Review #3

Math 9 Review – Part 3
Solving Equations

Solving Equations

When we solve an equation, we are trying to find the value of a variable that makes a mathematical sentence (equation) true.

① Simplify (combine like terms) on each side.

② In order to solve an equation, we must isolate the variable. by undoing operations happening to variable: OPPOSITE OPERATIONS

$+ \longleftrightarrow -$

$\times \longleftrightarrow \div$

$x^2 \longleftrightarrow$

$x^3 \longleftrightarrow \sqrt[3]{\ }$

Example 1: Solve the following equations.

a) $5x - 4 + 3 = 4$

$$5x - 1 = 4$$
$$+ 1 \qquad + 1$$
$$\frac{5x}{5} = \frac{5}{5}$$
$$x = 1$$

b) $6x - 10 = 56$

$$+10 \qquad +10$$
$$\frac{6x}{6} = \frac{66}{6}$$
$$x = 11$$

c) $2 = 4x - 5x$

$$\frac{2}{-1} = \frac{-1x}{-1}$$
$$-2 = x$$

d) $9a = 3a - 36$

$$-3a \quad -3a$$
$$\frac{6a}{6} = \frac{-36}{6}$$
$$a = -6$$

Solving Equations with Parentheses
- Expand the parentheses
- Simplify like terms (if possible)
- Isolate the variable

Example 2: Solve the following equations:

a) $2(y - 4) = 16$

$$2y - 8 = 16$$
$$+8 \qquad +8$$
$$\frac{2y}{2} = \frac{24}{2}$$
$$y = 12$$

b) $10 + 2x = -4(x - 1)$

$$10 + 2x = -4x + 4$$
$$+4x \qquad +4x$$
$$10 + 6x = \qquad 4$$
$$-10 \qquad\qquad -10$$
$$\frac{6x}{6} = \frac{-6}{6}$$
$$x = -1$$

c) $4(x-3)+9x=-38$

$4x-12+9x=-38$

$13x-12=-38$

$+12+12$

$\dfrac{(13)x}{13}=\dfrac{-26}{13}$

$\boxed{x=-2}$

d) ✶ coefficient is -1 !

$3-(2+4x)=4+2(3x+1)$

$3-2-4x=4+6x+2$

$1-4x=6+6x$

$+4x+4x$

$1=6+10x$

$-6-6$

$\dfrac{-5\div 5}{10\div 5}=\dfrac{(10)x}{10}$

$\boxed{-\dfrac{1}{2}=x}$

Verify (check) Your Solution

Once a solution is found, we must verify that it is correct. This is done by substituting the solution back into the original equation.

Example 3: Verify that $x=\boxed{7}$ is a solution to the following equation: $2(3x-5)=32$

show left
side = right
side

$L.S. = R.S.$

$2(3(7)-5)=32$

$2(21-5)=32$

$2\cdot(16)=32$

$32=32$ ✓

$x=7$ is correct!