

VECTORS AND SCALARS

Vectors always have a number (magnitude), a unit and a direction. They always have an arrow over their symbol.

Ex. \vec{v} - velocity 30 m/h [Right]

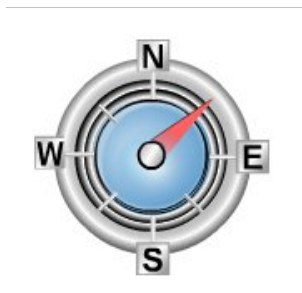
Scalars have a number (magnitude) and a unit, but **no** direction

Ex: t 56 min d 80 km v 215 km/h

Drawing Vectors

Directions for vectors are always given in square brackets.

Example : 10.0 m [45°NofE]

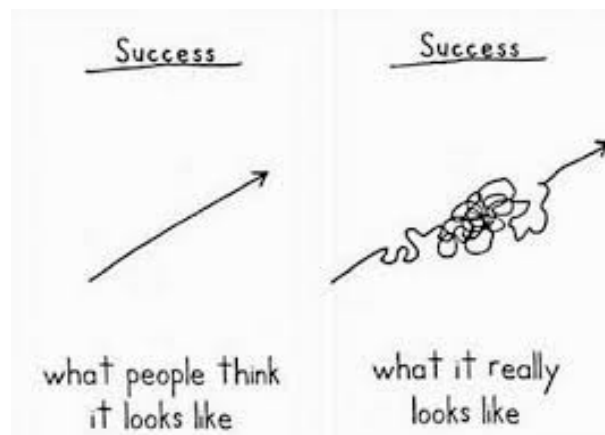


Distance/Displacement

Distance, d - measure of how far the object travelled
- scalar (m)

Displacement, \vec{d} - measure of how far the object travelled from start to finish. vector (m)

BIKE PATH DETOUR



Vectors are added “tip-to-tail” and then net or resultant vector is drawn from the start point to the tip of the last arrow drawn.

ex: You drive north for 50.0 km and then South for 30.0 km

a) What is your total distance, d

b) What is your total displacement, \vec{d}

Vectors are added “tip-to-tail” and then net or resultant vector is drawn from the start point to the tip of the last arrow drawn.

ex: You drive north for 50.0 km and then East for 50.0 km

a) What is your total distance, d

b) What is your total displacement, \vec{d}

Speed/Velocity

define as per p. 7

Speed, v : Distance divided by time. (m/s) May be average (total distance) or instantaneous (speed at a particular time)

Scalar

Velocity, \vec{v} : Displacement divided by time. (m/s) May be average (total displacement) or instantaneous (velocity at a particular time)

Vector

For the last example on the previous page, find the average speed and velocity if the total trip took 2.0 hours.

(Note that the direction of a velocity vector is always the same as the displacement vector that you used to obtain it.)

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Example 1

A person walks 12 km [S] then 10.0 km [N] in 30.0 min.

- Calculate
- (a) distance
 - (b) displacement
 - (c) speed
 - (d) velocity

Example 2

A car drives 220 km [N] then turns and continues 100.0 km [S]. If this trip takes 2.5 h, calculate the displacement and velocity.

Example 3

A plane flies 520 km [E] in 2.0 hours then turns and goes another 520 km [S] in a time of 3.0 hours.

Calculate each of the following:


- (a) distance
- (b) speed
- (c) displacement
- (d) velocity

Example 4

A ship sails 550 km [W] then another 550 km[N] in a total time of 12 hours.

Calculate the following

- (a) distance
- (b) speed
- (c) displacement
- (d) velocity

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