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|  | SUBJECT: Mechanics & Thermodynamics | | MARKS: /10 |
| | TOPIC: Vectors | CODE: BSP1153 | |
| | ASSESSMENT: QUIZ | NO: 1 | |
| NAME: SECTION: | | STUDENT ID: | |

Answer ALL questions.

1. The following vectors have the length 4.0 units. What are the x- and y-components of this vector. (4 Marks)

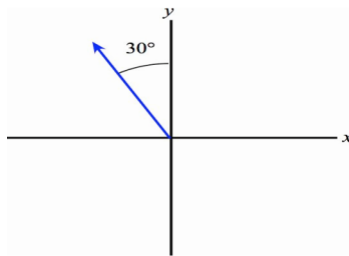


Figure 1

$$\text{x-component: } 4 \cos 120^\circ = -2$$

$$\text{y-component: } 4 \sin 120^\circ = 3.46$$

2. Given that $\mathbf{A} = -5\mathbf{i} - 3\mathbf{j} + 2\mathbf{k}$ and $\mathbf{B} = -2\mathbf{j} - 2\mathbf{k}$.

- i) Find the magnitude of \mathbf{A} and \mathbf{B} .

(2 Marks)

$$A = \sqrt{A_x^2 + A_y^2 + A_z^2} = \sqrt{(-5)^2 + (-3)^2 + (2)^2} = 6.164$$

$$B = \sqrt{B_x^2 + B_y^2 + B_z^2} = \sqrt{(0)^2 + (-2)^2 + (-2)^2} = 2.828$$

- ii) Find the dot product of \mathbf{A} and \mathbf{B} .

(2 Marks)

$$\mathbf{A} \cdot \mathbf{B} = A_x B_x + A_y B_y + A_z B_z = (-5)(0) + (-3)(-2) + (2)(-2) = 2$$

- iii) Find the angle between \mathbf{A} and \mathbf{B} .

(2 Marks)

$$\cos \phi = \frac{\mathbf{A} \cdot \mathbf{B}}{AB} = \frac{2}{(6.164)(2.828)} = 0.114$$

$$\phi = 83.4^\circ$$



Newton's Law

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<http://ocw.ump.edu.my/enrol/index.php?id=461>