Sec. 6.3 Solving Systems Using Elimination

Problem 1: Solve using elimination

a. $3x + 4y = -22$
$5x - 4y = 38$

$1 + 2 = 3$
$5 + 3 = 8$
$6 + 5 = 11$

$8x = 16$
$\frac{8x}{8} = \frac{16}{8}$
$x = 2$

$(2, -7)$

$3(2) + 4y = -22$
$6 + 4y = -22$
$-6 \quad -6$
$4y = -28$
$\frac{4y}{4} = \frac{-28}{4}$
$y = -7$

b. $-3x - 3y = 9$
$3x - 4y = 5$

$-7y = 14$
$\frac{-7y}{-7} = \frac{14}{-7}$
$y = -2$

$-3x - 3(-2) = 9$
$-3x + 6 = 9$
$-6 \quad -6$
$-3x = 3$
$\frac{-3x}{-3} = \frac{3}{-3}$
$x = -1$

$(-1, -2)$

Problem 2:

$-2x + 12y = -30 \rightarrow -2x + 12y = -30$

$3(3x - 4y = 17) \rightarrow 9x - 12y = 51$

$3(3) - 4y = 17$

$9 - 4y = 17$

$-9 \quad -9$

$-4y = 8$

$\frac{-4y}{-4} = \frac{8}{-4}$

$y = -2$

$7x = 21$

$\frac{7x}{7} = \frac{21}{7}$

$x = 3$

$(3, -2)$

Problem 3:

$-2(3x + 2y = 17) \rightarrow -6x - 4y = -34$

$3(2x + 5y = 26) \rightarrow 6x + 15y = 78$

$2x + 5(4) = 26$

$2x + 20 = 26$

$-20 \quad -20$

$2x = 6$

$\frac{2x}{2} = \frac{6}{2}$

$x = 3$

$11y = 44$

$\frac{11y}{11} = \frac{44}{11}$

$y = 4$

$(3, 4)$

Problem 4:

$12x - 8y = 20 \rightarrow 12x - 8y = 20$

$-4(3x - 2y = 5) \rightarrow -12x + 8y = -20$

$0 = 0$

True → same lines

infinitely many solutions

Problem 5:

A concession stand sold a total of 138 small and large popcorns. A small popcorn costs $2.50 and a large popcorn costs $4.00. Total popcorn sales were $466.50. How many large popcorns were sold?

x = # small p.
y = # large p.

$-4(x + y = 138) \rightarrow -4x - 4y = -552$

$2.50x + 4y = 466.50$

$2.5x + 4y = 466.50$

$-1.5x = -85.5$

$\frac{-1.5x}{-1.5} = \frac{-85.5}{-1.5}$

$x = 57$

$57 + y = 138$

$-57 \quad -57$

$y = 81$