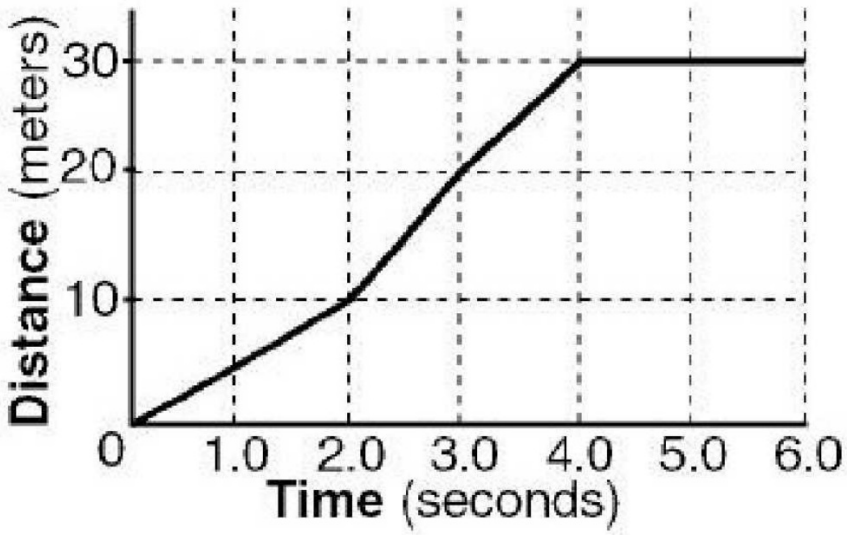


Do Now: Determine the velocity of each leg of the graph.

Leg Velocity

- Leg 1: $10\,m / 2\,s = 5\,m/s$
- Leg 2: $10\,m/s$
- Leg 3: $0\,m/s$

Today

- Velocity-Time Graphs
- Defining Acceleration
- First Kinematic Equations

Homework

- Graphing Review Worksheet
- On School Wires

Vectors Have Direction

- Displacement: How far an object is from where it started [m].
- Velocity: Displacement over a given time period [m/s].

Gridiron Physics

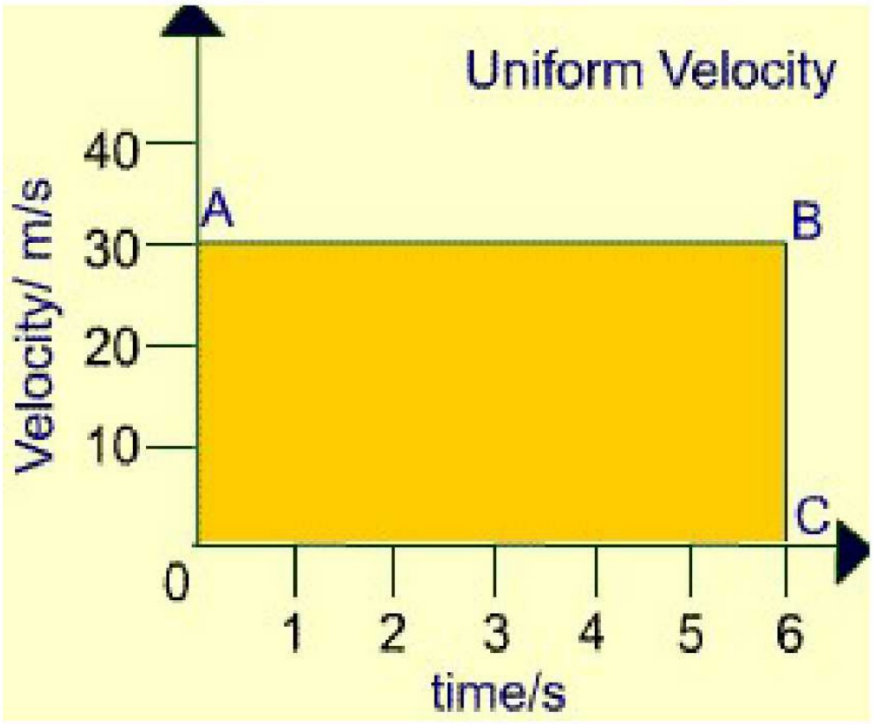
An object travels at 30m/s for 6 seconds. How far does it travel?

