

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

Leg Velocity

- Leg 1:
- Leg 2:
- Leg 3:

Today

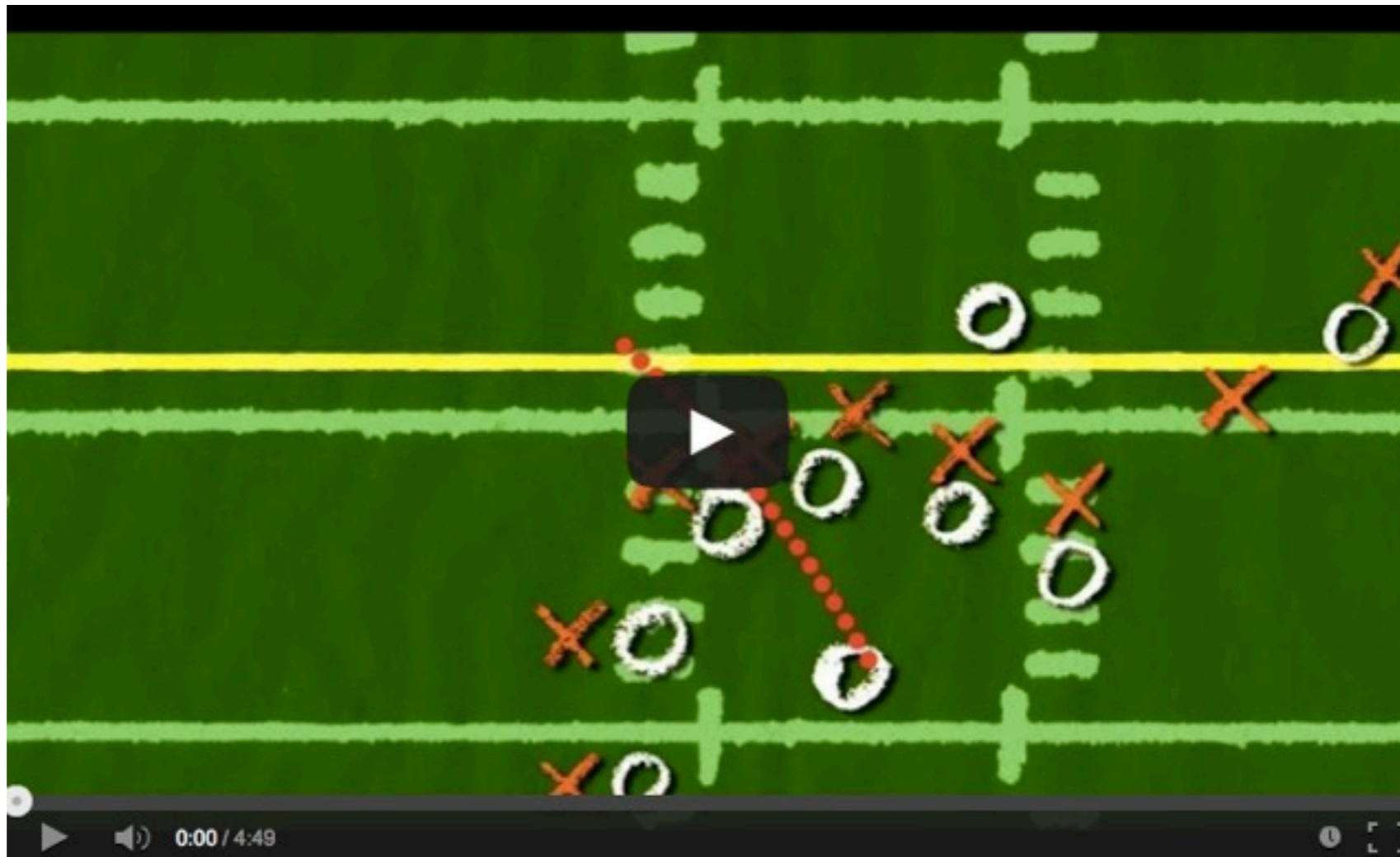
- Velocity-Time Graphs
- Defining Acceleration
- First Kinematic Equations

