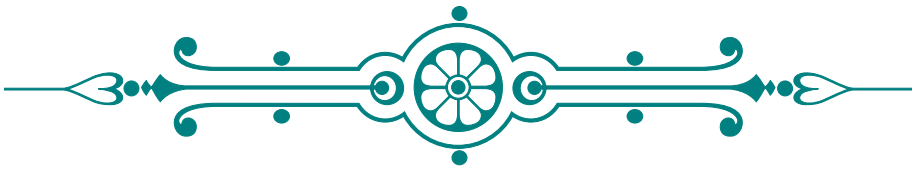

정보통신 수학 및 실습
Homework

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Chapter 7 Homework

1. Let v = (a, b, c) and w = (3a, 3b, 3c) be vectors. Show that $\| w \| = 3 \| v \|$

$3\sqrt{a^2 + b^2 + c^2} = \sqrt{9a^2 + 9b^2 + 9c^2}$

2. Let v = (1, 5, 2) and w = (3, 1, 1).

a) Find v - w

(-1-3, 5-1, -2-1) = (-4, 4, -3)

b) Find v + w.

(2,6,-1)

c) Find $v / \| w \|$

$\| w \| = \sqrt{9 + 1 + 1} = \sqrt{11}$
$(1/\sqrt{11}, 5/\sqrt{11}, 2/\sqrt{11})$

d) Find $\frac{1}{2} \| v - w \|$

$\frac{1}{2}\sqrt{16 + 16 + 9} = \frac{1}{2}\sqrt{41}$

e) Find $\frac{1}{2} \| v + w \|$

$\frac{1}{2}\sqrt{4 + 36 + 1} = \frac{1}{2}\sqrt{41}$

f) Find the vector u such that u + v + w = 2 j + k.

$u + v + w = (0, 2, 1)$
$u = (0, 2, 1) - (2, 6, -1)$
$u = (-2, -4, 2)$

3. Let v = -3 i - 2 j - k and w = 6 i + 4 j + 2k. Calculate v-w.

$(-3, -2, -1) - (6, 4, 2) = (-9, -6, -3)$

4. Let v = (8, 4, 3) and w = (-2, 1, 4). Is v $\perp$ w? Justify your answer.

$v \cdot w = -16 + 4 + 12 = 0 = \| v \| \| w \| cos\theta$
$\therefore cos\theta = 0$
$\therefore \theta = \frac{\pi}{2}$