

Scalar and vector (Topic 2)

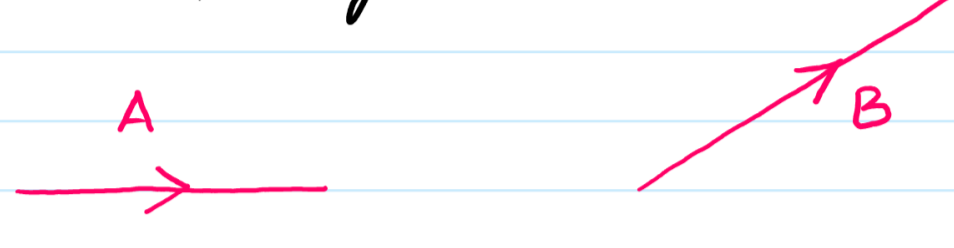
10 September 2020 09:17

In the topic of vectors we will discuss

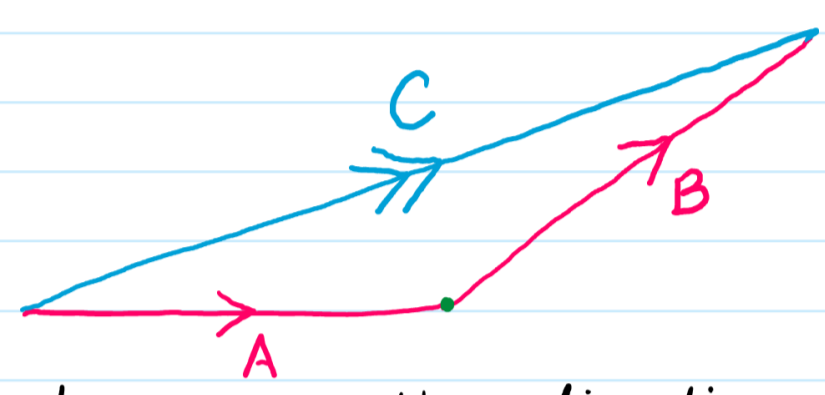
- ① Addition of vectors (O-level)
- ② Subtraction of vector (O-level)
- ③ "RESOLUTION OF VECTORS" new
- ④ Condition for "EQUILIBRIUM" new
- ⑤ How to construct "VECTOR TRIANGLE FOR EQUILIBRIUM" new

Example of Vector addition

- The rule was called Head to tail rule
- To obtain the Resultant, head of one vector is joined with the Tail of the other vector for eg.

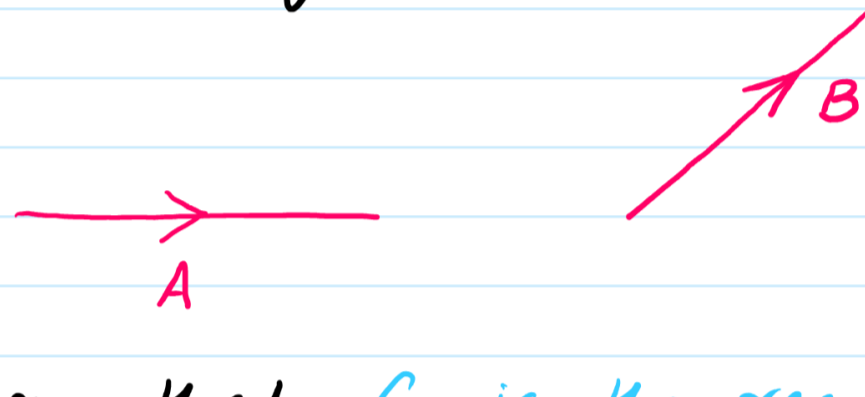


Q: Given that C is the resultant of $A+B$. Construct a vector diagram $C = A + B$ (vector addition)

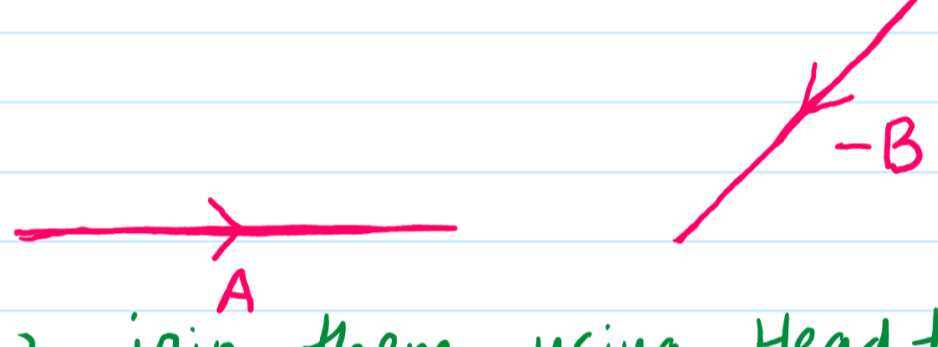


How to mark the direction of Resultant :- The arrow head of the Resultant must point towards the arrow head of the vectors.

