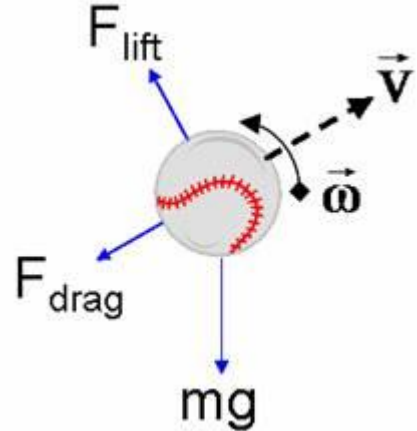


Vectors Introduction Discussion - Physics 12

- In Physics we often measure different **quantities** (properties of objects):

Mass, volume, density, velocity, acceleration, force on an object, the energy of an object etc.



- Some of these properties we measure have a *special* quality
- We can measure the size of all these properties.
- But some of these properties also have a **DIRECTION**

Mass – does it have a size (*magnitude*) and direction?

Volume – Does it have a size and direction?

Velocity – Does it have a size and direction?

- Velocity – Does have a size and direction.
- We call any quantity, which has a size (*magnitude*) and direction a **VECTOR**

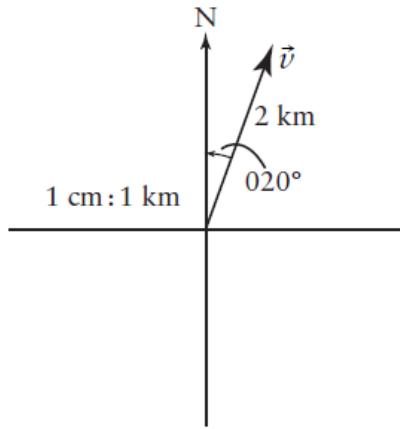
VECTOR quantity: a quantity with both *magnitude* and direction

- We call quantities with only a size - **SCALAR** quantities.

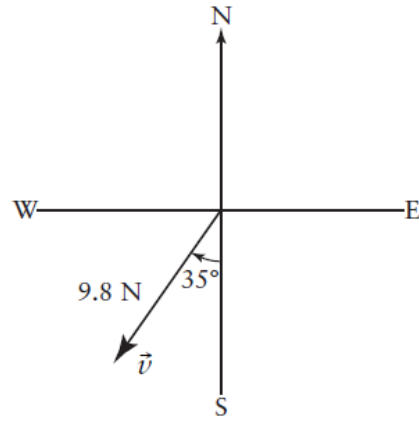
SCALAR Quantity: a quantity with just a *magnitude*. No Direction

Vector Direction Description

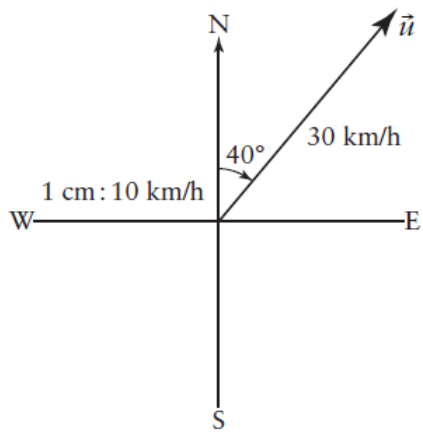
1.



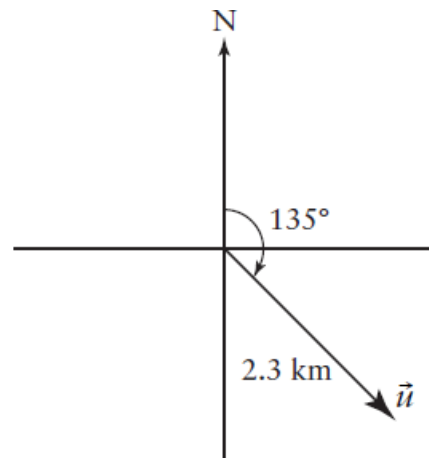
2.



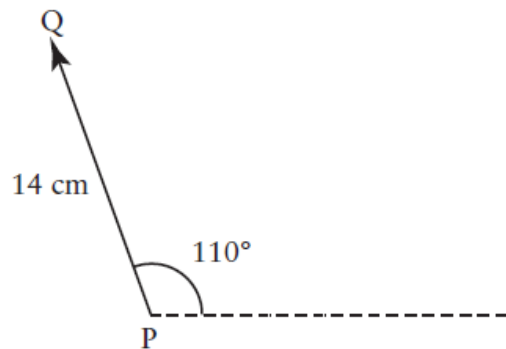
3.



4.



5.



Answers:

1. 2km @ 20° E of N or 2km @ 70° N of E
2. 9.8N @ 35° W of S or 9.8N @ 55° S of W
3. 30 km/h @ 40° E of N or 30 km/h @ 50° N of E
4. 2.3 km @ 45° S of E or 2.3 @ 45° E of S
5. 14 cm @ 20° W of N or 14cm @ 70° N of W

Physics 12 – Vector REVIEW Practice

Get out your physics 11 notes, get together with a friend, or use the internet to review vectors and vector addition. Do the following questions for tomorrow.

1. Draw a *sketch* (showing the approximate size and direction) of each of the following Vectors. Then find each vector's x and y **components**.

a) 25 meters [35° North of East]

b) 37 Newtons [12° East of North]

c) 12 m/s [22° North of West]

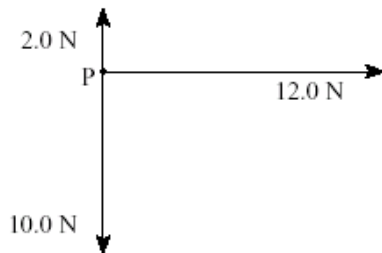
2. Find the **resulting** force vectors giving the two components: you need to include both a size and direction in your answer.

a) $35[\text{N}] + 25[\text{S}]$

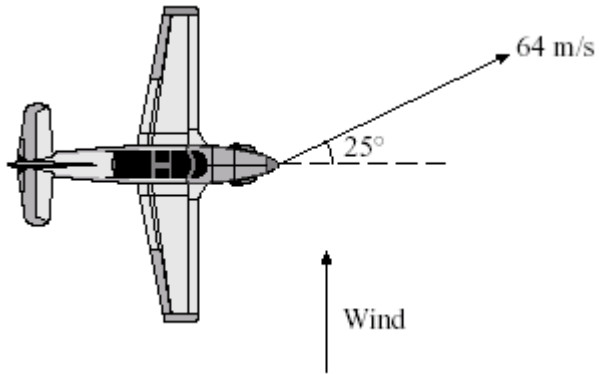
b) $163[\text{S}] + 37[\text{W}]$

c) $275[\text{N}] - 200[\text{E}]$

3. Three forces act at point P at the same time, as shown on the force vector diagram below. What is the magnitude of the resultant force vector?



4. A pilot points an aircraft due east, while the wind blows from the south.



The resultant velocity of the aircraft over the ground is 64 m/s, 25° N of E . At what speed does the wind blow?

5. Add the following two force vectors:

$$313\text{Newtons[E]} + 256\text{Newtons [25° N of E]}$$

tough one! (break into x and y components first then add) – or just wait...Mr. Walzl will show you.