1.3 Solving Equations w/ Variables on Both Sides p. 20

* Simplify each side, if necessary (d.p. or c.l.t.)
* "swap" sides w/ terms so that variable terms are on one side and constants are on the other
* it does not matter which term you move first

1) $15 - 2x = -7x$

$$+2x \qquad +2x$$

$$15 = -5x$$
$$-5 \quad -5$$

$$\boxed{-3 = x}$$

2) $-2(x-5) = 6\left(2-\tfrac{1}{2}x\right)$

$$-2x + 10 = 12 - 3x$$
$$+3x \qquad\qquad +3x$$

$$x + 10 = 12$$
$$-10 \quad -10$$

$$\boxed{x = 2}$$

3) $-3x = 2x + 19$

$$-2x \quad -2x$$

$$\frac{-5x}{-5} = \frac{19}{-5}$$

$$\boxed{x = -\frac{19}{5} \text{ or } -3.8}$$

4) $2.5y + 6 = 4.5y - 1$

$$-2.5y \qquad -2.5y$$

$$6 = 2y - 1$$
$$+1 \qquad\quad +1$$

$$\frac{7}{2} = \frac{2y}{2}$$

$$\boxed{3.5 = y}$$

5) $6(4-z) = 2z$

$$24 - 6z = 2z$$
$$+6z \quad +6z$$

$$\frac{24}{8} = \frac{8z}{8}$$

$$\boxed{3 = z}$$

6) $3 - 4x = -7 - 4x$

$$+4x \qquad\quad +4x$$

$$3 = -7$$

(never)

* Since this is not true, you answer is no solution

7) $6x + 4 = 4\left(\dfrac{3}{2}x + 1\right)$

$6x + 4 = 6x + 4$

↳ these are exactly
the same expressions
on both sides so
it is ALWAYS TRUE

We say
infinitely many
Solutions

When solving equations, there will be
3 possibilities:

1.) one solution $x + 2 = 5$ $x = 3$
2.) no solution $x - 5 = x + 3$ (false)
3.) infinitely many solutions $x + 7 = x + 7$ (true)

8) $2x + 1 = 2x - 1$ 9) $\dfrac{1}{2}(6x - 4) = 3x - 2$

   No Solution

                            $3x - 2 = 3x - 2$
                            infinitely many solutions

10) $\dfrac{1}{3}(2b + 9) = \dfrac{2}{3}\left(b + \dfrac{9}{2}\right)$ 11) $6(5 - 2v) = -4(3v + 1)$

   $\dfrac{2}{3}b + 3 = \dfrac{2}{3}b + 3$ $30 - \cancel{12v} = \cancel{-12v} - 4$
                                    $+12v \qquad +12v$

   infinetly many solutions $30 = -4$

                                   no solution