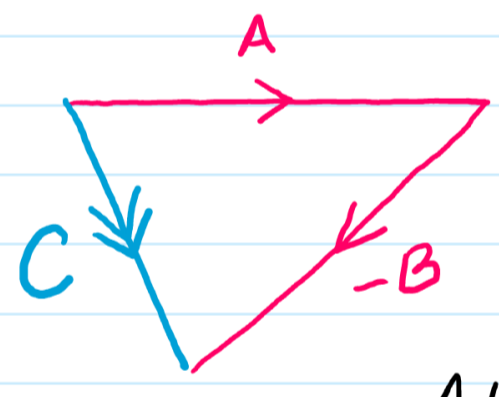
Example of "vector subtraction"



given that C is the resultant of $A-B$. Construct a vector diagram $C = A - B$ [vector subtraction] OR $C = A + (-B)$
dir of B must be reversed

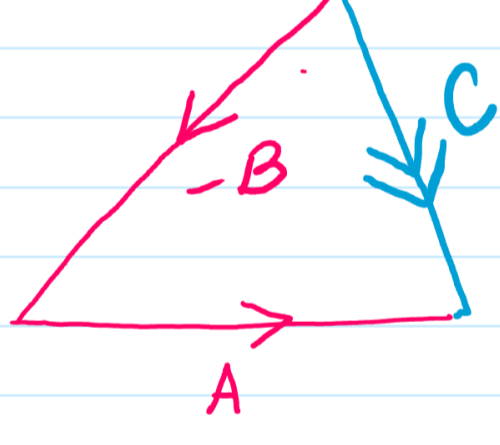


Now join them using Head to Tail Rule



$C = A - B$ option ①

Alternative diagram



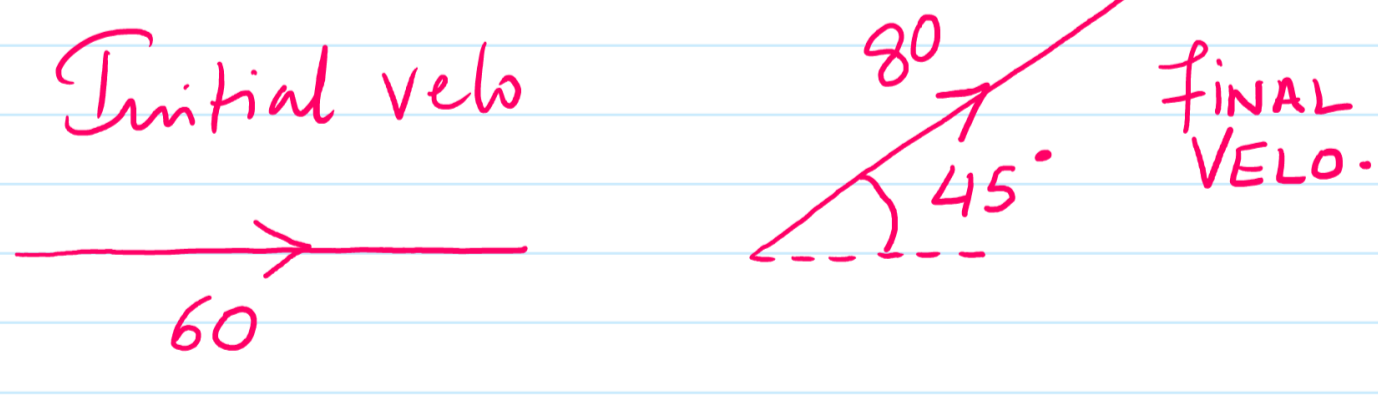
option ②
Choose any ①

Example of Vector subtraction

A car is initially moving with a velocity of 60 m/s due East.

