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General Physics I, Quiz 1
PHYS1000AA, Class year103
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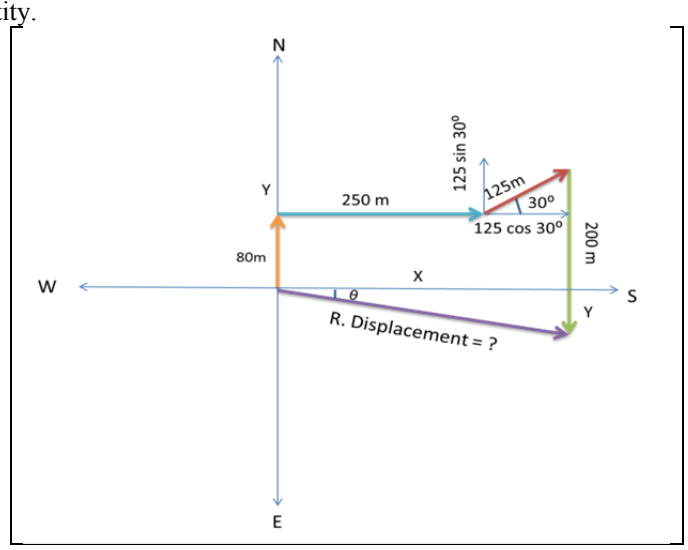
Quiz-1 Solution

1. Solution :

►Distance is scalar but displacement is vector quantity.



►Total distance passed through the x-direction, $X = (250+125\cos 30^0)$ m
$= 358.25$ m
Total distance passed through the y-direction, $Y = (80+125\sin 30^0-200)$ m
$= -57.5$ m $= 57.5$ m
= the distance between the south axis to end point.

Using Pythagoras law one can find the resultant distance between entrance and end point, $d = \sqrt{(X^2+Y^2)}$

$= \sqrt{\{(358.25)^2+ (57.5)^2\}}$

$= 362.84$ m

Since displacement is a vector quantity we need to find the angle between the horizontal axis and straight distance from entrance to end point. Let the angle is θ.

We can find, $\tan\theta = Y/X = -57.5/362.25$

So, $\theta = -9.0^0$

Therefore, resultant displacement, D = 362.84 m at 9^0 south of east. (Description is added due to understand clearly. Students need not to write elaborately)

2. Solution:

Dimension of force, $[F] = [MLT^{-2}]$
Given here, $a = (2.00\hat{i} + 5.00\ \hat{j})$ m/s^2, m=10 kg
We know, $F = ma = 10\ (2.00\hat{i} + 5.00\ \hat{j})$ N $= (20.00\hat{i} + 50.00\ \hat{j})$ N
Magnitude, $|F| = \sqrt{(20^2 + 50^2)} = 53.85$ N

No, there is no effect of gravitational force. It will be canceled out by Fsinθ.

3. Solution:

Newton's second law, F=ma

We know, Centripetal force $F = mv^2/r$, where r = radius

So, $F = \{5.97219 \times 10^{24}\ X\ (30000)^2\}/\ 150\times 10^{10}$ = Use calculator please.

Yes. If not then the solar system will be destroyed. That means earth will be destroyed.