

Solve by Substitution

- ① **SOLVE** one equation for x or y. (Isolate a variable)
- ② **SUBSTITUTE** the resulting equation from step 1 into the other equation for that variable.
- ③ **SOLVE** for the remaining variable.
- ④ **SUBSTITUTE** your answer from step 3 into either original equation to find the other variable.

Directions: Solve each system of equations below by substitution. Identify the solution.

7. $y = -7x - 1$
 $y = x - 9$

$$-7x - 1 = x - 9 \quad y = 1 - 9$$

$$-1 = 8x - 9 \quad y = -8$$

$$8 = 8x$$

$$1 = x$$

$(1, -8)$

8. $y = -5x + 30$
 $7x + 3y = 42$

$$7x + 3(-5x + 30) = 42 \quad y = -5(6) + 30$$

$$7x - 15x + 90 = 42 \quad y = 0$$

$$-8x + 90 = 42$$

$$-8x = -48$$

$$x = 6$$

$(6, 0)$

9. $6x - 5y = -28$
 $7x + y = 22$

$$7x + y = 22 \quad 6x - 5(-7x + 22) = -28$$

$$y = -7x + 22 \quad 6x + 35x - 110 = -28$$

$$41x - 110 = -28$$

$$41x = 82$$

$$x = 2$$

$$y = -7(2) + 22$$

$$y = 8$$

$(2, 8)$

10. $x - 7y = 53$
 $-4x - 5y = 19$

$$x - 7y = 53 \quad -4(7y + 53) - 5y = 19$$

$$x = 7y + 53 \quad -28y - 212 - 5y = 19$$

$$-33y - 212 = 19$$

$$-33y = 231$$

$$y = -7$$

$$x = 7(-7) + 53$$

$$x = 4$$

$(4, -7)$

11. $2y = 6x + 10$
 $3x - y = 5$

$$2y = 6x + 10 \quad 3x - (3x + 5) = 5$$

$$y = 3x + 5 \quad 3x - 3x - 5 = 5$$

$$-5 = 5$$

$N.S.$

12. $5x + 7y = -17$
 $4x - 3y = -5$

$$5x + 7y = -17 \quad 4x - 3\left(-\frac{5}{7}x - \frac{17}{7}\right) = -5$$

$$7y = -5x - 17 \quad 4x + \frac{15}{7}x + \frac{51}{7} = -5$$

$$y = -\frac{5}{7}x - \frac{17}{7}$$

$$\frac{43}{7}x + \frac{51}{7} = -5$$

$$\frac{43}{7}x = -\frac{86}{7}$$

$$x = -2$$

$(-2, -1)$

Hw: $1-9, 16-21, 28$ } $(-2, -1)$ $7y = -7$
 $y = -1$