Graphs of Linear Motion when acceleration is constant

**V0 = zero AND a = zero**

time

0

(+)

velocity

time

0

(+)

displacement

**+V0 AND a = zero**

time

0

(+)

velocity

time

0

(+)

displacement

**-V0 AND a = zero**

time

0

( - )

velocity

time

0

( - )

displacement

**V0 = zero OR +V0 AND +a**

time

0

(+)

velocity

time

0

(+)

displacement

+V0

V0 = zero

**V0 = zero OR -V0 AND -a**

time

0

( - )

velocity

time

0

( - )

displacement

V0 = zero

-V0

**+V0 AND -a**

velocity

time

0

(+)

(-)

time at maximum displacement OR “turn around” point

time

0

(+)

(-)

displacement

time at maximum displacement OR “turn around” point

**-V0 AND +a**

velocity

time

0

(+)

(-)

time at maximum displacement OR “turn around” point

time

0

(+)

(-)

displacement

time at maximum displacement OR “turn around” point

**+V0 AND slows to a stop**

velocity

time

0

(+)

(-)

time

to

stop

time

0

(+)

(-)

displacement

time

to

stop

**-V0 AND slows to a stop**

velocity

time

0

(+)

(-)

time

to

stop

time

0

(+)

(-)

displacement

time

to

stop

**General velocity vs time graphs**

velocity

time

speeds

up

speeds

up

slows

down

slows

down

positive

velocity

negative

velocity

(+)

(-)

The ***slope*** of the graph is the ***acceleration*** of the object.

The ***area*** under the graph is the ***displacement*** of the object.

**General displacement vs time graphs**

displacement

(+)

0

(-)

time

moving in the positive direction

moving in the negative direction

A ***straight-line*** graph means the ***acceleration*** of the object is ***zero***. The object moves in a straight line at constant speed.

A ***parabolic*** curve means the object is ***accelerating***.

If the parabola opens ***upward*** (bowl configuration) then the acceleration is ***positive***.

If the parabola opens ***downward*** (hill configuration) then the acceleration is ***negative***.

The slope of the tangent line at any point is the velocity of the object at that point.

If the parabola gets “steeper” then the object is speeding up.

If the parabola gets “flatter” then the object is slowing.