Homework

- Graphing Review Worksheet
- On School Wires

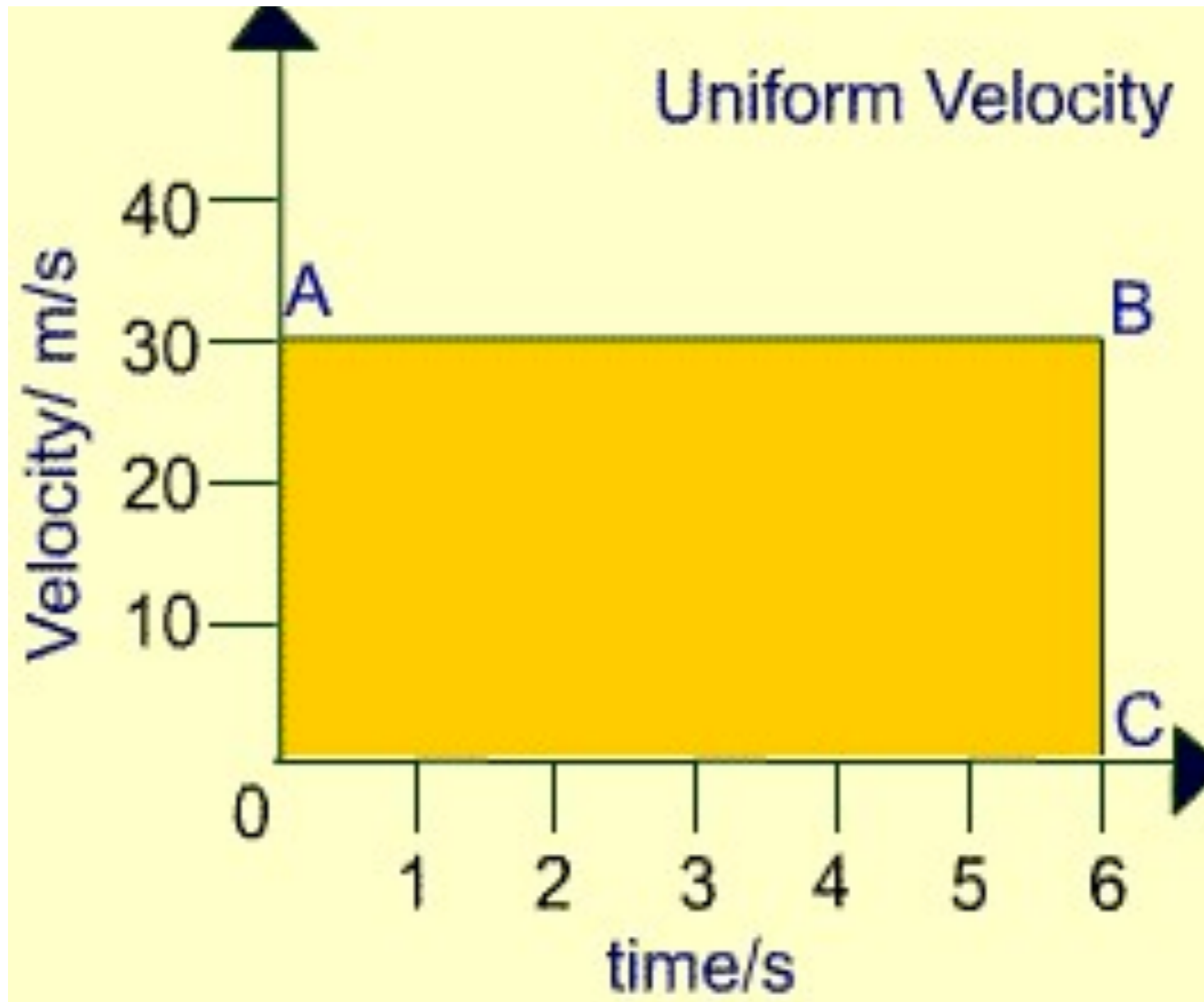
Vectors Have Direction

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

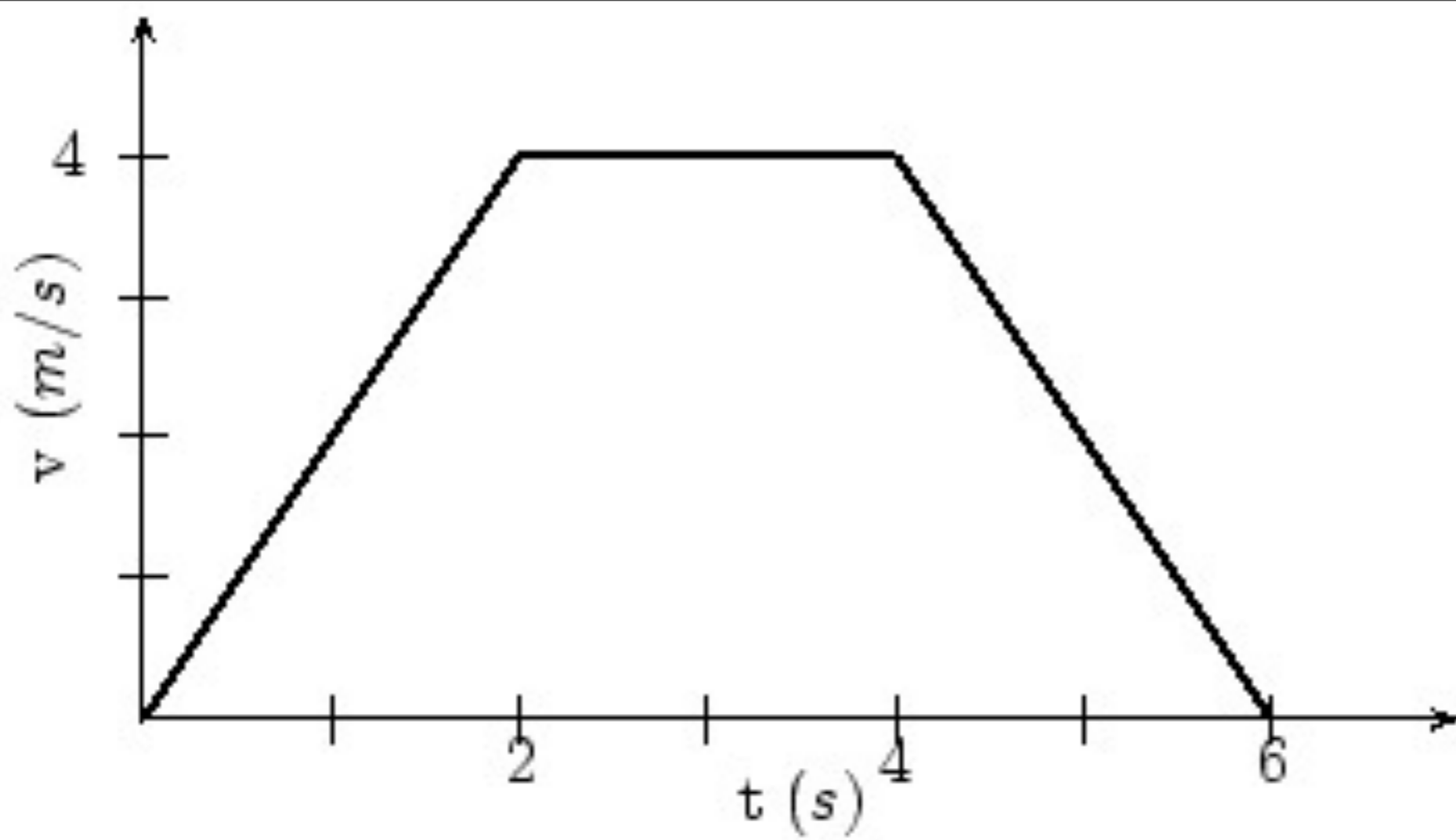


Gridiron Physics

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



