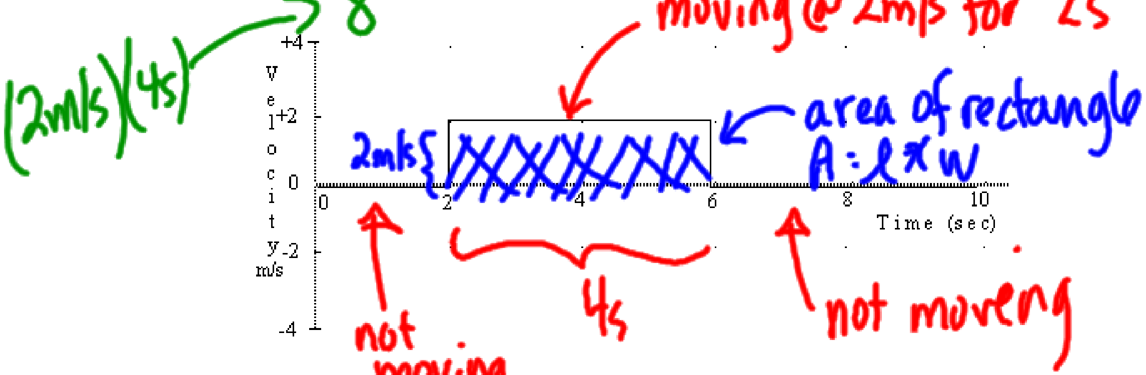
5. The velocity-time graph of an object is shown below. Figure out the total *distance* traveled by the object. Show your work.

Distance = 8 meters.



6. Both of the *velocity* graphs below, 1 and 2, show the motion of two objects, A and B.

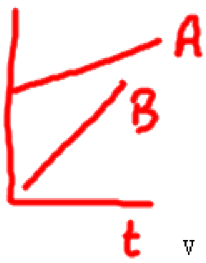
6. Both of the *velocity* graphs below, 1 and 2, show the (moving) motion of two objects, A and B. Answer the following questions separately for 1 and for 2. Explain your answers when necessary.

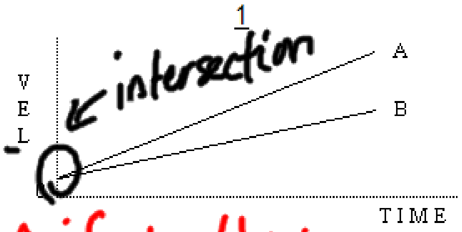
a) Is one faster than the other? If so, which one is faster? (A or B)

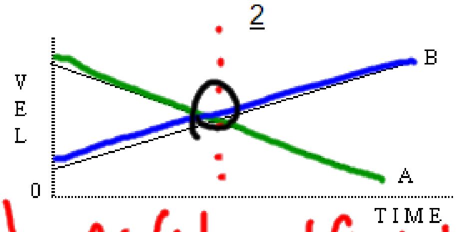
b) What does the intersection mean?

c) Can one tell which object is "ahead"? (define "ahead")

d) Does either object A or B reverse direction? Explain.







1

a) A is faster (higher on graph)

b) Both objects are going at the same velocity

c) You cannot tell position from a v-t graph

d) Neither object changes direction (v is always +)

2

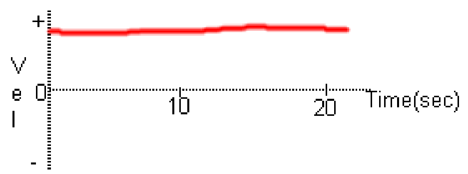
a) A is faster at first, then B

b) "

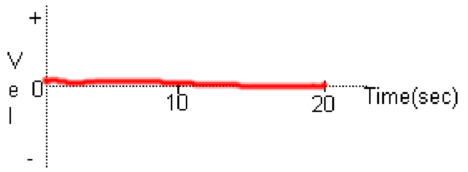
c)

d)

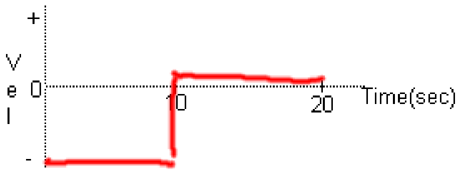
7. The object is moving away from the origin at a steady (constant) velocity.



