3.2/3.3 Solving Systems of Equations

Ex. 1

Substitution Method

$(4, -1)$

$2x + 3y = 5$

$x - 5y = 9 \rightarrow x = 5y + 9$

$2(5y+9) + 3y = 5$

$13y = -13$

$y = -1$

$x = 4$

Ex. 2

Linear Combination Method

$x - y = 5$

$5x + 3y = -3$

$\left(\frac{2}{3}, \frac{-2}{7}\right)$

$3\left(\frac{1}{x} - \frac{1}{y} = 5\right)$

$\frac{5}{x} + \frac{3}{y} = -3$

$\frac{3}{x} - \frac{3}{y} = 15$

$\frac{5}{x} + \frac{3}{y} = -3$

$\frac{8}{x} = \frac{12}{1}$

$\frac{8}{12} = x = \frac{2}{3}$

$\frac{1}{\frac{2}{3}} - \frac{1}{y} = 5$

$\frac{3}{2} - \frac{1}{y} = \frac{10}{2}$

$-\frac{1}{y} = \frac{7}{2}$

$7y = -2$

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

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

Ex. 3

It takes a plane $1\frac{1}{2}$ hours to fly 600 km against the wind. The return trip with the wind takes only 1 hour. Find the plane's airspeed and the speed of the wind.

P

W

plane: 500 Km/hr

wind: 100 Km/hr

	r	t	d
against wind	$P - W$	1.5	$1.5P - 1.5W$
with wind	$P + W$	1	$P + W$

$$1.5P - 1.5W = 600$$

$$1.5(P + W) = (600)1.5$$

$$3P = 1500$$

$$P = 500, \quad W = 100$$

Ex. 4

Student tickets to the game cost \$3 and adult tickets cost \$8. The number of student tickets sold was 60 less than twice the number of adult tickets. and sales totaled \$5700. How many student tickets were sold? 780

$$S = 2A - 60$$

$$A = 420$$

$$3S + 8A = 5700$$

$$3(2A - 60) + 8A = 5700$$

$$14A - 180 = 5700$$

$$14A = 5880$$