

6-3

#4

Twin sister...

$$\begin{array}{l} \textcircled{1} \quad 3x + 2y = 11 \quad 3x + \cancel{2y} = 11 \\ 2 \quad (7x - y = 3) + 14x + \cancel{2y} = 6 \\ \hline 17x = 17 \end{array}$$

$$7(1) - y = 3$$

$$x = 1$$

$$7 - y = 3$$

$$-y = -4$$

$$y = 4$$

$$\boxed{(1, 4)}$$

$$\begin{array}{l} \textcircled{2} \quad 3x - 4y = 18 \quad \cancel{3x} - 4y = 18 \\ -3(x + 3y = -7) + \cancel{-3x} - 9y = 21 \\ \hline -13y = 39 \end{array}$$

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

$$y = -3$$

$$x - 9 = -7$$

$$x = 2$$

$$\boxed{(2, -3)}$$

$$\begin{array}{l} \textcircled{3} \quad (5x + 2y = -8) \cdot 2 \quad 10x + \cancel{4y} = -16 \\ 9x - 4y = -22 + 9x + \cancel{4y} = -22 \\ \hline 19x = -38 \end{array}$$

$$5(-2) + 2y = -8$$

$$x = -2$$

$$-10 + 2y = -8$$

$$2y = 2$$

$$y = 1$$

$$\boxed{(-2, 1)}$$

$$\begin{array}{l} \textcircled{4} \quad 4(x - 5y = 15) \quad \cancel{4x} + 20y = 60 \\ 4x - 3y = 26 + \cancel{4x} - 3y = 26 \\ \hline 17y = -34 \\ y = -2 \end{array}$$

$$x - 5(-2) = 15$$

$$x + 10 = 15$$

$$x = 5$$

$$\boxed{(5, -2)}$$

$$\begin{aligned} \textcircled{5} \quad & 2x + 5y = 11 \rightarrow x + 15y = 33 & 2x + 5(1) = 11 \\ & 2(-3x + 8y = -1) \rightarrow -4x + 16y = -2 & 2x + 5 = 11 \\ & & 2x = 6 \\ & & x = 3 \\ & & 3|y = 3| \\ & & y = 1 \end{aligned}$$

$(3, 1)$

$$\begin{aligned} \textcircled{6} \quad & 4(7x - 3y = 2) \rightarrow 28x - 12y = 8 & 7(-1) - 3y = 2 \\ & 3(5x + 4y = -17) \rightarrow +15x + 12y = -51 & -7 - 3y = 2 \\ & & -3y = 9 \\ & & y = -3 \\ & & 43x = -43 \\ & & x = -1 \end{aligned}$$

$(-1, -3)$

$$\begin{aligned} \textcircled{7} \quad & 2(4x - 5y = -28) \rightarrow 8x - 10y = -56 & 4(-2) - 5y = -28 \\ & -5(-9x - 2y = 10) \rightarrow +45x + 10y = -50 & -8 - 5y = -28 \\ & & -5y = -20 \\ & & y = 4 \\ & & 53x = -104 \\ & & x = -2 \end{aligned}$$

$(-2, 4)$

$$\begin{aligned} \textcircled{8} \quad & 2(2x + 3y = 10) \rightarrow 4x + 9y = 30 & 2x + 3(0) = 10 \\ & -2(3x - 10y = 15) \rightarrow -6x + 20y = -30 & 2x = 10 \\ & & x = 5 \\ & & 29y = 0 \\ & & y = 0 \end{aligned}$$

$(5, 0)$

$$\begin{aligned} \textcircled{9} \quad & 2(-7x + 4y = -6) \rightarrow -14x + 8y = -12 & 2x - 5(-5) = 21 \\ & 7(2x - 5y = 21) \rightarrow 14x - 35y = 147 & 2x + 25 = 21 \\ & & 2x = -4 \\ & & x = -2 \\ & & -27y = 135 \\ & & y = -5 \end{aligned}$$

