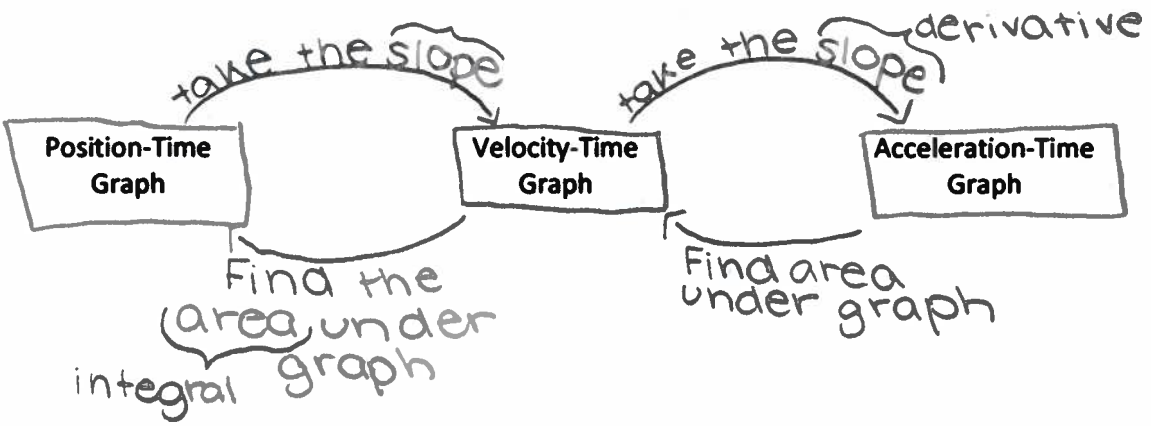
Jen

Physics 11

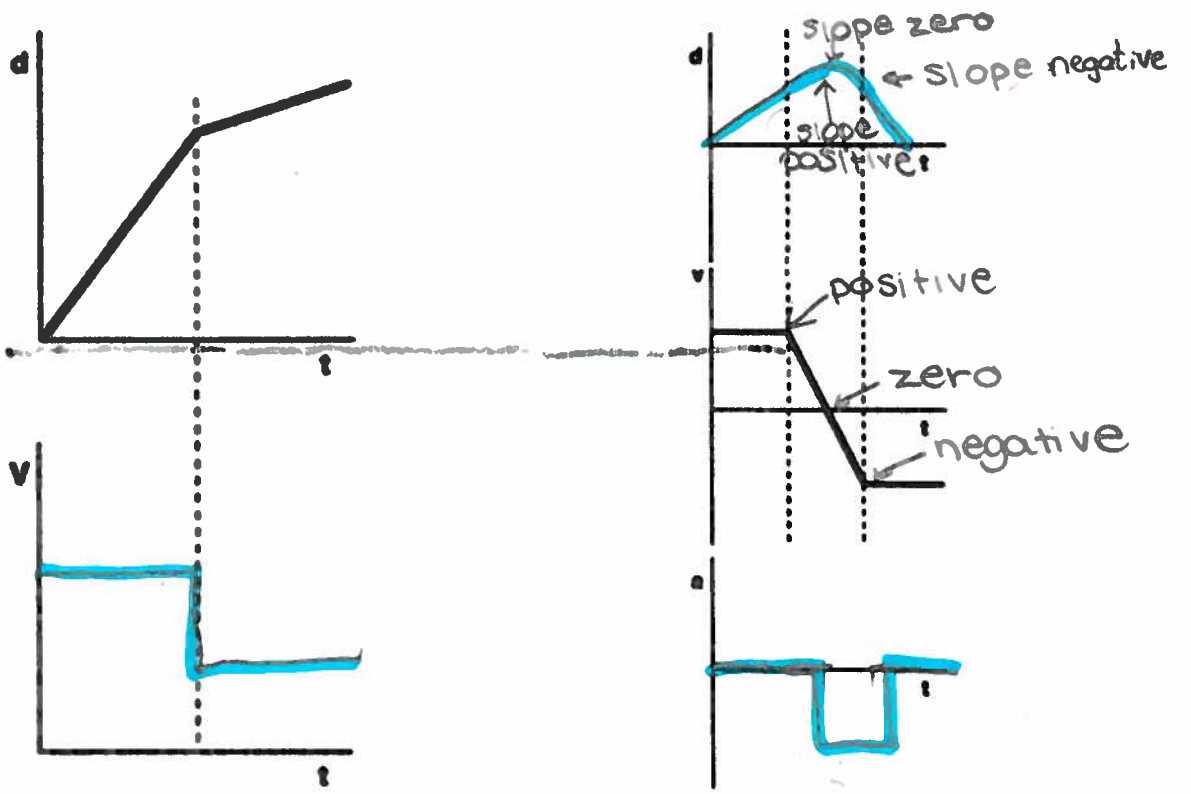
Section 2.5: Kinematics Graphs
A First Lesson in Calculus