K: $V = 30\ m/s$, $t = 6\ sec$

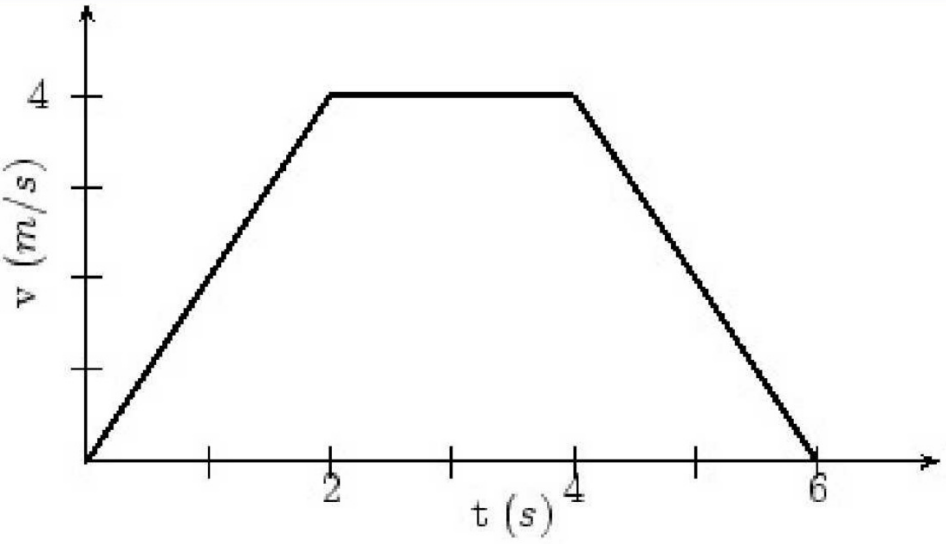
U: Δx

Eqn: $tV = \frac{\Delta x}{t}\ t \Rightarrow \Delta x = Vt$

$30\ m/s \cdot 6\ s = 180\ m$



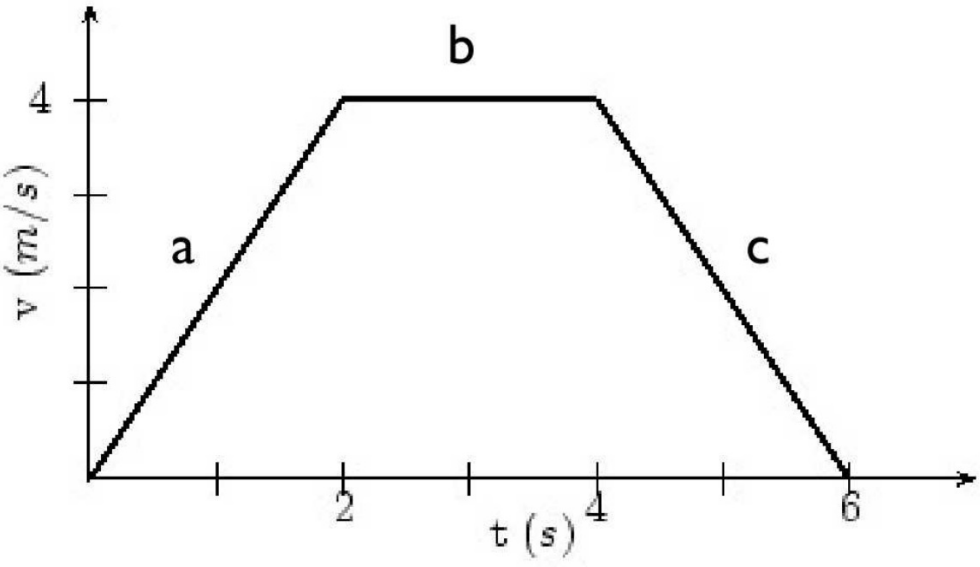
Displacement of the object based on the V-t graph.



Find the slope of the graph for each leg of the journey.

