7.1 Solving Systems of Equations

I. **The Method of Substitution**: p 452, just read over

Ex 1) $\frac{1}{5}x + \frac{1}{2}y = 8$ #10

$x + y = 20$

$$\begin{cases} 2x + 5y = 80 \\ x + y = 20 \end{cases}$$

$-x \qquad -x$

$y = 20 - x$

$2x + 5(20 - x) = 80$

$2x + 100 - 5x = 80$

$-3x + 100 = 80$

$\underline{-100 \quad -100}$

$\dfrac{-3x}{-3} = \dfrac{-20}{-3}$

$\boxed{x = \dfrac{20}{3}}$

$y = 20 - \dfrac{20}{3}$

$y = \dfrac{60}{3} - \dfrac{20}{3}$

$\boxed{y = \dfrac{40}{3}}$

$\left(\dfrac{20}{3}, \dfrac{40}{3} \right)$

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Ex 2) $x - y = -4$ → solve for y → $\dfrac{-y}{-1} = \dfrac{-x}{-1} - \dfrac{4}{-1}$

$x^2 - y = -2$

$y = x + 4$

$x^2 - (x + 4) = -2$

$x^2 - x - 4 = -2$

$\underline{ +2 \quad +2}$

$x^2 - x - 2 = 0$

$(x - 2)(x + 1) = 0$

$x - 2 = 0 \qquad x + 1 = 0$

$x = 2 \qquad\quad x = -1$

$\underline{x = 2}$

$y = 2 + 4$

$y = 6$

$\boxed{(2, 6)}$

$\underline{x = -1}$

$y = -1 + 4$

$y = 3$

$\boxed{(-1, 3)}$

Ex 3) 1.5x + .8y = 2.3 ×10   ×10
         .3x - .2y = .1   ×10   ×10

$$\begin{cases} 15x + 8y = 23 \\ 3x - 2y = 1 \end{cases}$$

$$\frac{-2y}{2} = \frac{-3x}{-2} + \frac{1}{-2}$$

$$y = \frac{3}{2}x - \frac{1}{2}$$

$$(1, 1)$$

$$15x + 8\left(\frac{3}{2}x - \frac{1}{2}\right) = 23$$

$$15x + 12x - 4 = 23$$

$$27x - 4 = 23$$
$$+4 \quad +4$$
$$27x = 27$$

$$\boxed{x = 1}$$

$$y = \frac{3}{2}(1) - \frac{1}{2}$$

$$y = \frac{3}{2} - \frac{1}{2}$$

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

$$\boxed{y = 1}$$