Section 4.2 Substitution

1) If necessary solve one of the equations for one of the variables.
2) Substitute the expression found in step 1 into the other equation.
3) Solve the equation.
4) Substitute the answer from step 3 into the equation from step 1.
5) Solve it and write answer as an ordered pair.

ex: $y = 5x - 13$

$2x + 3y = 12$

$2x + 3(5x - 13) = 12$

$2x + 15x - 39 = 12$

$+39 \quad +39$

$\frac{17x}{17} = \frac{51}{17}$

$x = 3$

$y = 5 \cdot 3 - 13$

$y = 15 - 13$

$y = 2$

$(3, 2)$

ex: $3x + 2y = -1$

$x - y = 3$

$+y \quad +y$

$x = 3 + y$

$3(3 + y) + 2y = -1$

$9 + 3y + 2y = -1$

$-9 \quad -9$

$\frac{5y}{5} = -\frac{10}{5}$

$y = -2$

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

$(1, -2)$

ex: $3x + y = -5$

$y = -3x + 3$

$3x + (-3x + 3) = -5$

$3 = -5$ Nope!

No solutions

Parallel Lines

ex: $y = 3x - 4$

$9x - 3y = 12$ } same line

$9x - 3(3x - 4) = 12$

$9x - 9x + 12 = 12$

$12 = 12$ Yes

infinitely many solutions

p 277 3-30 by 3s

27) $y = \frac{1}{3}x + \frac{2}{3}$ $\Rightarrow$ $\frac{1}{3}x + \frac{2}{3} = \frac{5}{7}x - 2$

$y = \frac{5}{7}x - 2$

$21 \cdot \frac{1}{3}x + 21 \cdot \frac{2}{3} = 21 \cdot \frac{5}{7}x - 21 \cdot 2$

$y = \frac{5}{7} \cdot 7 - 2$

$y = 5 - 2 = 3$

$7x + 14 = 15x - 42$

$-15x \quad -14 \quad -15x \quad -14$

$-8x = -56$

-8 -8

$x = 7$

$(7, 3)$