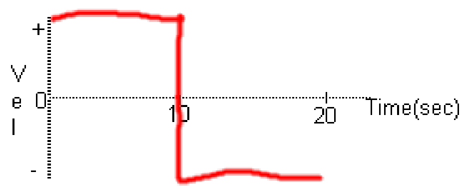
8. The object is standing still.

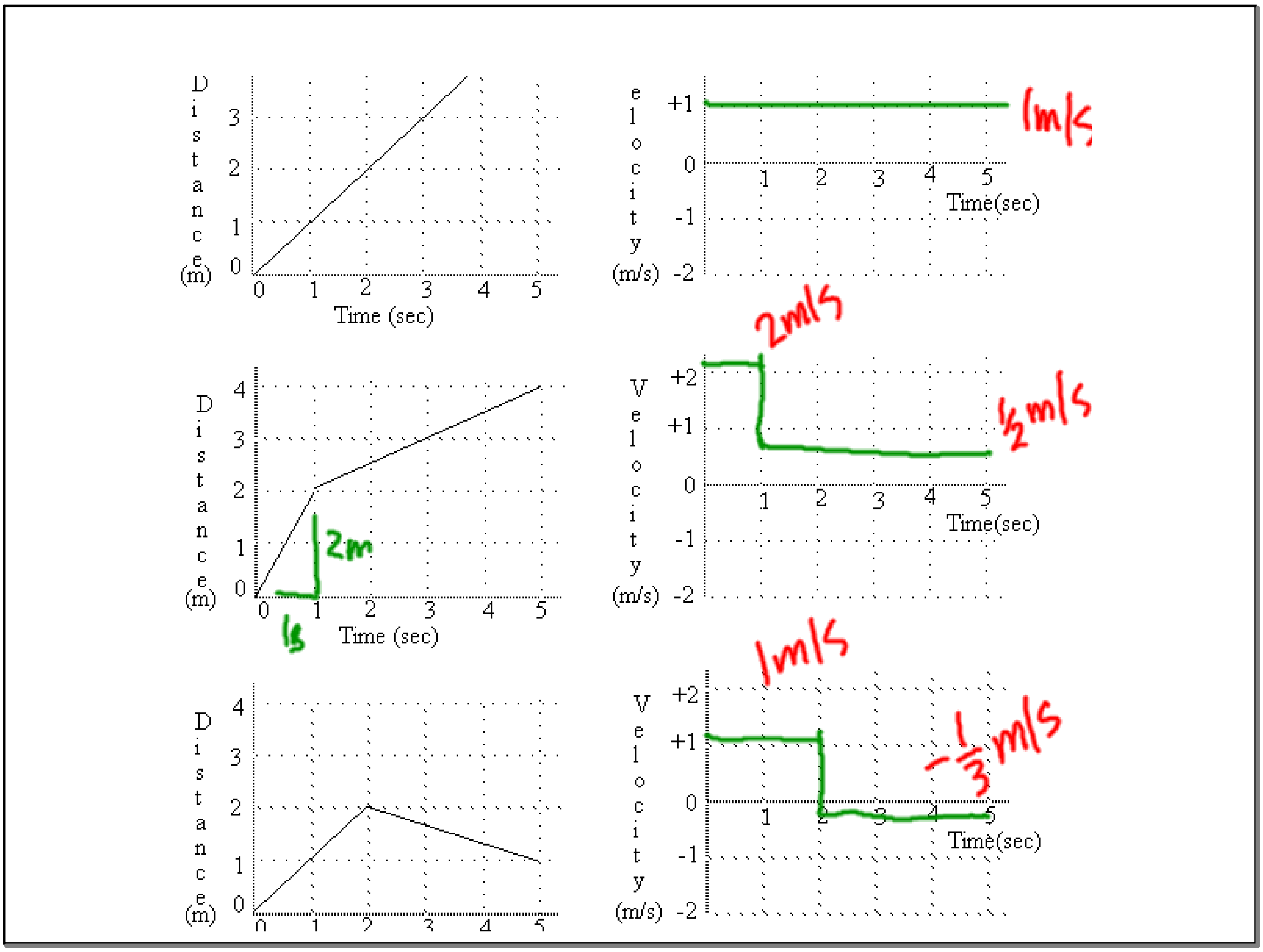


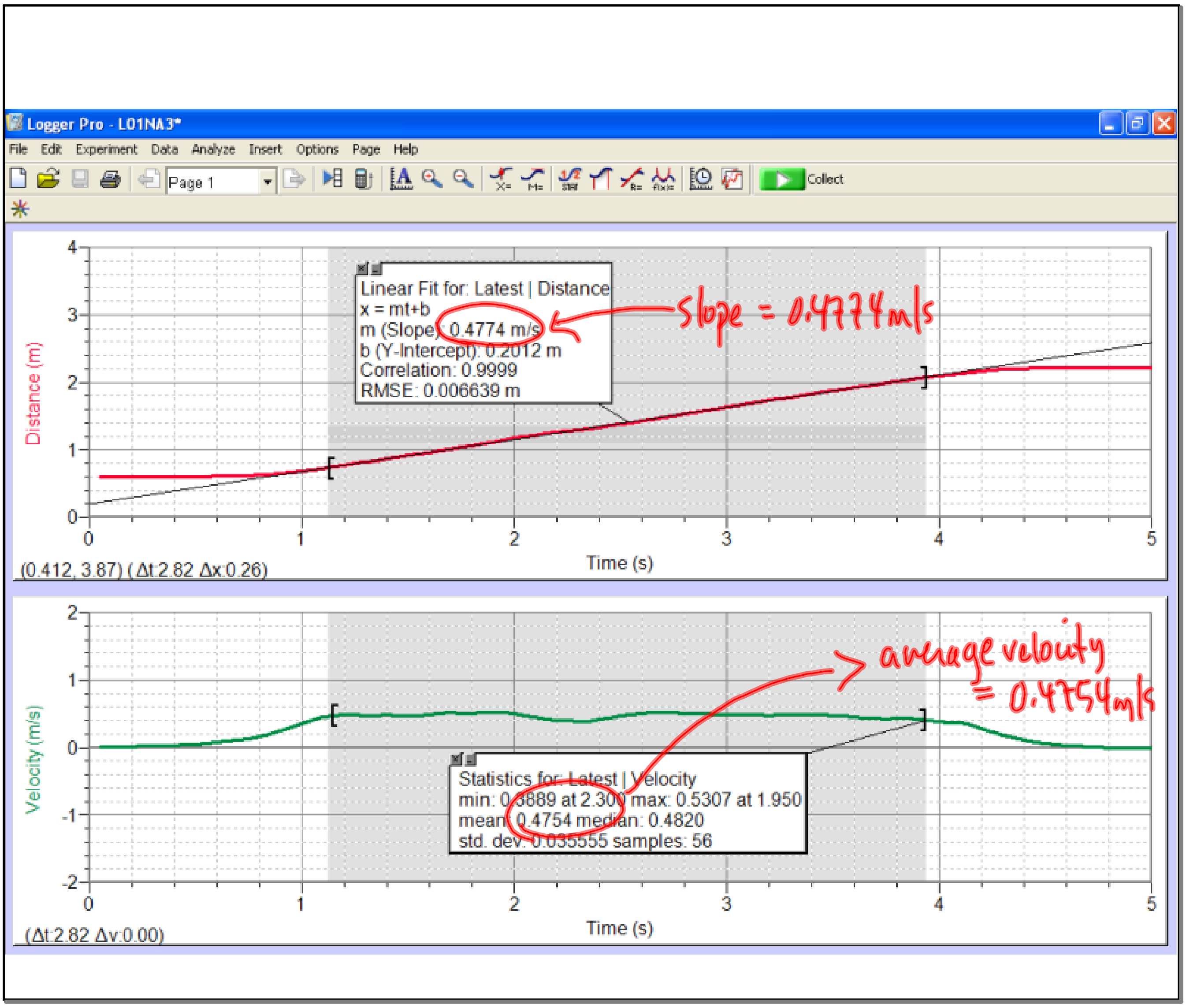
9. The object moves toward the origin at a steady (constant) velocity for 10 seconds, and then stands still for 10 seconds.



10. The object moves away from the origin at a steady (constant) velocity for 10 seconds, reverses direction and moves back toward the origin at the same speed for 10 seconds.




