

第四章限时练习

一、选择题

1—5 CDBDA 6—10BADAB

二、填空题

1, $2x + 2y - 3z = 0$

2, $x^2 + 2y^2 + z^2 = 1$

3, $x - 3y + z + 2 = 0$

4 $\pm \left\{ \frac{2}{3}, \frac{2}{3}, -\frac{1}{3} \right\}$

5, 3

三、计算题

1, 解: $\vec{a} = \{1, 1, 5\}$ $\vec{b} = \{2, -3, 5\}$

$$\therefore \vec{c} = \vec{a} - 3\vec{b} = \{-5, 10, -10\}$$

$$\therefore \vec{e} = \pm \frac{\vec{c}}{|\vec{c}|} = \pm \left\{ -\frac{1}{3}, \frac{2}{3}, -\frac{2}{3} \right\}$$

2, 解: $|\vec{a} \times \vec{b}| = |\vec{a}| |\vec{b}| \sin \frac{2}{3}\pi = \sqrt{3}$

3, 解: 由已知得直线的方向向量和所求平面的法向量相等 $\vec{S} = \vec{n} = \{2, 3, 1\}$

又知道平面上一点所以平面方程为:

$$2(x-1) + 3(y-2) + z + 1 = 0$$

$$\text{即 } 2x + 3y + z = 7$$

4, 令 $\vec{S}_1 = \{2, 1, 1\}$ $\vec{S}_2 = \{1, -2, 1\}$

$$\text{则 } \vec{S} = \vec{S}_1 \times \vec{S}_2 = \{3, -1, -5\}$$

又 $\because M(2, 1, 1)$ 在直线上

$$\therefore \text{直线方程: } \frac{x-2}{3} = \frac{y-1}{-1} = \frac{z-1}{-5}$$

5, 解: 由已知得直线方向向量为和平面法向量为:

$$\vec{S} = \{3, -2, 1\} \quad \vec{n} = \{1, 2, 2\}$$

$$\therefore \text{夹角 } \theta \text{ 满足: } \sin \theta = \frac{|\vec{S} \cdot \vec{n}|}{|\vec{S}| |\vec{n}|} = \frac{\sqrt{14}}{42}$$

$$\theta = \arcsin \frac{\sqrt{14}}{42}$$

交点 $M(x_0, y_0, z_0)$ 满足:
$$\begin{cases} \frac{x_0+3}{3} = \frac{y_0+2}{-2} = \frac{z_0}{1} \\ x_0+2y_0+2z_0-6=0 \end{cases}$$

$\therefore M(36, -28, 13)$