

10 a)  $x - y = -2$   
 $x + 2y = 7$

$x = y - 2$   
 $(y - 2) + 2y = 7$   
 $3y = 9$   
 $y = 3$

$x - (3) = -2$   
 $x = 1$   
 $(1, 3)$

b)  $2q - p = 3$   
 $q + 2p = 4$

$2q = p + 3$   
 $q = \frac{p}{2} + \frac{3}{2}$

$(\frac{p}{2} + \frac{3}{2}) + 2p = 4$   
 $p + 3 + 4p = 8$   
 $5p = 5$   
 $p = 1$

$2q - (1) = 3$   
 $2q = 4$   
 $q = 2$   
 $(q, p)$   
 $(2, 1)$

c)  $3g = h + 10$   
 $h = g - 4$

$3g = (g - 4) + 10$   
 $2g = 6$   
 $g = 3$

$h = (3) - 4$   
 $h = -1$

$(h, g)$   
 $(-1, 3)$

d)  $3x - z = -9$   
 $z - 2x = 7$

$z = 2x + 7$

$3x - (2x + 7) = -9$   
 $x - 7 = -9$   
 $x = -2$

$z - 2(-2) = 7$   
 $z + 4 = 7$   
 $z = 3$

$(-2, 3)$

e)  $3s + 2t = 6$   
 $s + 2t = 6$

$s = -2t + 6$   
 $3(-2t + 6) + 2t = 6$   
 $-6t + 18 + 2t = 6$   
 $-4t = -12$   
 $t = 3$

$s + 2(3) = 6$   
 $s = 0$   
 $(t, s)$   
 $(3, 0)$

f)  $2m + 5n = -6$   
 $m + 2n = -3$

$m = -2n - 3$   
 $2(-2n - 3) + 5n = -6$   
 $-4n - 6 + 5n = -6$   
 $n = 0$

$2m + 5(0) = -6$   
 $2m = -6$   
 $m = -3$

$(m, n)$   
 $(-3, 0)$

g)  $2y = w + 5$   
 $3w - y = 0$

$y = 3w$

$2(3w) = w + 5$   
 $6w - w = 5$   
 $5w = 5$   
 $w = 1$

$3(1) - y = 0$   
 $3 = y$   
 $(3, 1)$

h)  $2a - 3b - 1 = 0$   
 $2a - b - 5 = 0$   
 $2a - 5 = b$

$2a - 3(2a - 5) = 1$   
 $2a - 6a + 15 = 1$   
 $-4a = -14$   
 $a = \frac{7}{2}$

$2(\frac{7}{2}) - b = 5$   
 $7 - b = 5$   
 $-b = -2$   
 $b = 2$

$(\frac{7}{2}, 2)$

$$11. \quad \begin{aligned} 3x - y &= -7 \\ x - 2y &= 1 \end{aligned}$$

$$x = 2y + 1$$

$$\begin{aligned} 3(2y + 1) - y &= -7 \\ 6y + 3 - y &= -7 \\ 5y &= -10 \\ y &= -2 \end{aligned}$$

$$\begin{aligned} x - 2(-2) &= 1 \\ x + 4 &= 1 \\ x &= -3 \end{aligned}$$

$$(-3, -2)$$

$$12. \quad a) \quad \begin{aligned} x - 2y &= 1 \\ x + y &= 2 \end{aligned}$$

$$x = -y + 2$$

$$\begin{aligned} (y + 2) - 2y &= 1 \\ -3y &= -1 \\ y &= 1/3 \end{aligned}$$

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

$$\begin{aligned} 3x + 1 &= 6 \\ 3x &= 5 \\ x &= 5/3 \end{aligned}$$

$$(5/3, 1/3)$$

$$b) \quad \begin{aligned} 3x + y &= 8 \\ 2x - y &= 7 \end{aligned}$$

$$y = -3x + 8$$

$$\begin{aligned} 2x - (-3x + 8) &= 7 \\ 2x + 3x - 8 &= 7 \\ 5x &= 15 \\ x &= 3 \end{aligned}$$

$$\begin{aligned} 3(3) + y &= 8 \\ 9 + y &= 8 \\ y &= -1 \end{aligned}$$

$$(3, -1)$$

$$c) \quad \begin{aligned} x + y &= 5 \\ 2y - x &= 4 \end{aligned}$$

$$x = -y + 5$$

$$\begin{aligned} 2y - (-y + 5) &= 4 \\ 2y + y - 5 &= 4 \\ 3y &= 9 \\ y &= 3 \end{aligned}$$

$$\begin{aligned} x + (3) &= 5 \\ x &= 2 \end{aligned}$$

$$(2, 3)$$

$$d) \quad \begin{aligned} 3x - y &= 4 \\ x - 2y &= 3 \end{aligned}$$

$$3x - 4 = y$$

$$\begin{aligned} x - 2(3x - 4) &= 3 \\ x - 6x + 8 &= 3 \\ -5x &= -5 \\ x &= 1 \end{aligned}$$

$$\begin{aligned} 3(1) - y &= 4 \\ 3 - y &= 4 \\ -y &= 1 \\ y &= -1 \end{aligned}$$

$$(1, -1)$$

13 a)  $y - 2x = -2$   
 $x + y = 4$

$$\begin{aligned} x &= -y + 4 & x + (2) &= 4 \\ y - 2(-y + 4) &= -2 & x &= 2 \\ y + 2y - 8 &= -2 & & \\ 3y - 8 &= -2 & & \\ 3y &= 6 & & \\ y &= 2 & & \end{aligned}$$

**(2, 2)**

b)  $2x - y = -1$   
 $x - 2y = 5$

$$\begin{aligned} x &= 2y + 5 & x - 2\left(\frac{11}{3}\right) &= 5 \\ 2(2y + 5) - y &= -1 & x - \frac{22}{3} &= 5 \\ 4y + 10 - y &= -1 & & \\ 3y + 10 &= -1 & & \\ 3y &= -11 & 3x - 22 &= 15 \\ y &= -\frac{11}{3} & 3x &= 37 \\ & & x &= \frac{37}{3} \end{aligned}$$

**$\left(\frac{37}{3}, -\frac{11}{3}\right)$**

c)  $2x - y = -3$   
 $x + y = 0$

$$\begin{aligned} x &= -y & x + 1 &= 0 \\ 2(-y) - y &= -3 & x &= -1 \\ -2y - y &= -3 & & \\ -3y &= -3 & & \\ y &= 1 & & \end{aligned}$$

**(-1, 1)**

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

$$\begin{aligned} y &= 2x - 3 & 2(1) &= y + 3 \\ 3(2x - 3) &= 2x - 5 & 2 - 3 &= y \\ 6x - 9 &= 2x - 5 & -1 &= y \\ 4x &= 4 & & \\ x &= 1 & & \end{aligned}$$

**(1, -1)**

14. a)  $3x - y = 7$   
 $x + 3y = 9$

$$\begin{aligned} x &= -3y + 9 & x + 3(2) &= 9 \\ 3(-3y + 9) - y &= 7 & x &= 3 \\ -9y + 27 - y &= 7 & & \\ -10y + 27 &= 7 & & \\ -10y &= -20 & & \\ y &= 2 & & \end{aligned}$$

**(3, 2)**

b) (3, 2)

c) (3, 2)

d) Different ways to ask the same question.