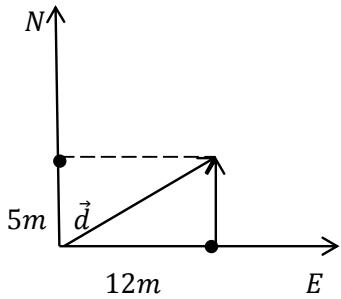


Answer on Question# 38215, Physics, Other

A radio-operated car travels 12.0 meters east in 4 seconds then 5.0 meters north in 2 seconds (yes, the car can make 90 degree turns without pausing). (A) Draw a vector map that describes the car's motion, including the car's displacement. (B) Calculate the car's average speed for the entire 6-second trip. (C) Calculate the car's average velocity (magnitude and direction) for the 6-second trip.

Solution

(A)



\vec{d} - the car's displacement.

(B) The car's average speed is

$$r = \frac{d}{t},$$

where d – the total distance car travelled, t – the total time of the 6-second trip.

$$r = \frac{12m + 5m}{4s + 2s} = 2.8 \frac{m}{s}.$$

(C) The car's average velocity is

$$\vec{v} = \frac{\vec{s}}{t},$$

where \vec{s} - the car's displacement, t – the total time of the 6-second trip.

Magnitude of average velocity is

$$v = \frac{s}{t} = \frac{\sqrt{(12m)^2 + (5m)^2}}{4s + 2s} = 2.2 \frac{m}{s}.$$

Direction of average velocity is

$$\theta = \tan^{-1} \left(\frac{5}{12} \right) = 21.8^\circ \text{ north of east.}$$