V-t Graph Conventions

- The slope of the line of a V-t graph is the acceleration of the object.
- The area between the curve and the principal axis is the displacement of the object.



Create a chart with Δdisplacement, Δtime, velocity and acceleration for each leg of the journey.

Acceleration (vector)

- Change in velocity.
- Measured in m/s^2.
- We will work with constant acceleration.
- Make a formula for the slope of the V-t graph.

Δt (sec)	Δx (m)	V(m/s)	a(m/s^2)

Materials

- Piece of graph paper. Fold it into quarters.
- Ruler
- Calculator

Wheel Down a Ramp

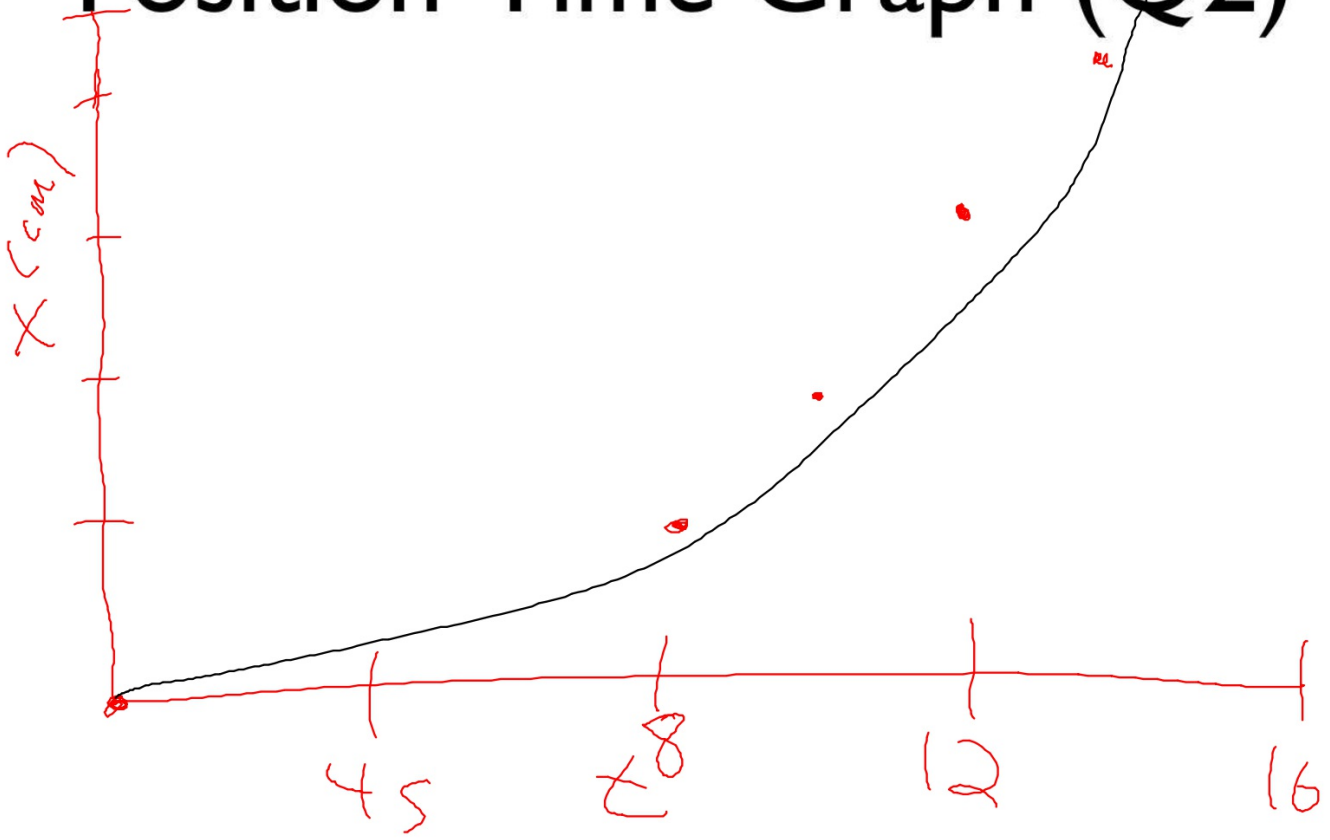
- Make a table with 5 columns in the upper left quarter.
- Label them t, Δt, x, Δx, V, and ΔV.
- You will record t & x.
- We will walk through calculating Δt, Δx, V, and ΔV.

