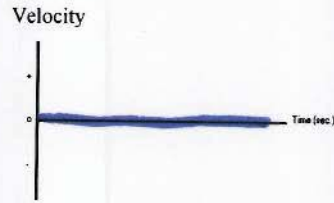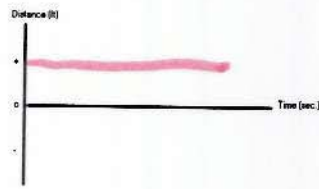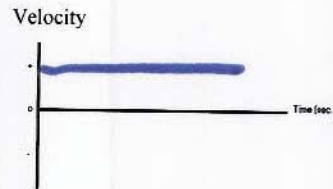# Graphing Distance and Velocity
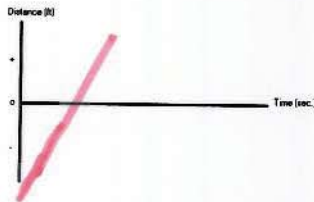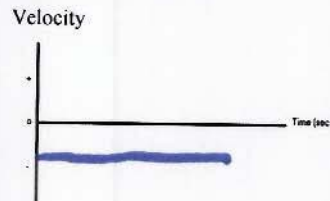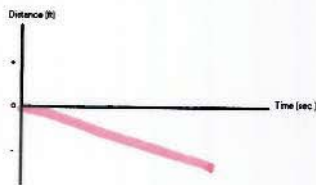
1. An object stands *still* ahead of the origin
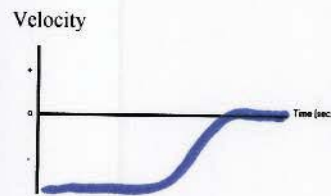

2. An object starts behind the origin but *runs* with a steady positive velocity

3. An object starts at the origin and *walks* away from the origin with a negative velocity

4. An object starting ahead *sprints* toward the origin and then stands *still*
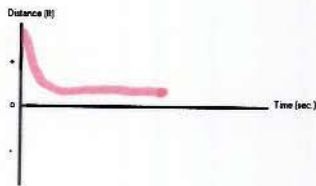
5. An object starting behind the origin starts to walk with a positive velocity, then begins to jog, and finally starts to sprint.
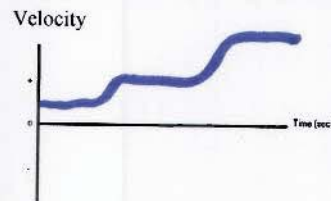
6. An object starting ahead of the origin *jogs* towards and then *sprints* away
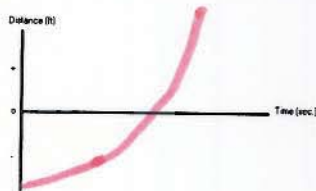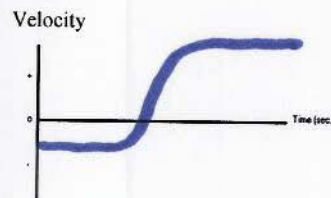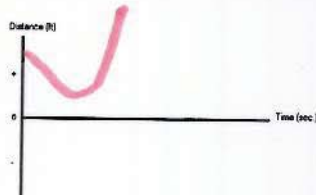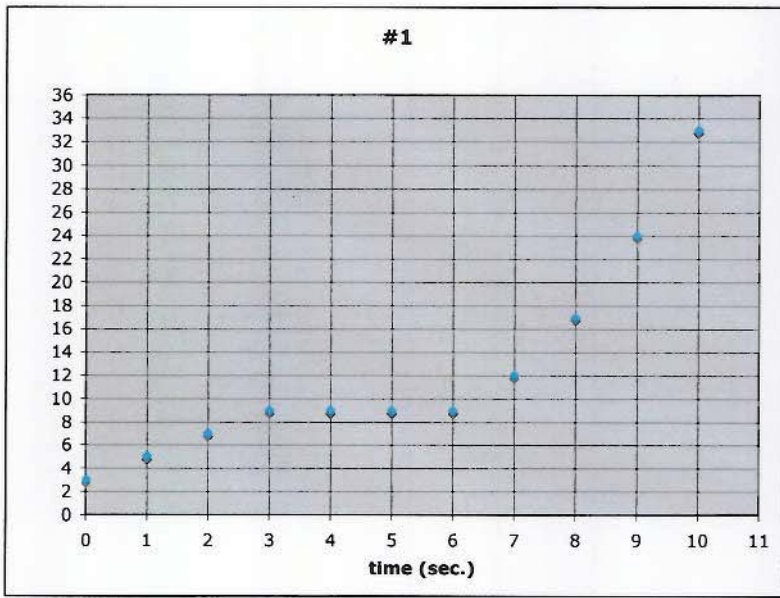

OR (I could see either argument)

s(t)

#1

time (sec.)

