Day 3 Notes
Solving Multi-Step Equations & Variables on BOTH SIDES!!!!

Name Key
Date _____ Period ____

Steps for Solving Equations:

- Simplify one or both sides of the equation by combining like terms.
- Then use S A D M E P to isolate the variable.
- Check (☑) your answer by plugging your solution into the ★ORIGINAL★ equation.

Combining Like Terms: Solve the equation and check your solution.

1) $3h-5h+11=17$

$-2h+11=17$
$-11 \quad -11$
$\frac{-2h}{-2}=\frac{6}{-2}$
$h=-3$

☑ $3(-3)-5(-3)+11=17$
$-9+15+11=17$
$\star 17=17$

2) $15a-4-12a=14$

$3a-4=14$
$3a=18$
$a=6$

☑
$15(6)-4-12(6)=14$
$90-4-72=14$
$86-72=14$
$\star 14=14$

Using the Distributive Property: Solve the equation and check your solution.

3) $7x+2(x+6)=39$

$7x+2x+12=39$
$9x+12=39$
$-12 \quad -12$
$9x=27$
$x=3$

☑ $7(3)+2(3+6)=39$
$21+2(9)=39$
$21+18=39$
$\star 39=39$

4) $5r-4(r-3)=17$

$5r-4r+12=17$
$r+12=17$
$r=5$

☑
$5(5)-4(5-3)=17$
$25-4(2)=17$
$25-8=17$
$\star 17=17$

Multiplying by a Reciprocal: Solve the equation and check your solution.

5) $\frac{3}{1}\cdot\frac{1}{3}(d+3)=5\cdot\frac{3}{1}$

$d+3=15$
$d=12$

☑ $\frac{1}{3}(12+3)=5$
$\frac{1}{3}(15)=5$
$\star 5=5$

6) $\frac{3}{4}\cdot\frac{4}{3}(7-n)=12\cdot\frac{3}{4}$

$7-n=9$
$-7 \quad -7$
$-n=2$
$n=-2$

☑
$\frac{4}{3}(7-2)=12$
$\frac{4}{3}(9)=12$
$\star 12=12$

Equations with Variables on Both Sides

Solve and check:

1) $7x + 10 = 2x + 25$

$-2x \quad -2x$

$5x + 10 = 25$

$5x = 15$

$\boxed{x = 3}$

$7(3)+10 = 2(3)+25$

$21+10 = 6+25$

$\star \; 31 = 31$

2) $8a - 9 = 2 - 3a$

$+3a \quad +3a$

$11a - 9 = 2$

$11a = 11$

$\boxed{a = 1}$

$8-9 = 2-3$

$\star \; -1 = -1$

3) $8z = 4(3z + 1)$

$8z = 12z + 4$

$-4z = 4$

$\boxed{z = -1}$

$8(-1) = 4(3(-1)+1)$

$-8 = 4(-2)$

$\star \; -8 = -8$

4) $7 + x = \frac{1}{2}(4x - 2)$

$7 + x = 2x - 1$

$-x \quad -x$

$7 = x - 1$

$\boxed{8 = x}$

$7+8 = \frac{1}{2}(4\cdot 8-2)$

$15 = \frac{1}{2}(30)$

$\star \; 15 = 15$

5) $-2(3g + 2) = \frac{1}{2}(12g + 8)$

$-6g - 4 = 6g + 4$

$-12g = 8$

$g = \frac{8}{-12}$

$\boxed{g = -\frac{2}{3}}$

6) $\left(\frac{1}{2}x + \frac{2}{3} = \frac{1}{3}x - \frac{3}{2}\right)6$

$3x + 4 = 2x - 9$

$x + 4 = -9$

$\boxed{x = -13}$

7) Twice a number, increased by 11, is the same as three times the number, decreased by 12. Find the number.

$2n + 11 = 3n - 12$

$-1n = -23$

$\boxed{n = 23}$

8) Kris was asked to solve the following equation for r: $2r + 3 = 5r - 3$

Discuss what Kris did in terms of correctly or incorrectly solving the equation.

$-2r \quad -2r$

$3 = 3r - 3$

$+3 \quad +3$

$6 = 3r$

$-3 \quad -3$

$3 = r$

← Should have used division, not subtraction!