Do Now: Simplify each expression.

1. $2y+7x+\frac{3}{4}y-12$

2. $10g-18h-23g-(-22h)$

3. $\frac{x}{3}+\frac{y}{3}+\frac{2y}{5}-y$

4. $(x+y)-(x-y)$

5. $-(3-c)-4(c-1)$

Algebra 2

Ch. 1 Handout 1.3

Solving Equations

Properties of Equality--Let a, b, and c represent real numbers

Reflexive Property: a = a

$2 + 3 = 2 + 3$

Symmetric Property: If a = b, then b = a.

If $8 = 3x + 4$ then $3x + 4 = 8$

Properties of Equality--Let a, b, and c represent real numbers

Transitive Property: If a = b and b = c, then a = c.

If 3 + 5 = 8 and 8 = 4(2) then 3+5 = 4(2)

Substitution Property: If a = b, then b may be substituted for a in any expression to obtain an equivalent expression.

Addition Property: If a = b, then a + c = b + c

$$x - 8 = 12$$
$$+8 \quad +8$$

Subtraction Property: If a = b, then a - c = b - c.

$$x + 8 = 12$$
$$-8 \quad -8$$

Multiplication Property: If a = b, then ac = bc

3. $\frac{x}{3} = 12 \cdot 3$

Division Property: If a = b and $c \neq d$, then $\frac{a}{c} = \frac{b}{c}$.

$\frac{3x}{3} = \frac{12}{3}$

A **solution** of an equation

Pull

a number that makes the equation true

Solve each equation. Check your answers.

1. $4(m+9) = -3(m-4)$

$4m + 36 = -3m + 12$

$+3m \qquad +3m$

$7m + 36 = 12$

$-36 \quad -36$

$\frac{7m}{7} = \frac{-24}{7}$

$m = \frac{-24}{7}$

Dist.

Add 3m to each side

Subtract 36 from each side

Divide by 7

$4\left(\frac{-24}{7}+9\right) = -3\left(\frac{-24}{7}-4\right)$

Solve each equation. Check your answers.

2. $2(y-3)+6=70$

Dist

$2y-6+6=70$

Inverse prop +

$\frac{2y}{2}=\frac{70}{2}$

Div. prop

$y=35$

$2(35-3)+6=70$

Solve each equation. Check your answers.

3. $5(1 - 3m) = 30 - 2(4m + 7)$

Dist.

$5 - 15m = 30 - 8m - 14$ combine like terms

$5 - 15m = 16 - 8m$

$-5 \quad -5$ subtr. prop

$-15m = 11 - 8m$

$+8m \quad +8m$ Add prop

$\frac{-7m}{-7} = \frac{11}{-7}$ Div prop

$m = -\frac{11}{7}$

4. The formula for the surface area of a rectangular prism ℓ units long, w units wide, and h units high is $A = 2(\ell w + \ell h + wh)$. Solve the formula for w.

$A = 2(\ell w + \ell h + wh)$

$A = 2\ell w + 2\ell h + 2wh$

$-2\ell h \qquad -2\ell h$

$A - 2\ell h = 2\ell w + 2wh$

$\frac{A - 2\ell h}{(2\ell + 2h)} = \frac{w(2\ell + 2h)}{(2\ell + 2h)}$

$$\frac{A - 2\ell h}{2\ell + 2h} = w$$

Solve $\frac{x}{a}+8=b$ for x. Find any restrictions on a and b.

$$\frac{x}{a}+8=b$$
$$-8 \qquad -8$$
$$a\left(\frac{x}{a}\right)=(b)-(8)\,a$$

$$x = ab - 8a \;;\; a \neq 0$$

subtract both sides by 8 and multiply every term by a to isolate x term.

6. The formula for the area of a trapezoid is $A = \frac{1}{2}h(b_1 + b_2)$.

Solve it for b_1. Using the correct terminology explain how you solve for x.

$2A = 2 \cdot \frac{1}{2}h(b_1 + b_2)$

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

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

$-b_2 \qquad -b_2$

$\frac{2A}{h} - b_2 = b_1$

Multiply both sides of equation by 2 and then divide both sides of equation by h. To isolate b_1 you subtract b_2 from both sides of equation

$h \neq 0$

7. Solve the equation of x: $ax + bx - 15 = 0$

Using the correct terminology explain how you solve for x.

$ax + bx - 15 = 0$

$+15 \quad +15$

$ax + bx = 15$

$\frac{x(a+b)}{(a+b)} = \frac{15}{(a+b)}$

$x = \frac{15}{a+b}$

Subtract 15 from both sides of the equation. Dist out x from left side and then divide both sides of equation (a+b)

$a + b = 0$ $\quad$ $a + b = 0$

$a \neq -b$ $\quad$ $b \neq -a$

8. **Using Ratios.** The sides of a quadrilateral are in the ratio 1:2:3:6. The perimeter isl38 cm. Find the lengths of the sides.

9. A plane takes off and flies east at a speed of 350 mi/h. Thirty-five minutes later, a second plane takes off from the same airport and flies east at a higher altitude at a speed of 400 mi/h. How long does it take the second plane to overtake the first plane?

10. The sides of a triangle are in the ratio 12:13:15. The perimeter is 120 cm. Find the lengths of the sides of the triangle.

11. Adrian will use part of a garage wall as one of the long sides of a rectangular rabbit pen. He wants the pen to be 3 times as long as it is wide. He plans to use 68 ft of fencing. Find the dimensions of the pen.

Assignment:

Day 1: 1.3 Pgs 21-23 1-27 odds, 37-47 odds, 55-63 odds