How far does it travel during 1st 3 seconds?

$6m$

What is its velocity at t = 1.5 seconds?

$2 m/s$

Is it ever standing still? When?

Yes, from 3 to 6 seconds

What is its average velocity during the entire trip?
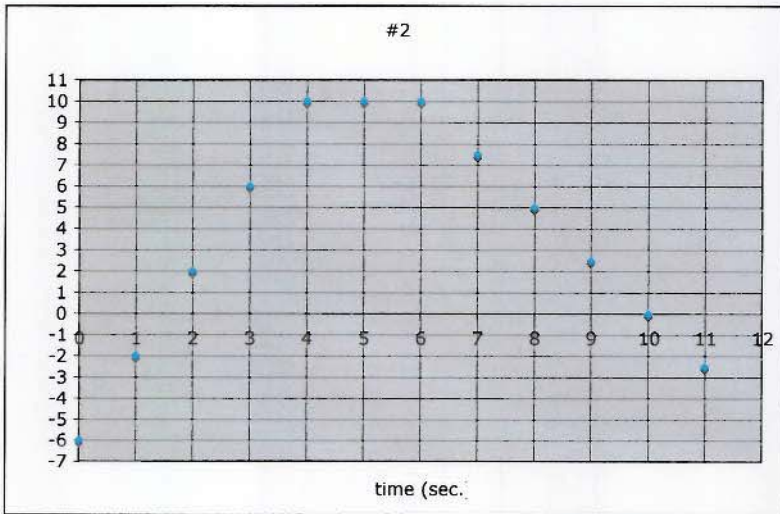
$(0,3)$ $(0,33)$ $\frac{30}{10} = \boxed{3 m/s}$

Does it ever change direction?

No

Is there any point of acceleration?

On $(7,10)$ there is a positive acceleration because the slope is increasing.

s(t)

#2

time (sec.)

How far does it travel during 1st 4 seconds?

$16 m$

What is its velocity at t = 3 seconds?

$4 m/s$

What is its average velocity during the 1st 10 seconds?

$(0,-6)$ $(10,0)$ $\frac{6}{10} = \boxed{\frac{3}{5} m/s}$

Does it ever change direction? When?
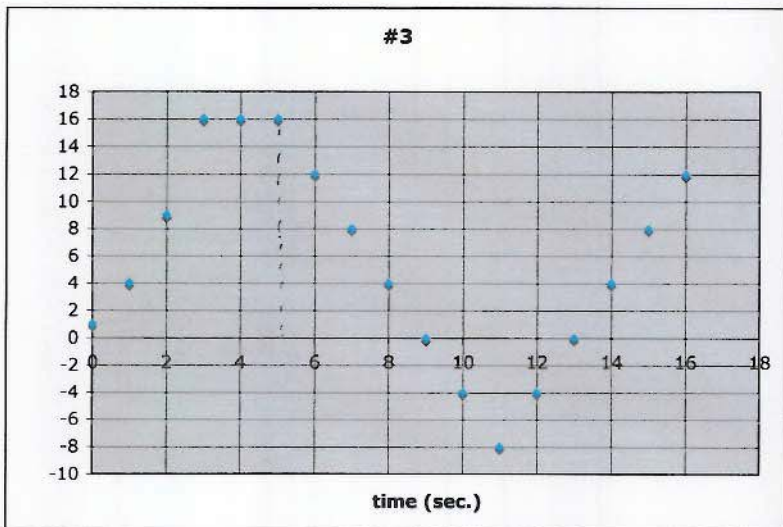
Yes, at $t = 6$

When is it moving the fastest? How do you know?

On the interval $(-6,4)$ because the slope is the steepest.

Compare the trip's distance and displacement.

$28.5 m$ $3.5 m$

s'(t)

#3

time (sec.)

What is its velocity at t = 3 seconds?

$16 m/s$

How far does it travel between 3 to 5 seconds?

$2 \cdot 16 = \boxed{32 m}$

Does it ever change direction? When?

Yes, at $t=9$ and $t=13$

When is there negative acceleration? Zero?

On the interval $(5,11)$ ↙ $(3,5)$

What is the acceleration from t = 11 to t = 16?

$4 m/s^2$

How far does it travel between 5 and 9 seconds?

It's the area! $\frac{1}{2} bh = \frac{1}{2}(16)4 = 32 m$

Think about trip's distance vs. displacement.

total area   positive area + negative area + positive area