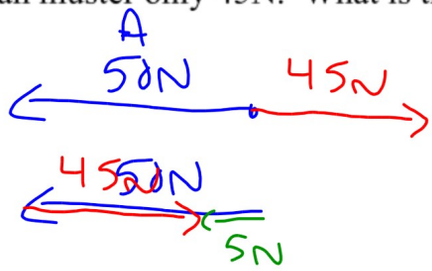
Adding Vectors

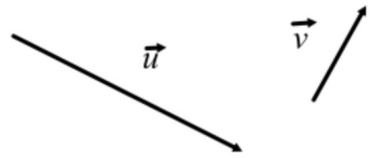
Example 1: In a tug-of-war, the "A" team pulls the rope with a force of 50N, while the "B" team can muster only 45N. What is the apparent force on the rope?



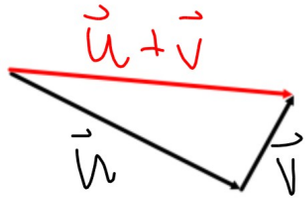
∴ A force of 5 N towards A.

Adding Vectors

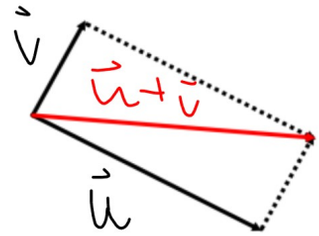
$\vec{u} + \vec{v}$



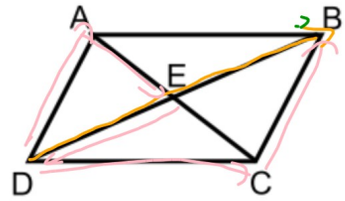
Tip to Tail:



Tail-to-tail:



Example 2: Consider the parallelogram shown.



1. What vector is equivalent to $\vec{AD} + \vec{AB}$?

$\vec{AC}$

2. Write AE as a sum of two vectors in two ways.

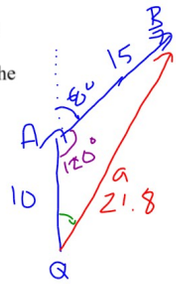
$\vec{AD} + \vec{DE}$ $\vec{AB} + \vec{BE}$ $\vec{AC} + \vec{CE}$ $\vec{BC} + \vec{DE}$

3. Write DB as a combination of 3, 4 and 5 vectors.

$\vec{DA} + \vec{AE} + \vec{EB}$ $\vec{DC} + \vec{CE} + \vec{EA} + \vec{AB}$

$\vec{DA} + \vec{AE} + \vec{ED} + \vec{DC} + \vec{CB}$

Example 3: A football player runs 10 yards forward from the quarterback, turns 60°, then runs another 15 yards. What distance and direction must the quarterback throw the ball to meet the player?



$a^2 = b^2 + q^2 - 2bq\cos A$

$a^2 = 10^2 + 15^2 - 2(10)(15)\cos 120°$

$\sqrt{a^2} \quad \sqrt{475}$

$a = 21.8$ yards

$\frac{\sin Q}{q} = \frac{\sin A}{a}$

$\frac{\sin Q}{15} = \frac{\sin 120}{21.8}$

$\sin Q = 0.5959$

$Q = 36.6°$

pg 52 #1, 3-6, 9-12,16