$(-2, -5)$

$$\begin{array}{r} \textcircled{10} \quad 8x + 3y = -12 \rightarrow 40x + 15y = -60 \quad 8(0) + 3y = -12 \\ -3(11x + 5y = -20) \rightarrow -18x - 15y = 60 \quad 3y = -12 \\ \hline 22x = 0 \quad y = -4 \\ x = 0 \end{array}$$

$$\boxed{(0, -4)}$$

$$\begin{array}{r} \textcircled{11} \quad -4x - 9y = 1 \rightarrow -x - 9y = 1 \quad -x + 2(-1) = -4 \\ -4(-x + 2y = -4) \rightarrow 4x - 8y = 16 \quad -x - 2 = -4 \\ \hline -17y = 17 \quad -x = -2 \\ y = -1 \quad x = 2 \end{array}$$

$$\boxed{(2, -1)}$$

$$\begin{array}{r} \textcircled{12} \quad 5x - 12y = -16 \rightarrow 5x - 12y = -16 \quad 5(4) - 12y = -16 \\ 3(-3x + 4y = 0) \rightarrow -9x + 12y = 0 \quad 20 - 12y = -16 \\ \hline -4x = -16 \quad -12y = -36 \\ x = 4 \quad y = 3 \end{array}$$

$$\boxed{(4, 3)}$$

$$\begin{array}{r} \textcircled{13} \quad x = \text{chickens} \quad -2(x + y = 100) \rightarrow -2x - 2y = -200 \\ y = \text{pigs} \quad 2x + 4y = 270 \quad + 2x + 4y = 270 \\ \hline 2y = 70 \\ y = 35 \\ x + 35 = 100 \\ x = 65 \end{array}$$

There are 65 chickens
and 35 pigs.

#5

Last Person on Earth...

$$\begin{aligned} \textcircled{1} \quad 3x - 3y = 15 &\rightarrow 3x - 3y = 15 & 2(4) + y = 7 \\ 3(2x + y = 7) &\rightarrow 6x + 3y = 21 & 8 + y = 7 \\ & & y = -1 \\ & & x = 4 \end{aligned}$$

$(4, -1)$

$$\begin{aligned} \textcircled{2} \quad -2x + 8y = 20 &\rightarrow -2x + 8y = 20 & -2(2) + 8y = 20 \\ 4(5x - 2y = 4) &\rightarrow 20x - 8y = 16 & -4 + 8y = 20 \\ & & 8y = 24 \\ & & y = 3 \\ & & x = 2 \end{aligned}$$

$(2, 3)$

$$\begin{aligned} \textcircled{3} \quad (7x + y = 9) &\rightarrow -7x - y = 9 & 7x + 5 = -9 \\ 7x + 4y = 6 &\rightarrow 7x + 4y = 6 & 7x = -14 \\ & & x = -2 \\ & & 3y = 15 \\ & & y = 5 \end{aligned}$$

$(-2, 5)$

$$\begin{aligned} \textcircled{4} \quad 9x - 5y = 20 &\rightarrow 9x - 5y = 20 & -x + 2(-4) = -8 \\ 9(-x + 2y = -8) &\rightarrow -9x + 18y = -72 & -x - 8 = -8 \\ & & -x = 0 \\ & & x = 0 \\ & & 13y = -52 \\ & & y = -4 \end{aligned}$$

$(0, -4)$

$$\begin{aligned} \textcircled{5} \quad 4x + y = 24 &\rightarrow 4x + y = 24 & x + 2(4) = 13 \\ -4(x + 2y = 13) &\rightarrow -4x - 8y = -52 & x + 8 = 13 \\ & & x = 5 \\ & & -7y = -28 \\ & & y = 4 \end{aligned}$$

$(5, 4)$

$$\begin{aligned} \textcircled{6} \quad (x-3y=8) \cdot (-1) &\rightarrow -x+3y=-8 & -1-3y=8 \\ -10x-3y=15 &\rightarrow -10x-3y=15 & -3y=9 \\ & & y=-3 \\ & & -7x=7 \\ & & x=-1 \end{aligned}$$

$(-1, -3)$

$$\begin{aligned} \textcircled{7} \quad (5x-3y=-24) \cdot 2 &\rightarrow 10x-6y=-48 & 5x-3(-3)=-24 \\ (2x+5y=9) \cdot (-5) &\rightarrow -10x-25y=-45 & 5x-9=-24 \\ & & 5x=-15 \\ & & x=-3 \\ & & -31y=-93 \\ & & y=3 \end{aligned}$$

