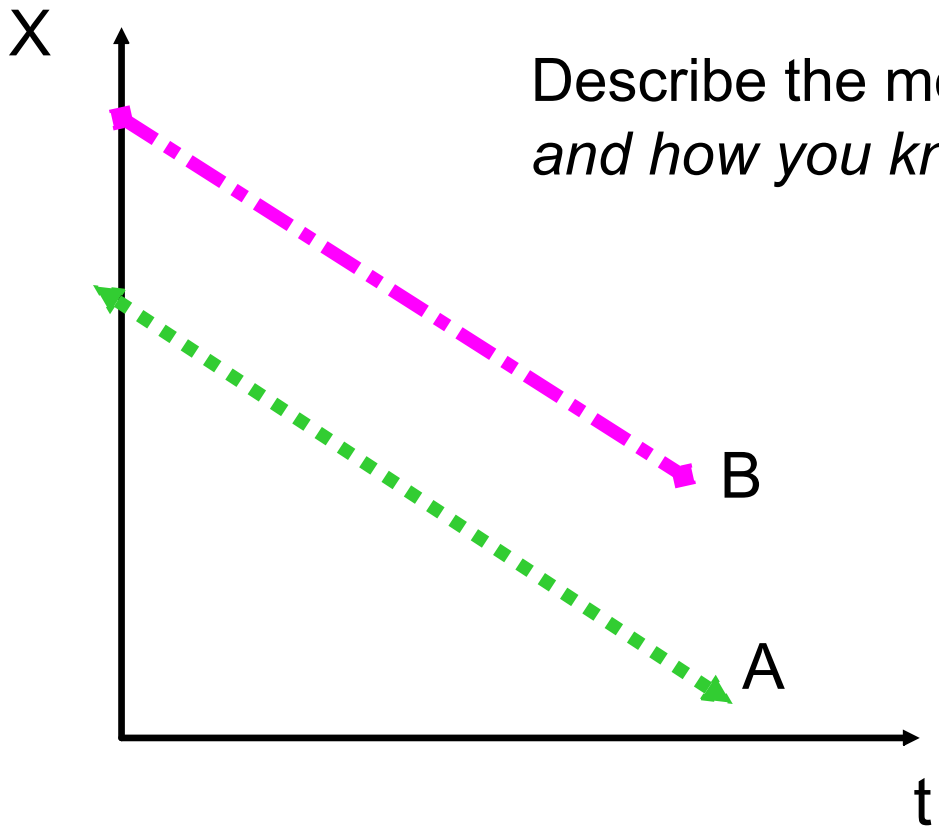
STATION 1:

(If extra time, work on pg. 30 #3)

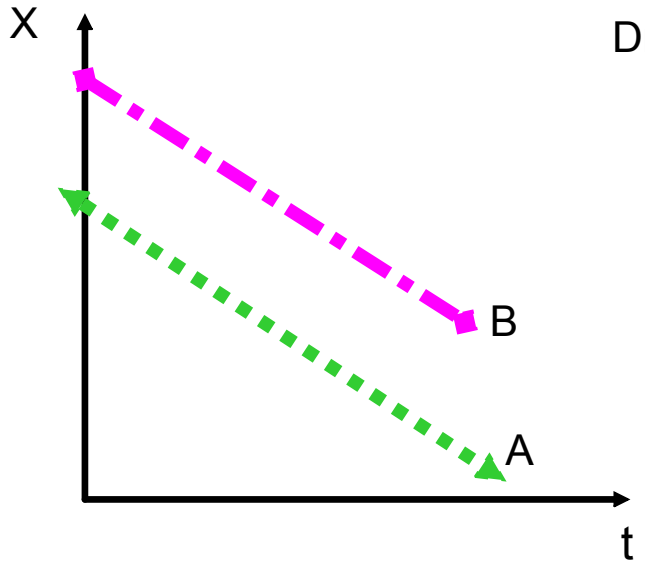
Draw a velocity graph for A and B

Draw a motion map for A and B

Describe the motion of A and B
and how you know

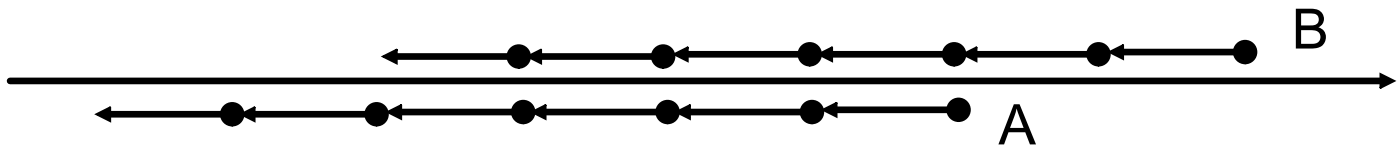


STATION 1:



Draw a velocity graph for A and B

Draw a motion map for A and B



Describe the motion of A and B and how you know.