There are important relationships between the three graphs we use in kinematics:



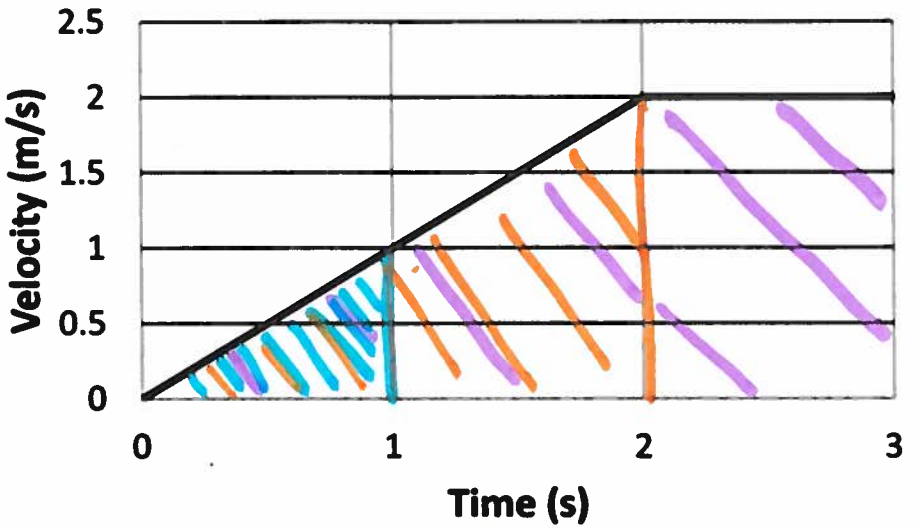
"Area under the graph" means the area between the graph **and the** x axis **.**

Example: Complete the following sets of graphs.



V = velocity
d = position
t = time

Example: An object in motion has the following v-t graph. Calculate its displacement at 1s, 2s, and 3s.



0 - 1 seconds

Area = $\frac{bh}{2}$

$= (1\,s)(1\,m/s) \div 2 = 0.5m$

0-2 seconds

$= \frac{2 \times 2}{2} = 2m$

0-3 seconds

$A = 1 \times 2$

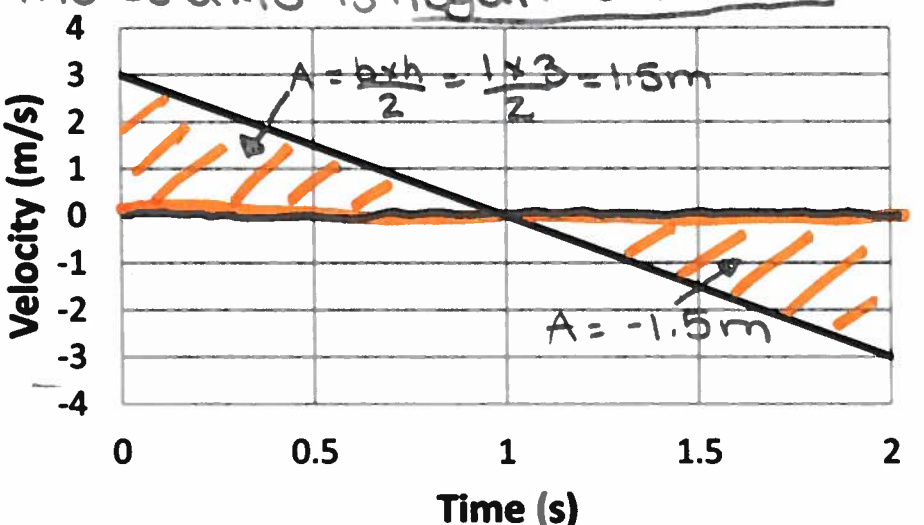
$= 2$

(add areas of all pieces)

$2 + 2 = 4m$

Example: For the following v-t graph, calculate the total displacement and total distance.

*area under the x-axis is negative area



Displacement: $1.5m - 1.5m = 0m$

Distance: $1.5m + 1.5 = 3m$