Wheel on ramp lab; Galileo's ramp lab revisited

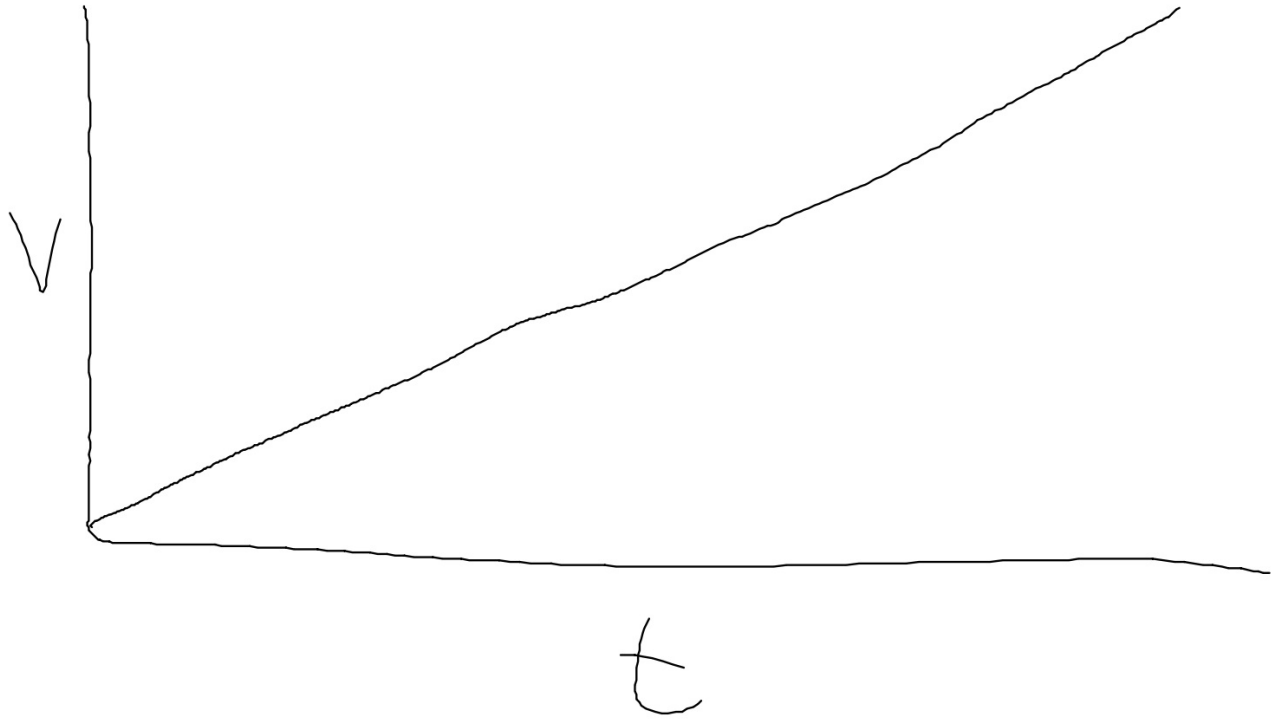
Galileo's Ramp

●t Δt x Δx V ΔV

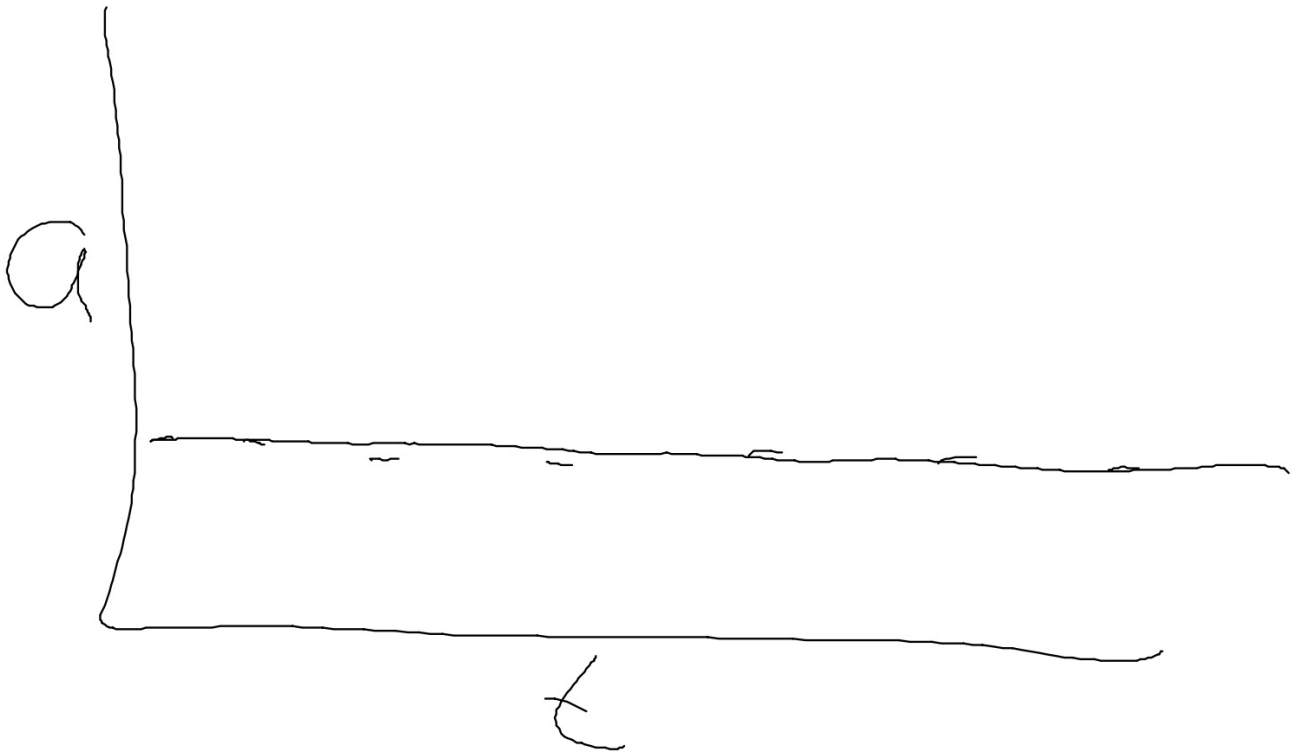
Position-Time Graph (Q2)



Velocity-Time Graph (Q3)

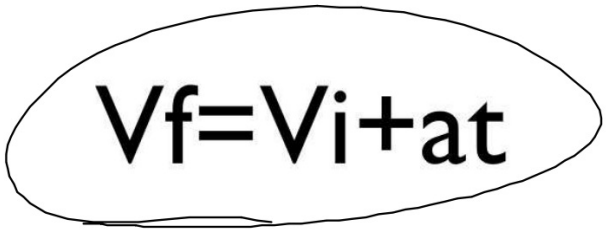


- ΔVelocity-time Graph (Q4)



$a=(Vf-Vi)/t$

- Slope of V-t graph.
- $a=\Delta v/t$
- Use algebra to isolate Vf.



- This is the first of 3 main kinematics equations.
- Identify the knowns and unknowns.
- Use algebra to isolate the unknown variable.
- Plug in numbers and cancel out units.

A plane needs to go 150m/s in order to take off. If the plane starts from rest (Vi=0) and accelerates at 4.9m/s^2, how long does it take for the plane to get to take off speed?

A drag racer starts from rest and accelerates uniformly at 15m/s^2. The race takes 9 seconds. How fast is she going when she crosses the finish line?

Evil Kinevil rides is doing a wheelie. The front wheel starts to come down and so he accelerates at 3.2m/s^2 to hold the wheelie. After 5 seconds he finishes the stunt at 40m/s. How fast was he going when he started the wheelie?

A truck is going 30m/s. It slams on the breaks and comes to a stop over 2.5 seconds. What is the acceleration of the truck?