

#7. $3x + 3y = 27$

$x - 3y = -11$

$$\begin{array}{r} 4x = 16 \\ \hline 4 \quad 4 \end{array}$$

$x = 4$

Substitute

$x + 3y = -11$

$4 + 3y = -11$

$-4 \quad -4$

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

$y = -5$

write as ordered

pair
 $(4, -5)$

9.) $2x + 4y = 22$

$2x - 2y = -8$

(i) multiply if nec.

$$\begin{array}{r} 2x + 4y = 22 \\ -1(2x - 2y = -8) \\ \hline \end{array}$$

$2x + 4y = 22$

$-2x + 2y = +8$

$\frac{6y}{6} = \frac{30}{6}$

eliminate by combining

$y = 5$

③ Substitute

$2x + 4y = 22$

$2x + 4(5) = 22$

$2x + 20 = 22$

$-20 \quad -20$

$2x = 2$

$x = 1$

④ Solution $(1, 5)$

15. $2x + 3y = 9$

$x + 5y = 8$

multiply

$2x + 3y = 9$

$-2(x + 5y) = -16$

$2x + 3y = 9$

$-2x - 10y = -16$

$-7y = -7$

combine

$y = 1$

Substitute

$2x + 3y = 9$

$2x + 3(1) = 9$

$2x + 3 = 9$

$-3 \quad -3$

$2x = 6$

$x = 3$

Solution

$(3, 1)$

$$\begin{array}{r}
 15) \quad \cancel{2x + 3y = 9} \\
 \quad \quad \cancel{x + 5y = 8} \\
 \textcircled{1} \text{ multiply} \\
 \quad \quad \cancel{2x + 3y = 9} \\
 \quad \quad \cancel{-2(x + 5y = 8)} \\
 \quad \quad \quad \quad \cancel{2x + 3y = 9} \\
 \quad \quad \quad \quad \cancel{-2x - 10y = -16} \\
 \text{combine} \\
 \quad \quad \quad \quad -7y = -7
 \end{array}$$

$$\begin{array}{r}
 21) \quad 9x + 8y = 15 \\
 \quad \quad 9x + 8y = 30 \\
 \text{multiply to eliminate} \\
 \quad \quad 9x + 8y = 15 \\
 \quad \quad -1(9x + 8y = 30) \\
 \quad \quad \quad \quad 9x + 8y = 15 \\
 \quad \quad \quad \quad \underline{-9x - 8y = -30} \\
 \text{combine} \quad \quad \quad 0 = -15 \\
 \text{no solution}
 \end{array}$$

$$\begin{array}{r}
 17) \quad 6x + 4y = 42 \\
 \quad \quad -3x + 3y = -6 \\
 \textcircled{1} \text{ multiply so} \\
 \quad \quad \text{can eliminate} \\
 \quad \quad 6x + 4y = 42 \\
 \quad \quad +2(-3x + 3y = -6) \\
 \quad \quad \quad \quad 6x + 4y = 42 \\
 \quad \quad \quad \quad \underline{-6x + 6y = -12} \\
 \text{combine} \quad \quad \quad 10y = 30 \\
 \quad \quad \quad \quad \boxed{y = 3}
 \end{array}$$

$$\begin{array}{r}
 6x + 4y = 42 \\
 6x + 4(3) = 42 \\
 6x + 12 = 42 \\
 \quad \quad -12 \quad -12 \\
 \quad \quad \quad \quad 6x = 30 \\
 \quad \quad \quad \quad \boxed{x = 5}
 \end{array}$$

Solution

$$(5, 3)$$

$$\begin{array}{r}
 23) \quad 5x - 3y = 10 \\
 \quad \quad 10x + 6y = 20 \\
 \text{multiply so can eliminate} \\
 \quad \quad -2(5x - 3y = 10) \\
 \quad \quad \quad \quad 10x + 6y = 20 \\
 \quad \quad \quad \quad \underline{-10x + 6y = -20} \\
 \quad \quad \quad \quad 10x + 6y = 20 \\
 \text{combine} \quad \quad \quad 12y = 0 \\
 \quad \quad \quad \quad \boxed{y = 0}
 \end{array}$$

$$\begin{array}{r}
 5x - 3(y) = 10 \\
 5x - 3(0) = 10 \\
 5x + 0 = 10 \\
 \quad \quad \quad \quad 5x = 10 \\
 \quad \quad \quad \quad \underline{5 \quad 5} \\
 \quad \quad \quad \quad \boxed{x = 2}
 \end{array}$$

Orx solution

$$(2, 0)$$

25. $4x - 7y = 15$
 $-8x + 14y = -30$
 multiply to eliminate

$$\begin{array}{r} 2(4x - 7y = 15) \\ 8x - 14y = 30 \\ -8x + 14y = -30 \end{array}$$

combine $0 = 0$
 infinite solutions

29. The student forgot to multiply the constant in the second equation by 4.

53.

33. $2x + y = 4$
 $6x + 7y = 12$

multiply
 $-3(2x + y = 4)$
 $-6x - 3y = -12$
 $6x + 7y = 12$

combine $4y = 0$
 $y = 0$

$2x + y = 4$ (2,0)
 $2x + 0 = 4$
 $2x = 4$
 $\frac{2x}{2} = \frac{4}{2}$
 $x = 2$

$$\begin{array}{r} 4 - 2a < 3a - 1 \\ -3a \quad -3a \\ 4 - 5a < -1 \\ -4 \quad -4 \\ -5a < -5 \\ \underline{-5} \quad \underline{-5} \\ a > 1 \end{array}$$