

Manipulatives

- Scaffolded Math and Science: Solving equations using algebra tiles: with pictures!

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Unit 7 Solving Equations in One Variable

Math Essentials

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Practice 7.1

Simplify

1. $-12x^2 - 9x^2$

2. $-2a + 9b - a - 16b$

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Consider

An iced cappuccino is \$3.00 at the coffee shop. Shaelyn bought 10 in June and 5 in July. How much did she spend on coffee in total over the summer?

$$\begin{aligned} & \$3 \times 10 + \$3 \times 5 \\ & = \$3(10 + 5) \\ & = \$3(15) \\ & = \$45 \end{aligned}$$

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The Distribute Law

For any numbers a , b , and c ,

$$a(b + c) = ab + ac$$

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Practice 7.2

Evaluate the following using the distribute law.

1. $5(1 + 3)$
2. $9(x - 5)$
3. $-3(a - 2b + 3c)$
4. $-(4 + 2x)$

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Practice 7.3

Simplify

1. $4(x + 5) - 8x$

2. $1 + 3(2a - 4) - 5a$

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Consider...

What value for x would make the following statement true:

$x + 5 = 8$?

○What about in $x - 1 = 2$?

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Equivalent Equations

•**Solution**: a replacement for a variable that makes the equation true.

○Example: $x = 3$ is a **solution** to $x + 5 = 8$

•**Equivalent equations**: equations with the **same solutions**

○Example: $x + 5 = 8$ and $x - 1 = 2$ are equivalent equations because both have the solution $x = 3$

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Practice 7.4

Find a possible solution for each of the following equations.

1. $c + 4 = 7$
2. $9 - x = -10$
3. $2b = -8$
4. $89 = 10 + a$

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Find at least two other equations equivalent to $x=2$.

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The Addition Principle

For any numbers a , b , and c ,
 $a = b$ is equivalent to $a + c = b + c$

Example: $x = 2$
 $x + 1 = 2 + 1$

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The Addition Principle

For any numbers a , b , and c ,
 $a = b$ is equivalent to $a + c = b + c$

How could we use this principle to
 solve $x - 10 = -5$?

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Practice 7.5

Solve for the unknown variable.

1. $10 = w - 6$
2. $-3 + x = 6$
3. $\frac{8}{9} = x + 5$

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The Multiplicative Principle

For any numbers a , b , and c ($c \neq 0$),
 $a = b$ is equivalent to $ac = bc$

How could we use this principle to solve
 $\frac{x}{-5} = 125$?

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Practice 7.6

Solve the following equations.

1. $\frac{n}{8} = -4$

2. $2x = 8$

3. $-y = 5$

4. $\frac{u}{7} = 98$

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Selecting the correct approach

- Which principle would you use to solve $39 = -3 + t$?
- Which principle would you use to solve $39 = -3t$?
- Use **addition** to reverse **add/subtract**.
- Use **multiplication** to reverse **multiply/divide**.

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Practice 7.7

Solve for x. Simplify your answer.

$$\frac{5x}{7} = -15$$

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Practice 7.8

Try solving the following equation

$$2x - 1 = 5$$

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Using the principles together

- Substitute $x = 3$ into $2x - 1 = 5$ to verify the possible solution.
 - List the steps that you just did.
 - To solve the equation, reverse the steps!

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Practice 7.9

Solve the following equations.

1. $5x - 8 = 27$
2. $38 = -9t + 2$
3. $-18 = -9 + 3y$

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Practice 7.10

Solve for v . Simplify your answer.

$$\frac{v}{2} + 13 = 14$$

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Practice 7.11

Solve for x .

$$95 - x = 187$$

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