

Linear and Angular Velocity

Linear Velocity: An object moves for a period of time (t) and the distance it travels \leftarrow can (s) represent the linear velocity (v)

formula: $s = vt$ or $v = \frac{s}{t}$ or $t = \frac{s}{v}$

Example 1

A car was driving for 2 hours and covered 80 miles, find linear velocity.

$t = \text{time}$	$t = 2 \text{ hr}$		
$s = \text{distance}$	$s = 80 \text{ mi}$	$v = \frac{s}{t}$	$\rightarrow \frac{80 \text{ mi}}{2 \text{ hr}} = 40 \text{ mi/hr}$
$v = \text{velocity}$	$v = ?$		

Example 2

A car was traveling at 25 mi/hr, it covered 125 miles, how long was it on the road?

$v = 25 \text{ mi/hr}$			
$s = 125 \text{ mi}$	$t = \frac{s}{v}$	$\rightarrow t = \frac{125 \text{ mi}}{25 \text{ mi/hr}}$	$\rightarrow \frac{125 \cancel{\text{mi}}}{1} \cdot \frac{1 \text{ hr}}{25 \cancel{\text{mi}}} = 5 \text{ hr}$
$t = ?$			

Example 3

A car is traveling at 350 ft per second, it is traveling for 30 mins, how many miles has it covered.

$$s = vt$$

$$\frac{350 \cancel{\text{ft}}}{\cancel{\text{sec}}} \cdot \frac{30 \cancel{\text{min}}}{1} \cdot \frac{60 \cancel{\text{sec}}}{1 \cancel{\text{min}}} \cdot \frac{1 \text{ mi}}{5280 \cancel{\text{ft}}} = \frac{630000}{5280} \text{ mi}$$

$$\approx 119.32 \text{ miles}$$

$$\frac{119.32 \text{ mi}}{30 \cancel{\text{min}}} \cdot \frac{60 \cancel{\text{min}}}{1 \text{ hr}}$$

$$\frac{1159.2}{30} \approx 238.64 \text{ mi/hr}$$

Example 4

A man is out for a run, he wants to run 6 miles in 40 minutes, what must his mph speed be?

$$s = 6 \text{ mi} \quad v = \frac{s}{t} \rightarrow \frac{6 \text{ mi}}{1} \cdot \frac{1}{40 \text{ min}} \cdot \frac{60 \text{ min}}{1 \text{ hr}} = \frac{360 \text{ mi}}{40 \text{ hr}}$$

He must run at a speed of 9 mph

Example 5

If given 25 miles per hour, convert to yards per second.

$$\frac{25 \text{ mi}}{1 \text{ hr}} \cdot \frac{1 \text{ hr}}{60 \text{ min}} \cdot \frac{1 \text{ min}}{60 \text{ sec}} \cdot \frac{5280 \text{ ft}}{1 \text{ mi}} \cdot \frac{1 \text{ yd}}{3 \text{ ft}} = \frac{\text{yds}}{\text{sec}}$$

$$\frac{13200 \text{ yds}}{10800 \text{ sec}} \approx 12.22 \text{ yds/sec}$$