

7.5: Solving by Elimination

(multiplication/
addition)

$$\text{ex. 1) } \begin{array}{l} 2x + y = -7 \\ -1(x + y = -4) \end{array}$$

$$\begin{array}{r} + \quad 2x + y = -7 \\ \quad -x - y = 4 \\ \hline \quad \quad x = -3 \end{array}$$

Solve for y:

$$\begin{array}{l} x + y = -4 \\ -3 + y = -4 \\ y = -4 + 3 \\ \quad y = -1 \end{array}$$

$$2) \quad \begin{aligned} 3x - 4y &= 7 \\ 5x - 6y &= 8 \end{aligned}$$



make them both
the same number
(one positive, one negative)

$$\begin{aligned} 5(3x - 4y = 7) &\Rightarrow \cancel{15x} - 20y = 35 \\ -3(5x - 6y = 8) &\Rightarrow \underline{\cancel{-15x} + 18y = -24} \end{aligned}$$

$$-2y = 11$$

$$\frac{-2y}{-2} = \frac{11}{-2} \text{ or } -5.5$$

Solve for the other
variable using either
equation.

$$3x - 4y = 7$$

$$3x - 4(-5.5) = 7$$

$$3x + 22 = 7$$

$$3x = 7 - 22$$

$$3x = -15$$

$$\boxed{x = -5}$$

Intersection point
 $(-5, -5.5)$

$$3) \quad \begin{aligned} 2x + 3y &= 6 \\ 5x + 10y &= 20 \end{aligned}$$

$$\begin{aligned} 5(2x + 3y = 6) &\Rightarrow \cancel{10x} + 15y = 30 \\ -2(5x + 10y = 20) &\Rightarrow \cancel{-10x} - 20y = -40 \\ \hline &-5y = -10 \end{aligned}$$

$$\begin{aligned} 2x + 3y &= 6 \\ 2x + 3(2) &= 6 \\ 2x + 6 &= 6 \\ 2x &= 6 - 6 \\ 2x &= 0 \\ \frac{2x}{2} &= \frac{0}{2} \\ x &= 0 \end{aligned}$$

$$\begin{aligned} -5y &= -10 \\ \frac{-5y}{-5} &= \frac{-10}{-5} \\ y &= 2 \end{aligned}$$

$$(0, 2)$$

Worksheet

1. $(4, 0)$

2. $(2, -1)$

3. $(2, -6)$

4. $(1, -0.5)$

5. $(\frac{4}{5}, \frac{2}{5})$

6. $(1, -1)$

7. $(\frac{3}{2}, \frac{3}{4})$ or $(1.5, 0.75)$