Practice 4.2

Solve the following systems of linear equations using substitution:

1. $5x + 3y = -1$, $y = -3x - 3$

$5x + 3(-3x-3) = -1$
$5x - 9x - 9 = -1$
$-4x = 8$
$x = -2$

$y = -3x - 3$
$y = -3(-2) - 3$
$y = 3$

$(-2, 3)$

2. $8x - y = 16$, $y = -8x$

$8x - (-8x) = 16$
$16x = 16$
$x = 1$

$y = -8(1)$
$y = -8$

$(1, -8)$

3. $x + 8y = -18$, $-6x + 3y = 6$

$x = -8y - 18$

$-6(-8y - 18) + 3y = 6$
$48y + 108 + 3y = 6$
$51y + 108 = 6$
$51y = -102$
$y = -2$

$x + 8y = -18$
$x + 8(-2) = -18$
$x = -2$

$(-2, -2)$

4. $9x + 3y = -4$, $y = -8 - 3x$

$9x + 3(-8 - 3x) = -4$
$9x - 24 - 9x = -4$
$-24 = -4$

NO Solution.

5. $y = x + 2$, $y + 6 = 3x$

$x + 2 + 6 = 3x$
$8 = 2x$
$4 = x$

$y = x + 2$
$y = 4 + 2$
$y = 6$

$(4, 6)$

6. $x = 12.5 + 2y$, $3x + 6y = -47.7$

$3(12.5 + 2y) + 6y = -47.7$
$37.5 + 6y + 6y = -47.7$
$12y = -85.2$
$y = -7.1$

$x = 12.5 + 2y$
$x = 12.5 + 2(-7.1)$
$x = -1.7$

$(-1.7, -7.1)$

Solve the following systems of linear equations using elimination:

7. $-7x + 2y = 4$, $7x - y = -2$

$y = 2$

$7x - y = -2$
$7x - 2 = -2$
$7x = 0$
$x = 0$

$(0, 2)$

8. $4x = 24 + 2y$, $-4x - 4y = -12$

$4x - 2y = 24$
$-6y = 12$
$y = -2$

$4x = 24 + 2y$
$4x = 24 + 2(-2)$
$4x = 20$
$x = 5$

$(5, -2)$

9. $2x - 8y = 8$, $-2x + 8y = 2$

$0 = 10$

NO Solution.

10. $2x + 3y = -6$, $x - 2y = -10$

$-2[x - 2y = -10]$
$-2x + 4y = 20$
$2x + 3y = -6$
$7y = 14$
$y = 2$

$x - 2y = -10$
$x - 2(2) = -10$
$x - 4 = -10$
$x = -6$

$(-6, 2)$

11. $x + y = 7$, $-2x - 2y = -14$

$2[x + y = 7]$
$2x + 2y = 14$
$0 = 0$

Infinitely many Solutions

12. $8x + 4y = 8$, $4x + 8y = 6.4$

$-2[8x + 4y = 8]$
$-16x - 8y = -16$
$-12x = -9.6$
$x = .8$

$8x + 4y = 8$
$8(.8) + 4y = 8$
$y = .4$

$(0.8, 0.4)$

13. $5x - 6y = 18$, $-8x + 8y = -24$

$4(5x - 6y = 18)$
$3[-8x + 8y = -24]$
$20x - 24y = 72$
$-24x + 24y = -72$
$-4x = 0$
$x = 0$

$5x - 6y = 18$
$5(0) - 6y = 18$
$-6y = 18$
$y = -3$

$(0, -3)$

14. $2x + 7y = -16$, $-7x + 5y = -3$

$7[2x + 7y = -16]$
$2[-7x + 5y = -3]$
$-14x + 10y = -6$
$14x + 49y = -112$
$59y = -118$
$y = -2$

$2x + 7y = -16$
$2x + 7(-2) = -16$
$2x = -2$
$x = -1$

$(-1, -2)$

Choose the best method for solving:

15. $2y = 10 + x$, $7x = 4y$ $\Rightarrow x = 2y - 10$

$7(2y - 10) = 4y$
$14y - 70 = 4y$
$y = 7$

$7x = 4y$
$7(x) = 4(7)$
$x = 4$

$(4, 7)$

16. $x + 2y = 11.4$, $-2x + 6y = 18.5$

$2[x + 2y = 11.4]$
$2x + 4y = 22.8$
$10y = 41.3$
$y = 4.13$

$x + 2(4.13) = 11.4$
$x = 3.14$

$(3.14, 4.13)$