3장 벡터

5. $\vec{A} = +29\hat{j}$, $\vec{C} \equiv \vec{A} + \vec{B} = -14\hat{j}$

$\vec{B} = \vec{C} - \vec{A} = -14\hat{j} - 29\hat{j} = -43\hat{j}$, $-y$방향 크기 43단위

15.

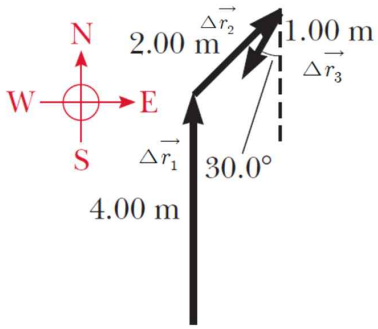

그림 P3.15

$|\vec{A}| = A$,

각이 θ일 때 $\vec{A} = A\cos\theta\,\hat{i} + A\sin\theta\,\hat{j}$

$\Delta\vec{r}_1 = (4.00\hat{j})$ m,

$\Delta\vec{r}_2 = (2.00)(\cos 45.0^\circ\,\hat{i} + \sin 45.0^\circ\,\hat{j})$ m

$\Delta\vec{r}_3 = (1.00)(\cos 240.0\,\hat{i} + \sin 240.0\hat{j})$ m

합 변위 $\Delta\vec{r} = (0.914\,\hat{i} + 4.548\,\hat{j})$ m

크기 $|\Delta\vec{r}| = \sqrt{(0.914)^2 + (4.548)^2}$ m $= 4.64$ m

방향 $\theta = \tan^{-1}\left(\dfrac{4.548}{0.914}\right) = 78.7^\circ$

16. (a)

$\vec{F} = \vec{F_1} + \vec{F_2} = 120\cos(60.0^\circ)\hat{i} + 120\sin(60.0^\circ)\hat{j} - 80.0\cos(75.0^\circ)\hat{i} + 80.0\sin(75.0^\circ)\hat{j}$

$= 60.0\,\hat{i} + 104\,\hat{j} - 20.7\,\hat{i} + 77.3\,\hat{j} = (39.3\hat{i} + 181\hat{j})$ N

$|\vec{F}| = \sqrt{39.9^2 + 181^2}$ N $= 185$ N, $\theta = \tan^{-1}\left(\dfrac{181}{39.3}\right) = 77.8^\circ$

(b) 전체 힘이 0이 되려면 (a) 부분의 합력과 크기는 같고 방향은 반대인 힘이 필요하다.

$\vec{F_3} = -\vec{F} = -(39.3\hat{i} + 181\hat{j})$ N

17. $\vec{D} = \vec{A} + \vec{B} + \vec{C} = (2\hat{i} - 2\hat{j})$ m,

$|\vec{D}| = \sqrt{(2^2 + (-2)^2)} = 2.83$ m, $\theta = \tan^{-1}\left(\dfrac{-2}{2}\right) = -45^\circ = 315^\circ$

$\vec{E} = -\vec{A} - \vec{B} + \vec{C} = (-6\hat{i} + 12\hat{j})$ m

$|\vec{E}| = \sqrt{(-6)^2 + 12^2} = 13.4$ m, $\theta = \tan^{-1}\left(\dfrac{12}{-6}\right) = -63.4^\circ = 117^\circ$

20. $\vec{A} = (3\hat{i} - 4\hat{j} + 4\hat{k})\,\mathrm{m}, \vec{B} = (2\hat{i} + 3\hat{j} - 7\hat{k})\,\mathrm{m}$ 일 때,

(a) $\vec{C} = \vec{A} + \vec{B} = [(3+2)\hat{i} + (-4+3)\hat{j} + (4-7)\hat{k}]\,\mathrm{m} = (5\hat{i} - \hat{j} - 3\hat{k})\,\mathrm{m}$

$|\vec{C}| = \sqrt{5^2 + (-1)^2 +) - 3)^2} = 5.92\,\mathrm{m}$

(b) $\vec{D} = 2\vec{A} - \vec{B} = [(6-2)\hat{i} + (-8-3)\hat{j} + (8+7)\hat{k}]\,\mathrm{m} = (4\hat{i} - 11\hat{j} + 15\hat{k})\,\mathrm{m}$

$|\vec{D}| = \sqrt{4^2 + (-11)^2 + 15^2} = 19.0\,\mathrm{m}$