$(-3, 3)$

$$\begin{aligned} \textcircled{8} \quad -6x+2y=-18 &\rightarrow 6x+2y=-18 & -6x+2(0)=-18 \\ 2(3x+3y=9) &\rightarrow 6x+6y=18 & -6x=-18 \\ & & 8y=0 \\ & & y=0 \\ & & x=3 \end{aligned}$$

$(3, 0)$

$$\begin{aligned} \textcircled{9} \quad 3(-5x+2y) &= -20 \rightarrow 15x+6y=-60 & 8(2)+3y=1 \\ -2(8x+3y=1) &\rightarrow -16x-6y=-2 & 16+3y=1 \\ & & 3y=-15 \\ & & y=-5 \\ & & -31x=-62 \\ & & x=2 \end{aligned}$$

$(2, -5)$

$$\begin{aligned} \textcircled{10} \quad -3x+2y=10 & & -3x+2(-1)=10 \\ 3x+4y=-14 & & -3(-2)=10 \\ & & -3x=12 \\ & & x=-4 \\ & & 6y=-6 \\ & & y=-1 \end{aligned}$$

$(-4, -1)$

Monastery...

#4

① $x = 1^{\text{st}} \#$ $x + y = 92$ $5x + y = 92$
 $y = 2^{\text{nd}} \#$ $+ x - y = 20$ $y = 30$
 $2x = 112$
 $x = 56$

The numbers
are 56, 30.

② $x = 1^{\text{st}} \#$ $y - x = 16$ $4x - 5 - x = 16$
 $y = 2^{\text{nd}} \#$ $y = 4x - 5$ $3x = 21$
 $y = 4(7) - 5$ $x = 7$
 $y = 23$

The numbers are 7, 23.

③ $x = 1^{\text{st}} \text{ piece}$ $x + y = 100$ $y + 18 + y = 100$
 $y = 2^{\text{nd}} \text{ piece}$ $x = y - 18$ $2y = 82$
 $x = 41 + 18$ $y = 41$
 $x = 59$

The 1st piece is 59 ft
& the 2nd piece is 41 ft.

④ $x = \text{apples}$ $-) (3x + 4y = 4.85) \rightarrow -3x - 4y = -4.85$
 $y = \text{bananas}$ $3x + 10y = 8.75 \rightarrow 3x + 10y = 8.75$
 $3x + 4(1.05) = 4.85$ $4y = 3.90$
 $3x + 2.10 = 4.85$ $y = .105$
 $3x = 2.25$
 $x = .75$

The apple costs
\$.75.

⑤ $x = \text{stilt}$ $x = 2y - 5$ $2y - 5 + y = 43$
 $y = \text{dunk}$ $x + y = 43$ $3y = 48$
 $x = 2(16) - 5$ $y = 16$
 $x = 27$ stilt scored 27, dunk scored 16

⑥ $x = \text{bert}$ $-3(x + 2y = 30)$ $3x - 6y = -90$
 $y = \text{ernie}$ $3x + 8y = 108$ $3x + 8y = 108$
 $x + 2(9) = 30$ $2y = 18$
 $x = 12$ $y = 9$

bert is 12 and ernie is 9

⑦ $x = 4\text{-passenger cars}$ $-4(x + y = 15)$ $4x - 4y = -60$
 $y = 6\text{-passenger cars}$ $4x + 6y = 72$ $4x + 6y = 72$
 $x + 6 = 15$ $2y = 12$
 $x = 9$ $y = 6$

there are 9 4-passenger cars = 6 6-passenger cars

⑧ $x = \text{people}$ $-3(x + 2y = 180)$ $3x - 6y = -540$
 $y = \text{couples}$ $3x + 5y = 475$ $3x + 5y = 475$
There were 65 couples there $-y = -65$
 $y = 65$

⑨ $x = \text{science book \$}$ $40x = 360 + 30y \rightarrow 40x - 30y = 360$
 $y = \text{algebra book \$}$ $40x + 30y = 3900$ $40x + 30y = 3900$
 $40(54) = 360 + 30y$ An algebra book costs \$60 $20y = 4320$
 $2160 = 360 + 30y$ $x = 54$
 $1800 = 30y$
 $60 = y$