

<10장 연습문제 정답>

연습문제 10.1

1. (a) 3

(b) 2

(c) $\frac{1}{7}$

(d) $\sqrt{6}$

(e) $\sqrt{29}$

(f) $\sqrt{14}$

(g) $\pi\sqrt{2}$

(h) $\pi^2\sqrt{2}$

3. (a) $34\vec{i} + 5\vec{k}$

(b) $\vec{i} - 4\vec{j} + 9\vec{k}$

(c) $-12\vec{i} + 10\vec{j} + 35\vec{k}$

(d) $-5\vec{i} - 5\vec{j} + 10\vec{k}$

5. (a) $\langle -1, 0, 0 \rangle$

(b) $\langle 0, -1, 0 \rangle$

(c) $\langle 0, 0, 1 \rangle$

(d) $\left\langle -\frac{2}{\sqrt{5}}, 0, \frac{1}{\sqrt{5}} \right\rangle$

(e) $\left\langle -\frac{2}{\sqrt{6}}, \frac{1}{\sqrt{6}}, -\frac{1}{\sqrt{6}} \right\rangle$

(f) $\left\langle -\frac{3}{\sqrt{14}}, -\frac{2}{\sqrt{14}}, \frac{1}{\sqrt{14}} \right\rangle$

(g) $\left\langle -\frac{9}{\sqrt{82}}, 0, -\frac{1}{\sqrt{82}} \right\rangle$

(h) $\left\langle -\frac{4}{\sqrt{17}}, \frac{1}{\sqrt{17}}, 0 \right\rangle$

연습문제 10.2

1. (a) -9

(b) $7\sqrt{3}$

(c) -4

(d) $\frac{1}{6} + 2\pi^2 + \sqrt{15}$

$$3. \text{ (a) } \cos^{-1}\left(\frac{13}{\sqrt{26}\sqrt{17}}\right) \quad \text{(b) } \cos^{-1}\left(-\frac{7}{\sqrt{38}\sqrt{10}}\right)$$

$$\text{(c) } \cos^{-1}\left(\frac{9}{\sqrt{14}\sqrt{13}}\right) \quad \text{(d) } \cos^{-1}\left(\frac{7}{2\sqrt{19}}\right)$$

$$5. \text{ (a) } x = -6 \quad \text{(b) } y = 12 \quad \text{(c) } z = 0 \text{ 또는 } z = -2$$

$$7. \text{ (a) } x = \frac{3}{2} \quad \text{(b) } y = -3$$

연습문제 10.3

$$1. \text{ (a) } < 2, -4, 1 > \quad \text{(b) } < -2, 4, -1 >$$

$$\text{(c) } < 6, -4, 7 > \quad \text{(d) } < 0, 0, 0 >$$

$$\text{(e) } < 8, -8, 4 > \quad \text{(f) } < 0, 0, -4 >$$

$$\text{(g) } -8 \quad \text{(h) } -8$$

$$3. \text{ (a) } 5\sqrt{2} \quad \text{(b) } 5\sqrt{2} \quad \text{(c) } 6\sqrt{2}$$

5. (a) $\vec{0}$

(b) $\vec{0}$

(c) $\vec{0}$

(d) $\vec{0}$

(e) $-\vec{k}$

(f) $-\vec{k}$

7. $\vec{a} = \langle a_1, a_2, a_3 \rangle$, $\vec{b} = \langle b_1, b_2, b_3 \rangle$, $\vec{c} = \langle c_1, c_2, c_3 \rangle$ 라 하자.

$$\begin{aligned} (\vec{a} + \vec{b}) \times \vec{c} &= \langle a_1 + b_1, a_2 + b_2, a_3 + b_3 \rangle \times \langle c_1, c_2, c_3 \rangle \\ &= \begin{vmatrix} a_2 + b_2 & a_3 + b_3 \\ c_2 & c_3 \end{vmatrix} \vec{i} - \begin{vmatrix} a_1 + b_1 & a_3 + b_3 \\ c_1 & c_3 \end{vmatrix} \vec{j} + \begin{vmatrix} a_1 + b_1 & a_2 + b_2 \\ c_1 & c_2 \end{vmatrix} \vec{k} \\ &= \langle (a_2 + b_2)c_3 - (a_3 + b_3)c_2, -(a_1 + b_1)c_3 + (a_3 + b_3)c_1, (a_1 + b_1)c_2 - (a_2 + b_2)c_1 \rangle \\ &= \langle a_2c_3 - a_3c_2, -a_1c_3 + a_3c_1, a_1c_2 - a_2c_1 \rangle \\ &\quad + \langle b_2c_3 - b_3c_2, -b_1c_3 + b_3c_1, b_1c_2 - b_2c_1 \rangle \\ &= \vec{a} \times \vec{c} + \vec{b} \times \vec{c} \end{aligned}$$