Resolution of vectors

14 September 2020 08:30

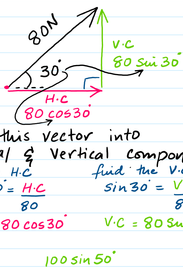
- What does "Resolution" mean

The term resolution or resolve means breaking down any vector into two perpendicular fragments or components.

Generally the two components are referred to as
1. Horizontal component (H.C)
2. Vertical component (V.C)

example of resolution is given below.

Q.1



Resolve this vector into horizontal & vertical components

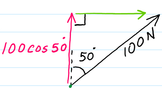
Find the H.C: $\cos 30° = \frac{H.C}{80}$

$H.C = 80 \cos 30°$

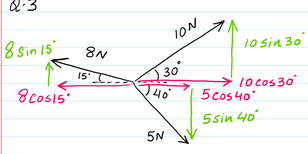
Find the V.C: $\sin 30° = \frac{V.C}{80}$

$V.C = 80 \sin 30°$

Q2



Q.3



(i) By resolving find the resultant of these vectors in the horizontal plane

$\rightarrow$ $10\cos 30 + 5\cos 40 - 8\cos 15$

$= 4.8\ N$

(ii) By resolving find the resultant of these vectors in the vertical plane

$+\uparrow$ $10\sin 30 + 8\sin 15 - 5\sin 40$

$= 3.9\ N$

(iii) Hence find the (overall) resultant of all these forces

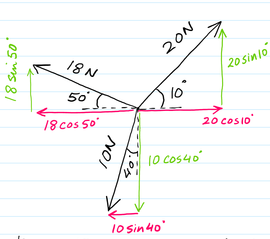
- To find the (overall) Resultant we can now apply HEAD TO TAIL RULE as shown below.

magnitude: $R = \sqrt{4.8^2 + 3.9^2} = 6.2\ N$

direction with the horizontal

$\tan\theta = \frac{3.9}{4.8} = 39°$

Q4 find the magnitude of the resultant in the given diagram



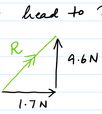
$\rightarrow$ $-18\cos 50 + 20\cos 10 - 10\sin 40$

$= 1.7\ N$

$+\uparrow$ $20\sin 10 + 18\sin 50 - 10\cos 40$

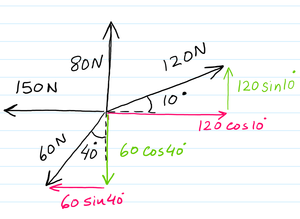
$= 9.6\ N$

Resultant head to Tail



$R = 9.7\ N$

Q.5



$\rightarrow$ $120\cos 10 - 150 - 60\sin 40$

$= -70.4\ N$

$+\uparrow$ $80 + 120\sin 10 - 60\cos 40$

$= 54.8\ N$

head to Tail Rule.