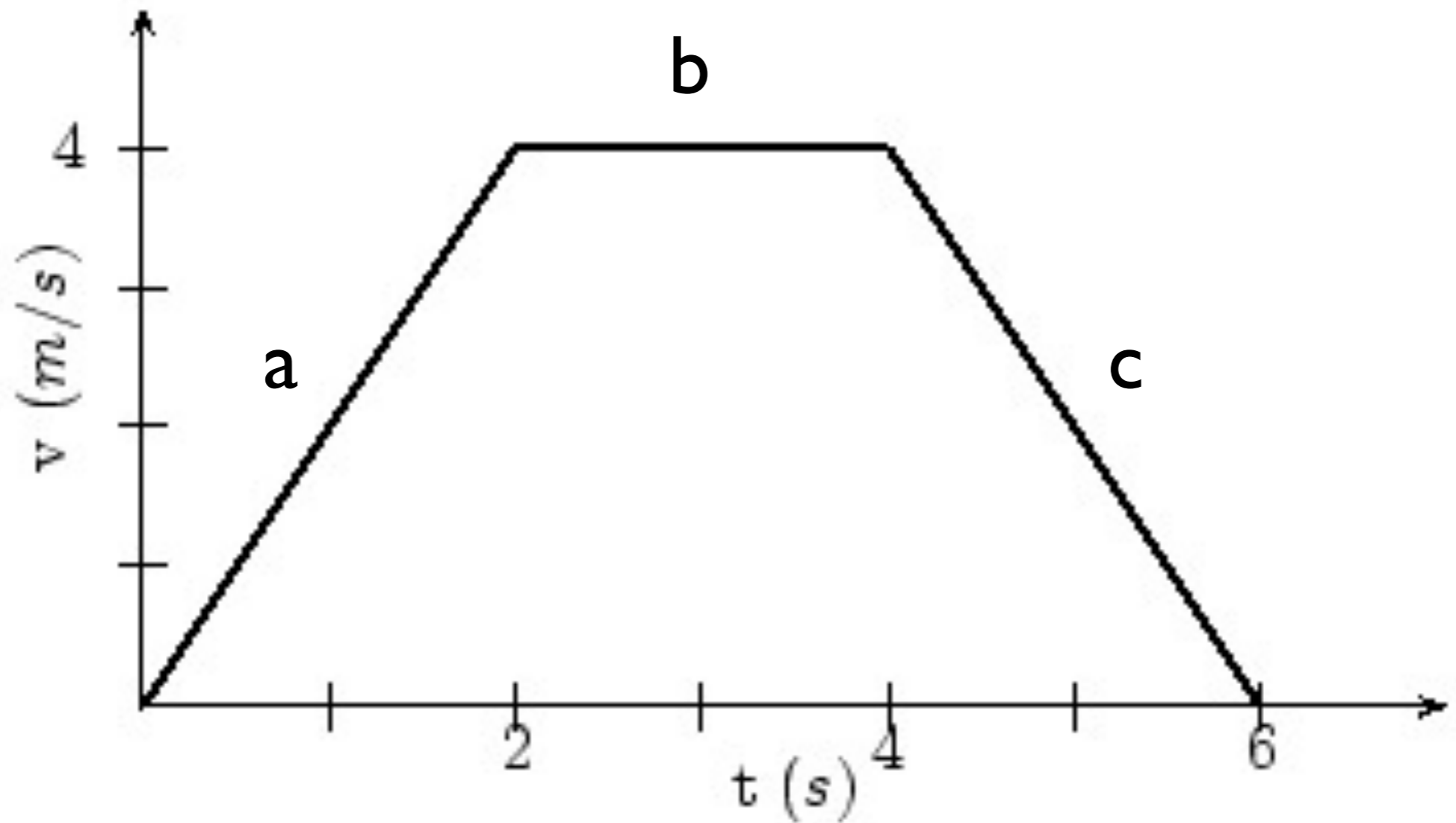
Displacement of the object based on the V-t graph.



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 Δ displacement, Δ time, 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/s²)

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)

- Δ Velocity-time Graph (Q4)

$$a = (V_f - V_i) / t$$

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

$$V_f = V_i + at$$

- 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 ($V_i=0$) 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?

