Name Answers Date

5.3 Solving Systems of Linear Equations (Elimination)

Steps for solving a system of equations by elimination:
1) Multiply, if necessary, one or both equations by a constant so at least 1 pair of like terms have the opposite coefficients.
2) Add the equations to eliminate one of the variables.
3) Solve the resulting equation for the remaining variable.
4) Substitute the value from step 3 into one of the original equations and solve.

Solve the system of linear equations by elimination. Check your solution.

1) $x - y = 4$
$x + y = 2$

$\frac{2x}{2} = \frac{6}{2}$
$x = 3$

$3 + y = 2$
$-3 \quad -3$
$y = -1$

$(3, -1)$

2) $x + 3y = 5$
$2x - 3y = 1$

$\frac{3x}{3} = \frac{6}{3}$
$x = 2$

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

$(2, 1)$

3) $4x - y = 7$
$-4x + 2y = -2$

$y = 5$

$4x - 5 = 7$
$+5 \quad +5$
$\frac{4x}{4} = \frac{12}{4}$
$x = 3$

$(3, 5)$

4) $2x + 3y = -2$
$3(3x - y = -14)$ →
$2x + 3y = -2$
$9x - 3y = -42$

$\frac{11x}{11} = \frac{-44}{11}$
$x = -4$

$2(-4) + 3y = -2$
$-8 + 3y = -2$
$+8 \quad +8$
$\frac{3y}{3} = \frac{6}{3}$
$y = 2$

$(-4, 2)$

5) $-4(x - 3y = 1)$
$4x + 5y = 4$

$-4x + 12y = -4$
$4x + 5y = 4$

$17y = 0$
$y = 0$

$x - 3(0) = 1$
$x - 0 = 1$
$x = 1$

$(1, 0)$

6) $-2(3x - 5y = 9)$
$6x - 6y = 6$

$-6x + 10y = -18$
$6x - 6y = 6$

$4y = -12$
$y = -3$

$3x - 5(-3) = 9$
$3x + 15 = 9$
$-15 \quad -15$
$3x = -6$
$x = -2$

$(-2, -3)$

7) $3x - y = 0$
$-3x + 5y = 0$

$4y = 0$
$y = 0$

$3x - 0 = 0$
$3x = 0$
$x = 0$

$(0, 0)$

8) $2y = -5x - 3$
$4x - 2 = -6y$
$+5x \quad +5x$
$+6y \quad +6y$
$4x + 6y = 2$

$3(5x + 2y = -3)$
$4x + 6y = 2$

$\rightarrow -15x - 6y = 9$
$4x + 6y = 2$

$-11x = 11$
$x = -1$

$2y = -5(-1) - 3$
$2y = 5 - 3$
$2y = 2$
$y = 1$

$(-1, 1)$

9) For what values of and should you solve the system by elimination?

a) $3x + 5y = 10$
$2x + ay = 4$

$a =$ -5

b) $-4x - 3y = 9$
$bx + 7y = 2$

$b =$ 4