第八章作业-

一、1~4: DCDA

 $\overline{}$. 5. $2\cdot \vec{b} imes \vec{a}$

6. 2

7. 20

8. (-2,3,0)

1. (1)

$$\overrightarrow{AB} = (3,5,8)$$
 $\overrightarrow{CD} = (2,-4,-7)$
 $\overrightarrow{m} = (5,1,-4)$
 $\overrightarrow{a} = 4 \begin{bmatrix} 3 \\ 5 \\ 8 \end{bmatrix} + 3 \begin{bmatrix} 2 \\ -4 \\ -7 \end{bmatrix} - \begin{bmatrix} 5 \\ 1 \\ -4 \end{bmatrix} = \begin{bmatrix} 13 \\ 7 \\ 7 \end{bmatrix}.$
 $\operatorname{Prj}_{\vec{i}} = 13, \ \operatorname{Prj}_{\vec{j}} = 7, \ \operatorname{Prj}_{\vec{k}} = 7.$

分向量分别为

$$13\vec{i},\ 7\vec{j},\ 7\vec{k}.$$

(2)

$$|\vec{a}| = \sqrt{13^2 + 7^2 + 7^2} = \sqrt{169 + 49 + 49} = \sqrt{267}$$

(3)

$$\begin{bmatrix} \cos \alpha \\ \cos \beta \\ \cos \gamma \end{bmatrix} = \begin{bmatrix} 13/\sqrt{267} \\ 7/\sqrt{267} \\ 7/\sqrt{267} \end{bmatrix}$$

(4)

$$egin{bmatrix} 13/\sqrt{267} \\ 7/\sqrt{267} \\ 7/\sqrt{267} \end{bmatrix}
ewline \begin{bmatrix} -13/\sqrt{267} \\ -7/\sqrt{267} \\ -7/\sqrt{267} \end{bmatrix} \, .$$

(5)

$$\overline{AC} = \sqrt{(1-0)^2 + (3-0)^2 + (2-1)^2} = \sqrt{11}$$

2.

$$ec{a} imes ec{b} = (-7, -5, -1) \ ec{v} = k(-7, -5, -1)$$

$$egin{aligned} rac{ec{v}\cdotec{c}}{|ec{c}|} &= 1 \ |ec{c}| &= \sqrt{2^2+1^2+2^2} = 3 \ k(-14-5-2) &= 3 \ k &= -rac{1}{7} \ ec{v} &= (1,rac{5}{7},rac{1}{7}). \end{aligned}$$

3.

在 \vec{a} , \vec{b} 所在平面上,以 \vec{a} 为x轴建立直角坐标系。

$$ec{a}=(4,0),\ ec{b}=(rac{3\sqrt{3}}{2},rac{3}{2})$$
 $ec{lpha}=ec{a}+2ec{b}=(4+3\sqrt{3},3)$
 $ec{eta}=ec{a}-3ec{b}=(4-rac{9\sqrt{3}}{2},-rac{9}{2})$
 $S=|lpha imesec{eta}|=|-rac{9}{2}\cdot(4+3\sqrt{3})-3\cdot(4-rac{9\sqrt{3}}{2})|$
 $=|-18-rac{27\sqrt{3}}{2}-12+rac{27\sqrt{3}}{2}|$
 $=30.$

4.

$$ert ec{a} imes ec{b} ert = ert ec{a} ert ec{b} ert \sin(\widehat{ec{a}}, \overrightarrow{b})$$
 $\cos(\widehat{ec{a}}, \overrightarrow{b}) = rac{ec{a} \cdot ec{b}}{ert ec{a} ert ec{b} ert} = rac{2}{2\sqrt{2}} = rac{1}{\sqrt{2}}$ $\sin(\widehat{ec{a}}, \overrightarrow{b}) = \sqrt{1 - rac{1}{2}} = rac{1}{\sqrt{2}}$ $ert ec{a} imes ec{b} ert = 2 \cdot \sqrt{2} \cdot rac{1}{\sqrt{2}} = 2$

5.

$$egin{aligned} ec{eta} \cdot ec{\gamma} &= (\lambda ec{a} + 17 ec{b}) \cdot (3 ec{a} - ec{b}) \ &= 3 \lambda ec{a}^2 + (51 - \lambda) ec{a} \cdot ec{b} - 17 ec{b}^2 \ &= 12 \lambda + (51 - \lambda) (10 \cos rac{2\pi}{3}) - 425 \ &= 12 \lambda - 255 + 5 \lambda - 425 \ &= 17 \lambda - 680 = 0 \ \lambda &= 40. \end{aligned}$$

7.

设 $\vec{v} = (\sin \theta, \cos \theta, 0).$

$$-4\sin heta+3\cos heta=0$$
 $an heta=rac{3}{4}$
$$\begin{cases} \sin heta=rac{3}{5}\ \cos heta=rac{4}{5} \end{cases} or \begin{cases} \sin heta=-rac{3}{5}\ \cos heta=-rac{4}{5} \end{cases}$$
 $ec{v}=(rac{3}{5},rac{4}{5},0)$ 或 $ec{v}=(-rac{3}{5},-rac{4}{5},0).$

8.

$$egin{aligned} -3ec{a}\cdotec{b} &= (-3,6,-12)\cdot(1,5/3,-2/3) = -3+10+8 = 15. \ ec{a} imes 3ec{b} &= (1,-2,4) imes(3,5,-2) = (-16,14,11) \end{aligned}$$