Algebra RH

Essential Question: What are literal equations?

or substitute answer for x in original equation $(b-a)+a=b$ $b=b$ ✓

Do Now: Solve for x. $x + a = b$

$-a \quad -a$

$x = b - a$

to check

substitute numbers in each equation and see if they are equal in value

$x=1$, $a=2$, $b=3$

$x + a = b$ $\quad 1 + 2 = 3$

$x = b - a$ $\quad 1 = 3 - 2$

The **properties of equality** justify the series of **inverse operations** that are performed in order to solve an equation.

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, then $\frac{a}{c}=\frac{b}{c}$, c ≠ 0

Example:

Write the property of equality used in each step in solving the equation.

Steps	Property
$-5x - 4 = 16$	
$-5x = 20$	addition property of equality
$x = -4$	division property of equality

Literal Equations: an equation with two or more distinct variables

When solving for another variable in an equation:

- Ask yourself, "What happened to the variable being solved?"
- Keep in mind, the last operation done is the first undone using inverse operations.
- Always keep your equation balanced (what you do to one side must be done to the other side).

Examples: Solve for x.

1. $\frac{ax}{a}=\frac{b}{a}$

$x = \frac{b}{a}$

2. $a\left(\frac{x}{a}\right)=(b)a$

$x = ba$

3. $\frac{x}{a}+c=d$

$-c \quad -c$

$a\left(\frac{x}{a}\right)=(d-c)a$

$x = a(d-c)$

4. $\frac{a(x-4)}{a} = \frac{b}{a}$

$x - 4 = \frac{b}{a}$

$+4 \quad +4$

$x = \frac{b}{a} + 4$

5. $\frac{x}{a-b} = \frac{c}{1}$

$x = c(a-b)$

6. $\frac{a}{(x-b)} = \frac{c}{d}$

$ad = c(x-b)$

$\frac{ad}{c} = x - b$

$\frac{ad}{c} + b = x$

7. $c = 3x - 3b$

$+3b \quad +3b$

$\frac{c+3b}{3} = \frac{3x}{3}$

$\frac{c+3b}{3} = x$ or $\frac{c}{3} + b = x$

* 8. $c - 2x = bx$

get variables that are the same to the same side

$c = bx + 2x$

factor out variable

$\frac{c}{b+2} = \frac{x(b+2)}{b+2}$

* 9. $a = \frac{1}{3}(b+x)$

eliminate fractional co-efficient first, if possible

$3A = b + x$

$-b \quad -b$

$3A - b = X$

$\frac{c}{b+2} = X$

Solve for the variable indicated.

10. $C = \frac{5}{9}(F-32); F$

eliminate fractional co-efficient by multiplying by its reciprocal

$\frac{9}{5}C = F - 32$

$\frac{9}{5}C + 32 = F$

11. $A = \frac{1}{2}h(b_1 + b_2); h$

$\frac{2A}{(b_1+b_2)} = \frac{h(b_1+b_2)}{(b_1+b_2)}$

$\frac{2A}{(b_1+b_2)} = h$

12. $P = 2(l + w); w$

either

$\frac{P}{2} = l + w$

$-l \quad -l$

$\frac{P}{2} - l = w$

or

$P = 2l + 2w$

$\frac{P-2l}{2} = \frac{2w}{2}$

$\frac{P-2l}{2} = w$

$\frac{P}{2} - l = w$