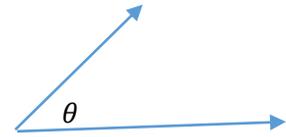


1. Remember: **The angle between two vectors is defined as being the angle made when the vectors are placed *tail-to-tail*.**

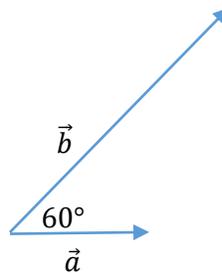
Suppose the angle between two vectors is 60° .



- a) What angle would be made if the same vectors were moved so that they were *head-to-tail*?
- b) What angle would be made if the same vectors were moved so that they were *head-to-head*?

2. Two vectors \vec{a} and \vec{b} are shown in the diagram below. $|\vec{a}| = 3$ and $|\vec{b}| = 15$.

- a) Find $|\vec{a} - \vec{b}|$



- b) Find the direction $\vec{a} - \vec{b}$ makes with vector \vec{a}

3. There may have been two solutions for the angle in 2b) above. Which one is correct? We will examine why below.

There is never ambiguity when adding/subtracting vectors. However, you must be careful with your use of the Sine Law. There are always two solutions between 0° and 180° when taking the inverse sine. Make sure you know you are getting the correct one!

Velocity is an example of a vector (speed + direction). Velocity is always relative. (ie. Relative to the ground, to moving water, to the air, to another moving object).

Example An airplane steering N45°W (North then 45° West) at 500 km/h (relative to the air) encounters a wind of 120km/h from N65°E. Determine the velocity of the plane relative to the ground.

1. Text page 150 #7, 8, 10, 13 and page 153 #9, 10, 15
2. Three distinct **unit vectors** \vec{a} , \vec{b} and \vec{c} lie in the same plane (i.e. they can all be drawn on the same flat surface). The angle between \vec{a} and \vec{b} is 45°. The angle between \vec{b} and \vec{c} is also 45°. Draw a picture of the vector $\vec{a} - 2\vec{b} + 3\vec{c}$ and calculate the magnitude of this vector. (ANSWER – appox. 1.64)