After some time it changes its direction & starts moving at 80 m/s in the direction North-East.

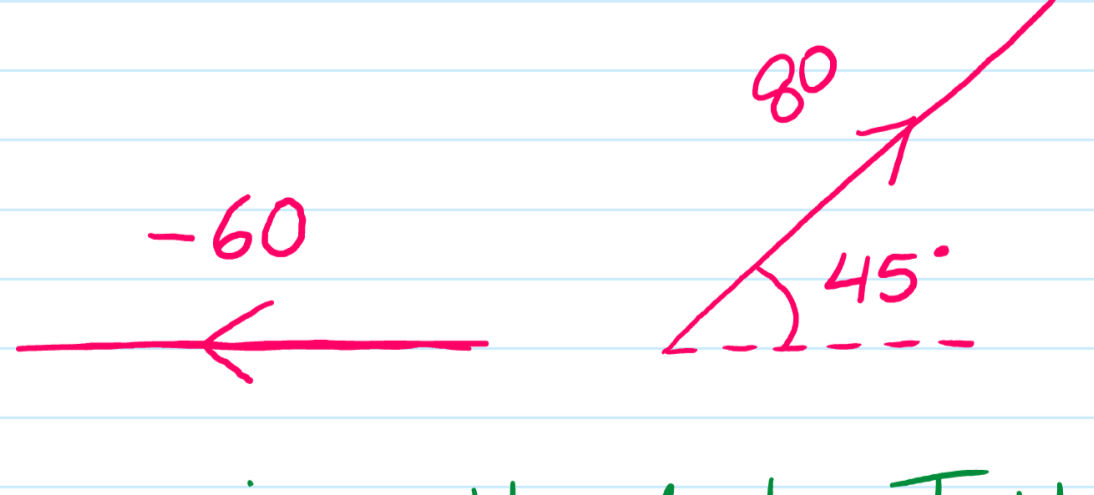
Construct a vector diagram to calculate the magnitude of "change in velocity"



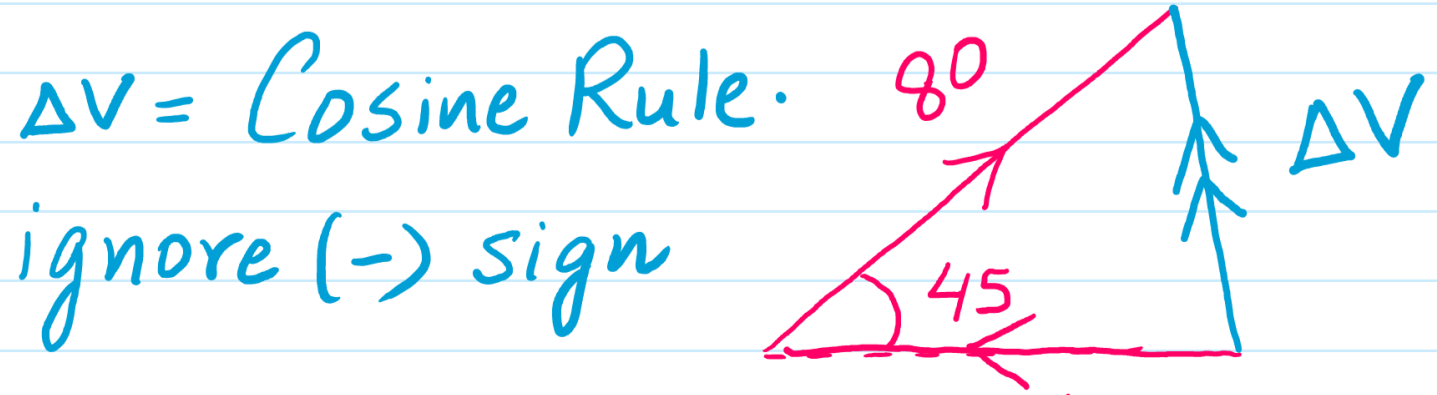
$$\Delta V = F.V - I.V \quad \text{[vector subtraction]}$$

$$\Delta V = F.V + (-I.V)$$

we will reverse I.V



Join using Head to Tail Rule



$\Delta V = \text{Cosine Rule.}$
 ignore (-) sign

$$\Delta V^2 = 80^2 + 60^2 - 2(80)(60) \cos 45^\circ$$

$$\Delta V = 56.7 \text{ m/s}$$