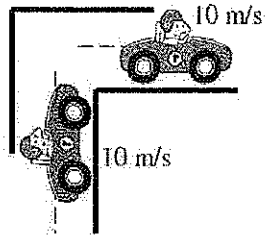
Velocity & Acceleration Key

Speed (S) or Velocity (V)	Scalar (S) or Vector (V)
V A bike goes 25 m/s toward main street.	V 40 mph toward Dallas.
S A person walks 4 mph.	V 3 m/s² to the left.
S A plane flies 200 m/s.	V 10 meters up the hill.
V A bird flies 100 mph due south.	V 12 meter per sec².
	V Direction matters.
	S No direction is needed

Accelerating? Yes, No, or Maybe?

N At constant velocity.
Y Going 5 m/s then going 3 m/s.
Y A car going around a corner. *(see graphic at right).*
M At constant speed. direction change?
Y Stopping.
N A car at rest.



Object A accelerates at 10 m/s²; Object B accelerates at 5 m/s².

Both Which one will go faster?
B Which one will take more time to reach a high speed?
A If they start at rest, which one will reach 40 m/s first?
Both Which one goes farther (longer distance)?
A Which one will be 100m away sooner?

Mass, Time, Distance, Velocity, or Acceleration?

I 2 hrs	T 5 sec	M 8 kg
S 3 m/s	S 9 mph	A 4 m/s²
A 6 mph/sec	D 12 m	D 1 in

Object A 

Object B 

Object C 

Object D 

Choose which of the above applies to the following

C+D Constant speed.	B Distance increases
B Positive acceleration.	B Starts at rest.
C At constant velocity.	A Is stopping.
A,B,D Accelerating.	A,B,C Constant direction.
A Decelerating.	A Negative acceleration.
C Acceleration = 0.	C $V_i = V_f$

Give what you know for the following: (V_i, V_f or a)

An object at constant velocity. $a=0$ $V_f=V_i$
An object that is stopping. $a=-$ $V_f=0$
An object that accelerates from rest. $a=+$ $V_i\ 0$
An object at rest. $a=0$ $V_i=V_f=0$

A person starts running from 2 m/s to 6 m/s in 2 seconds. Calculate the person's acceleration.

Variables:
$a=?$
$\Delta V = 6m/s - 2m/s = 4m/s$
$t = 2s$

Formula:
$a=\frac{\Delta V}{t}$

Solve:
$a=\frac{4m/s}{2s}=\boxed{2m/s^2}$

A dragster's top acceleration is 60 m/s². If it starts from rest at the starting line, how fast will it be going after 3 seconds?

Variables:
$a=60m/s^2$
$\Delta V = V_f - 0m/s$
$t=3sec$

Formula:
$\Delta V = a \cdot t$
$a=\frac{\Delta V}{t}$

Solve:
$V_f - 0m/s = 60m/s^2 \cdot 3sec$
$\boxed{V_f = 180m/s}$

A plane stops from 250 mph in 25 seconds. Calculate the planes acceleration.

Variables:
$a=?$
$\Delta V = 0m/hr - 250m/hr$
$t=25s$

Formula:
$a=\frac{\Delta V}{t}$

Solve:
$a=\frac{-250m/hr}{25s}$
$\boxed{a=-10\frac{m/hr}{sec}}$

A car travels 30 m in 5 seconds. After accelerating for 3 seconds, it travels 20 m in 2 seconds. Calculate the car's acceleration.

1) Find V_i. $d=30m$, $t=5sec$ $V=\frac{30m}{5sec}=6m/s$
2) Find V_f. $d=20m$, $t=2s$ $V_f=\frac{20m}{2sec}=10m/s$
3) Calculate a. $\Delta V = 10m/s - 6m/s$, $t=3sec$ $a=\frac{\Delta V}{t}$ $a=\frac{4m/s}{3sec}=1.3m/s^2$