variable. That is we want to get the variable by itself on one side of the equal sign.

To isolate the variable and solve the equation, we use opposite operations:

Addition	opposite	Subtraction
Subtraction	opposite	Addition
Multiplication	opposite	Division
Division	opposite	Multiplication

Remember whatever you do to one side of the equation you MUST do the the other side.

Examples: *

$$2x + 4 = 20 \quad -4$$

$$2x + 4 - 4 = 20 - 4$$

$$2x = 16$$

$$\frac{2x}{2} = \frac{16}{2}$$

$$x = 8$$

LS	RS
$2(8) + 4$	} 26
$16 + 4$	
20	

Master 6.29

Activating Prior Knowledge continued

Preserving Equality

Quick Review

When we solve an equation using algebra, we must preserve the equality.
Whatever we do to one side of an equation, we must do to the other side too.

We can:

- Add the same number to both sides
- Subtract the same number from both sides
- Multiply both sides by the same number
- Divide both sides by the same number

Example 2

- a) Describe the operation you would perform to isolate the variable in each equation.
b) Solve the equation. Verify the solution.

i) $x + 7 = 9$

$$x + 7 - 7 = 9 - 7$$

ii) $3x = 36$

$$\frac{3x}{3} = \frac{36}{3}$$

Solution

- i) a) To isolate x , subtract 7 from both sides of the equation.

b) $x + 7 - 7 = 9 - 7$

$$x = 2$$

Check: Substitute $x = 2$ back into the original equation.

$$\begin{aligned} \text{Left side} &= x + 7 & \text{Right side} &= 9 \\ &= 2 + 7 \\ &= 9 \end{aligned}$$

Since the left side equals the right side, the solution is correct.

- ii) a) To isolate x , divide both sides of the equation by 3.

b) $\frac{3x}{3} = \frac{36}{3}$

$$x = 12$$

Check: Substitute $x = 12$ back into the original equation.

$$\begin{aligned} \text{Left side} &= 3x & \text{Right side} &= 36 \\ &= 3(12) \\ &= 36 \end{aligned}$$

Since the left side equals the right side, the solution is correct.

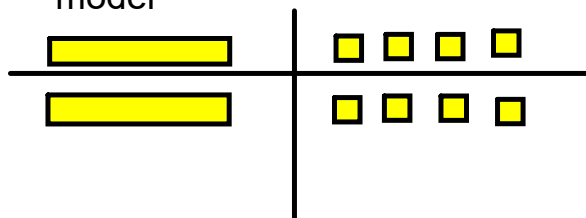
Whatever we do to one side of the equation, we must do to the other side, too.

Solve using algebra tiles then solve by using algebra



a) $2y - 1 = 7$

model



$\blacksquare -1$
 $\blacksquare +1$

algebra

with algebra whatever you want to get rid of you do the opposite operation to it

$$2y - 1 = 7 + 1$$

$$\frac{2y}{2} = \frac{8}{2}$$

$$y = 4$$

b) $2 + 3a = -4 - 2$

$$\frac{3a}{3} = \frac{-6}{3}$$

$$a = -2$$

b) $2 + 3a = -4$

$$2 + 3(-2) = -4$$

$$2 - 6 = -4$$

$$-4$$



Getting a Fraction or a Decimal as an Answer is OK

Use algebra to solve the equation. Then verify the solution.

$$16t - 69 = -13 \quad +69 \quad +69$$

$$\frac{16t}{16} = \frac{56}{16}$$

$$t = 3.5$$

LS	RS	
16(3.5) - 69	- 13	
56 - 69		
-13		✓





Solve each equation. Verify the solution.

a) $-2x + 4 = 26$

$$-2x + \overset{-4}{4} = 26 \quad -4$$

$$\frac{-2x}{-2} = \frac{22}{-2}$$

$$x = -11$$

b) $\frac{a}{3} = 6$ ⁽³⁾ ⁽³⁾

$$a = 18$$

c) $-3 = 2x + 15$ ⁻¹⁵ ⁻¹⁵

$$\frac{-18}{2} = \frac{2x}{2}$$

$$-9 = x$$



Brad charges \$4 for each bag of garbage, and \$7 cleaning gutters. On Friday, Brad cleaned 1 gutter and took out the garbage. He earned \$19. How many bags of garbage did he take out?

a) Write the equation to represent this problem? $4x + 7 = 19$

b) Solve the equation using algebra.

$$\frac{4x}{4} = \frac{12}{4}$$

$$x=3$$

c) Verify the solution.

$$4(3) + 7 = 19$$

$$12 + 7 = 19$$

$$19$$

Class/Homework

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5 , #6, #7, #8, #9, #10, #11

Use algebra only

** Always check (verify means sub back in)**

Worksheet 2 : Solve using algebra



Extra Practice??

IXL math



Grade 8 Skills

X.6 Solve one-step equations

X.7 Solve two-step equations

Questions??

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Attachments

Extra Practice 2 Solve using algebra.pdf