Task 02 - Vectors

Date	@February 14, 2025
Due Date	@February 19, 2025
Related Links	https://github.com/shawqicauses/uwc-computer-science/blob/main/y-01-s-01/phy-111/assignments/pre-class-task-02-vectors-due-19-feb.pdf
Status	Done
Type	Pre Class

Question no. 01

1.1 What is a vector? Give me two examples of vectors you are familiar with and explain why they are classified as vectors?

A vector is a quantity that has both magnitude and direction.

Examples:

1. ***Velocity***: It has both speed (***magnitude***) and ***direction*** (e.g. 10 m/s east).
2. ***Force***: It acts in a specific ***direction*** with a certain ***magnitude*** (e.g. 5 N downward).

Both are classified as vectors because they require ***both magnitude and direction*** to be fully described.

1.2 Describe The different ways a vector can be represented using words, symbols, and sketches.

1. ***Words***: force of 5 N acting at 30 degrees north of east.
2. ***Symbols***: ***A = (Ax, Ay)*** or ***A = Ai + Bj*** in unit vector notation.
3. ***Sketches***: We draw an arrow where The length represents magnitude and The direction indicates orientation.

1.3 Define The resultant of two or more vectors.

The ***resultant vector*** is The single vector that has The same effect as two or more vectors combined. It is found by ***vector addition***.

1.4 Can The two forces, 10 N upward and 5 N downward, have a resultant of 3 N? Support your answer with a detailed calculations.

No, because:

R = 10N - 5N = 5N (***upward***).

Since The forces act in ***opposite*** directions, The resultant is found by ***subtraction***. The possible resultants are ***5 N*** (upward) or ***5 N*** (downward), not ***3 N***.

1.5 Determine The resultant of The following forces: 3 N to The left and 6 N at bearing of 60 degrees.

Using vector components:

- ***Leftward force (3 N)***: (-3, 0)
- ***Force at 60 degrees***: (6 cos 60 degrees, 6 sin 60 degrees) → (***3, 5.2***).

Resultant components:

Rx = -3 + 3 = 0

Ry = 0 + 5.2 = 5.2

|R| = Square Root Of [(***0 * 0)*** + ***(5.2 * 5.2)***] = ***5.2 N***

Direction:

Since ***Rx = 0***, The resultant force is ***5.2 N*** upward.

With Love, Shawqi.