

北一女中 107 學年度《數戰數決》有獎徵答活動

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題號：3-2 頁碼/總頁數： (如果一題只有一頁，可不填)
 (請不要將兩題的解答寫在同一張答案紙，一題的解答也不要寫在同一張答案紙的正反面。)

$$\begin{cases} x(yz + \frac{1}{x}) = x \times \frac{1}{x+y+z} & \text{--- ①} \\ y(zx + \frac{2}{y}) = y \times \frac{1}{x+y+z} & \text{--- ②} \\ z(xy + \frac{7}{z}) = z \times \frac{1}{x+y+z} & \text{--- ③} \end{cases}$$

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由 ①+②+③ 得

$$3xyz + 1 + 2 + 7 = 1$$

$$xyz = -3 \quad \text{--- ④}$$

$$yz = \frac{-3}{x}, \quad zx = \frac{-3}{y}, \quad xy = \frac{-3}{z}$$

$$\begin{cases} yz + \frac{1}{x} = \frac{-3}{x} + \frac{1}{x} = -\frac{2}{x} \\ zx + \frac{2}{y} = \frac{-3}{y} + \frac{2}{y} = -\frac{1}{y} \\ xy + \frac{7}{z} = \frac{-3}{z} + \frac{7}{z} = \frac{4}{z} \end{cases}$$

$$\therefore yz + \frac{1}{x} = zx + \frac{2}{y} = xy + \frac{7}{z}$$

$$\therefore -\frac{2}{x} = -\frac{1}{y} = \frac{4}{z}$$

$$\Rightarrow x = 2y, \quad z = -4y \quad \text{代入 ④}$$

$$\text{得 } 2y \times y \times (-4y) = -3$$

$$8y^3 = 3$$

$$y = \frac{\sqrt[3]{3}}{2} \quad \text{則 } x = \sqrt[3]{3}, \quad z = -2\sqrt[3]{3}$$

答： $\begin{cases} x = \sqrt[3]{3} \\ y = \frac{1}{2}\sqrt[3]{3} \\ z = -2\sqrt[3]{3} \end{cases}$