

$$\begin{aligned}
 1. \quad & b+c+d+e = 4 \quad - \textcircled{1} \\
 & a+c+d+e = 5 \quad - \textcircled{2} \\
 & a+b+d+e = 1 \quad - \textcircled{3} \\
 & a+b+c+e = 2 \quad - \textcircled{4} \\
 & a+b+c+d = 0 \quad - \textcircled{5}
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{1} + \textcircled{2} + \textcircled{3} + \textcircled{4} + \textcircled{5} \\
 4a+4b+4c+4d+4e &= 12 \\
 a+b+c+d+e &= 3 \quad - \textcircled{6}
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{6} - \textcircled{1} \\
 (a+b+c+d+e) - (b+c+d+e) &= 3-4 \\
 a &= -1
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{6} - \textcircled{2} \\
 (a+b+c+d+e) - (a+c+d+e) &= 3-5 \\
 b &= -2
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{6} - \textcircled{3} \\
 (a+b+c+d+e) - (a+b+d+e) &= 3-1 \\
 c &= 2
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{6} - \textcircled{4} \\
 (a+b+c+d+e) - (a+b+c+e) &= 3-2 \\
 d &= 1
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{6} - \textcircled{5} \\
 (a+b+c+d+e) - (b+c+d+e) &= 3-0 \\
 a &= 3
 \end{aligned}$$

Therefore, $a = -1, b = -2, c = 2, d = 1$ and $e = 3$

$$\begin{aligned}
 2. \quad & xy = 1 \quad - \textcircled{1} \\
 & yz = 4 \quad - \textcircled{2} \\
 & zx = 9 \quad - \textcircled{3}
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{1} \times \textcircled{2} \times \textcircled{3} \quad xyz \cdot yz \cdot zx &= 1 \cdot 4 \cdot 9 \\
 (xyz)^2 &= 36 \\
 xyz &= 6, -6
 \end{aligned}$$

$$\text{When } xyz = 6 \quad - \textcircled{4}$$

$$\begin{aligned}
 \textcircled{4} \div \textcircled{1} \\
 \frac{xyz}{xy} &= \frac{6}{1} \\
 z &= 6
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{4} \div \textcircled{2} \\
 \frac{xyz}{yz} &= \frac{6}{4} \\
 x &= \frac{3}{2}
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{4} \div \textcircled{3} \\
 \frac{xyz}{xz} &= \frac{6}{9} \\
 y &= \frac{2}{3}
 \end{aligned}$$

or

$$\text{When } xyz = -6 \quad - \textcircled{5}$$

$$\begin{aligned}
 \textcircled{5} \div \textcircled{1} \\
 \frac{xyz}{xy} &= \frac{-6}{1} \\
 z &= -6
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{5} \div \textcircled{2} \\
 \frac{xyz}{yz} &= \frac{-6}{4} \\
 x &= -\frac{3}{2}
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{5} \div \textcircled{3} \\
 \frac{xyz}{xz} &= \frac{-6}{9} \\
 y &= -\frac{2}{3}
 \end{aligned}$$

Therefore, $x = \frac{3}{2}, y = \frac{2}{3}$ and $z = 6$ or

$x = -\frac{3}{2}, y = -\frac{2}{3}$ and $z = -6$

$$\begin{aligned}
 3. \quad ab &: 1 & - \textcircled{1} \\
 bc &: 2 & - \textcircled{2} \\
 cd &: 3 & - \textcircled{3} \\
 de &: 4 & - \textcircled{4} \\
 ea &: 6 & - \textcircled{5}
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{1} \times \textcircled{2} \times \textcircled{3} \times \textcircled{4} \times \textcircled{5} \\
 ab \cdot bc \cdot cd \cdot de \cdot ea &: 1 \cdot 2 \cdot 3 \cdot 4 \cdot 6 \\
 (abcde)^2 &: 144 \\
 abcde &: 12, -12
 \end{aligned}$$

$$\text{When } abcde = 12 \quad \text{---} \quad \textcircled{6}$$

$$\begin{aligned}
 \textcircled{6} \div (\textcircled{2} \times \textcircled{4}) \\
 \frac{abcde}{bcde} &: \frac{12}{2 \cdot 4} \\
 a &: \frac{3}{2}
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{6} \div (\textcircled{3} \times \textcircled{5}) \\
 \frac{abcde}{acde} &: \frac{12}{3 \cdot 6} \\
 b &: \frac{2}{3}
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{6} \div (\textcircled{1} \times \textcircled{4}) \\
 \frac{abcde}{abde} &: \frac{12}{1 \cdot 4} \\
 c &: 3
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{6} \div (\textcircled{2} \times \textcircled{5}) \\
 \frac{abcde}{abce} &: \frac{12}{2 \cdot 6} \\
 d &: 1
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{6} \div (\textcircled{1} \times \textcircled{3}) \\
 \frac{abcde}{abcd} &: \frac{12}{1 \cdot 3} \\
 e &: 4
 \end{aligned}$$

or

$$\text{When } abcde = -12$$

$$\begin{aligned}
 \textcircled{6} \div (\textcircled{2} \times \textcircled{4}) \\
 \frac{abcde}{bcde} &: \frac{-12}{2 \cdot 4} \\
 a &: -\frac{3}{2}
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{6} \div (\textcircled{3} \times \textcircled{5}) \\
 \frac{abcde}{acde} &: \frac{-12}{3 \cdot 6} \\
 b &: -\frac{2}{3}
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{6} \div (\textcircled{1} \times \textcircled{4}) \\
 \frac{abcde}{abde} &: \frac{-12}{1 \cdot 4} \\
 c &: -3
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{6} \div (\textcircled{2} \times \textcircled{5}) \\
 \frac{abcde}{abce} &: \frac{-12}{2 \cdot 6} \\
 d &: -1
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{6} \div (\textcircled{1} \times \textcircled{3}) \\
 \frac{abcde}{abcd} &: \frac{-12}{1 \cdot 3} \\
 e &: -4
 \end{aligned}$$

Sets of (a, b, c, d, e) are $(\frac{3}{2}, \frac{2}{3}, 3, 1, 4)$, $(-\frac{3}{2}, -\frac{2}{3}, -3, -1, -4)$