

3.6 Solving Systems of Equations in 3 Variables

1 Solve for (x, y, z) : **Linear Combination**

$$\begin{aligned} \textcircled{1} & 2x + y + 3z = 9 \\ \textcircled{2} & x - 2y + z = 8 \\ \textcircled{3} & -4x + 3y + 2z = -4 \end{aligned}$$

Handwritten work:

$$\begin{aligned} \textcircled{2} & 1 + 4 + z = 8 \quad (1, -2, 3) \\ & \boxed{z = 3} \\ \textcircled{1} & 2x + y + 3z = 9 \\ \textcircled{2} & x - 2y + z = 8 \\ \textcircled{3} & -4x + 3y + 2z = -4 \end{aligned}$$

$$\begin{aligned} (x-2) \textcircled{2} & -2x + 4y - 2z = -16 \\ \textcircled{3} & -4x + 3y + 2z = -4 \\ \hline & -6x + 7y = -20 \end{aligned}$$

$$\begin{aligned} \textcircled{1} & 2x + y + 3z = 9 \\ \textcircled{2} & -3x + 6y - 3z = -24 \\ \hline & -x + 7y = -15 \end{aligned}$$

$$\begin{aligned} & -6x + 7y = -20 \\ & \quad x - 7y = 15 \\ \hline & \quad \quad y = -2 \end{aligned}$$

$$\begin{aligned} & \quad \quad y = -2 \\ & \quad \quad \quad x = 1 \end{aligned}$$

2

Over a 1-week period, 255 VHS Spirit Items were sold. The number of coffee mugs sold was 5 less than the number of T-shirts sold, and the number of paw print decals sold was 5 more than the number of t-shirts and mugs combined. How many of each item were sold?

(Total) $\textcircled{1} M + T + P = 255$

(mugs) $\textcircled{2} M = T - 5$

(pawz) $\textcircled{3} P = M + T + 5$

$$\begin{aligned} \textcircled{1} & (T - 5) + T + P = 255 \\ \textcircled{3} & P = (T - 5) + T + 5 \end{aligned}$$

Subst.

65 T-shirts
130 pawz
60 mugs

$$\begin{aligned} 2T + P &= 260 \\ P &= 2T \end{aligned}$$

$$4T = 260$$