Distance (m)
Time (sec)
Velocity (m/s)
Time(sec)
1m/s
2m/s
½m/s
2m
1s
1m/s
-1/3 m/s


Logger Pro - L01NA3*
File Edit Experiment Data Analyze Insert Options Page Help
Page 1
Collect
Linear Fit for: Latest | Distance
x = mt+b
m (Slope): 0.4774 m/s
b (Y-Intercept): 0.2012 m
Correlation: 0.9999
RMSE: 0.006639 m
slope = 0.4774 m/s
Distance (m)
Time (s)
(0.412, 3.87) (Δt:2.82 Δx:0.26)
average velocity = 0.4754 m/s
Statistics for: Latest | Velocity
min: 0.3889 at 2.300 max: 0.5307 at 1.950
mean: 0.4754 median: 0.4820
std. dev: 0.035555 samples: 56
Velocity (m/s)
Time (s)
(Δt:2.82 Δv:0.00)

Velocity and Position-Time Graphs

Scalar – has only a magnitude (size) 10 km

vector – has both magnitude + direction 10 km [E]

position ($\vec{d}$) – where the object is in relation to a reference point (vector)

displacement ($\Delta\vec{d}$) ~ change in position; where the object is now in relation to where it started (vect)

distance (Δd) ~ how far the object has travelled (scalar)

velocity ($\vec{v}$) ~ rate of change of the object's position (vector)

speed (v) ~ how fast the object travels (scalar)

Sep 27-9:28 AM

Slope = $\frac{\text{rise}}{\text{run}}$

slope = $\frac{\Delta d}{\Delta t}$

walking away at a steady pace

* From INB, you found that the slope on a d-t graph is equal to velocity

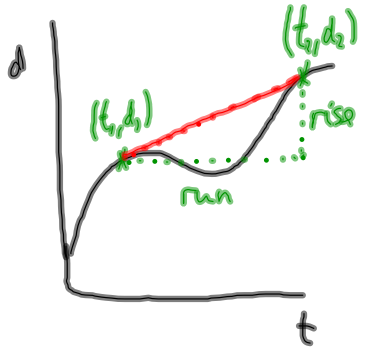
(CONSTANT VELOCITY) $v = \frac{\Delta d}{\Delta t}$

$\vec{v} = \frac{\Delta \vec{d}}{\Delta t}$

(Speed = $\frac{\text{distance}}{\text{time}}$) (velocity = $\frac{\text{displacement}}{\text{time}}$)

Sep 27-9:41 AM

NON-CONSTANT VELOCITY



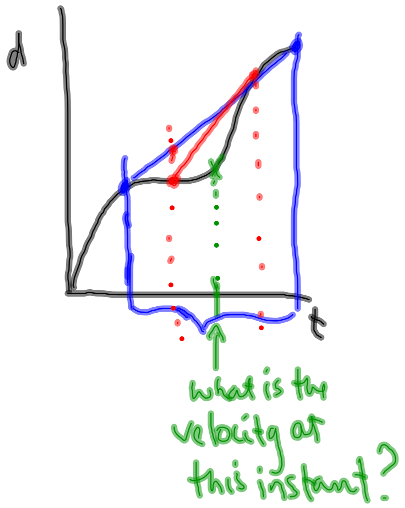
$$\text{slope} = \frac{\text{rise}}{\text{run}}$$

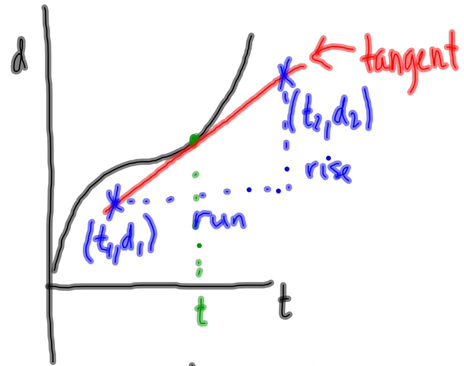
$$\text{slope} = \frac{\Delta d}{\Delta t}$$

The slope between two points, in this case, gives us the average velocity

$$V_{ave} = \frac{\Delta d}{\Delta t}$$

What if we want to know the velocity at a particular instant in time?





$$\text{slope} = \frac{\text{rise}}{\text{run}}$$

$$\text{slope} = \frac{\Delta d}{\Delta t}$$

$$V_{inst} = \frac{\Delta d}{\Delta t}$$

The instantaneous velocity is the slope of the tangent drawn at time, t.