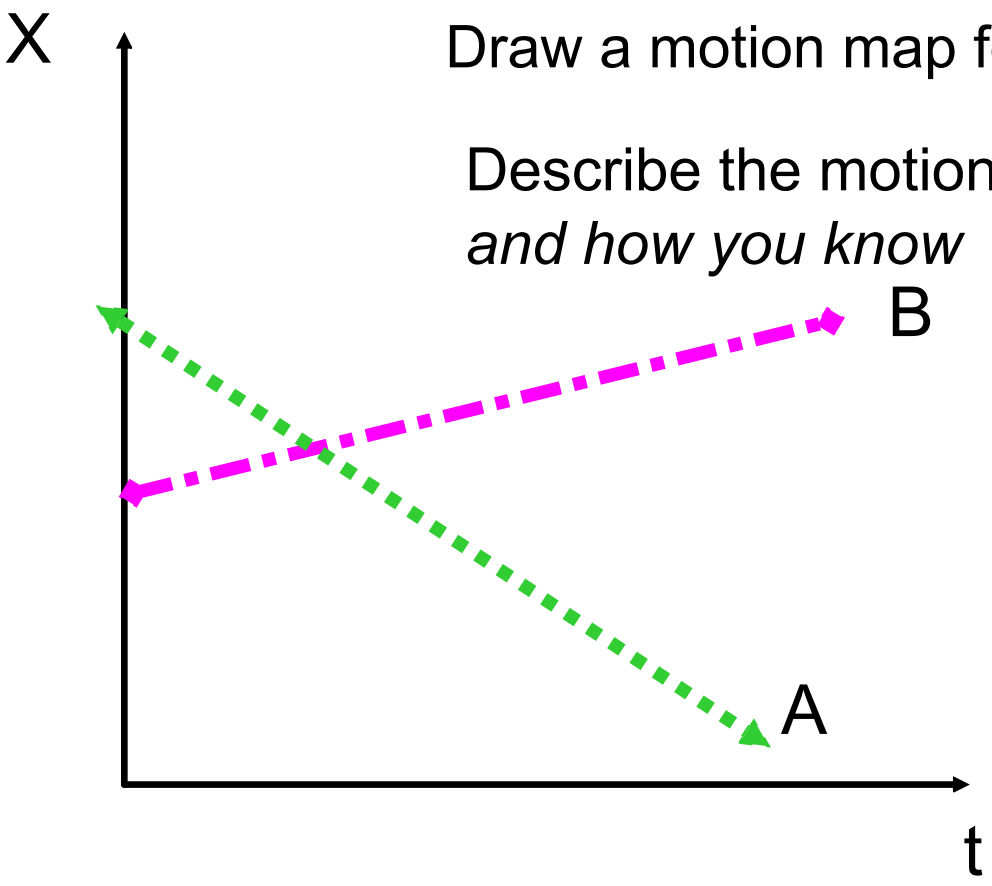
- B and A travel at the same constant negative velocity. I know this because B and A have the same slope.
- B starts further away from zero than A. I know this because B is higher on the Y-axis than A.

STATION 2:

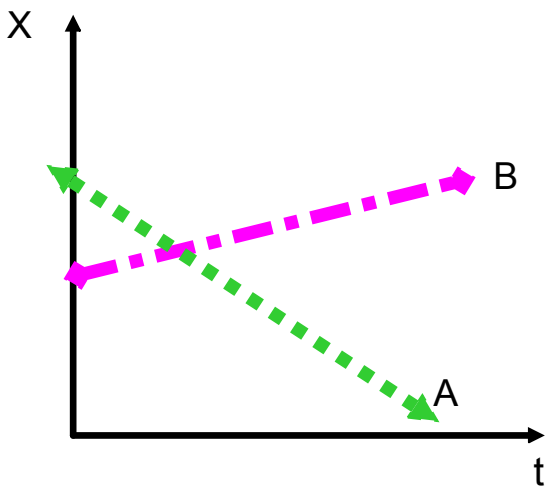
Draw a velocity graph for A and B

Draw a motion map for A and B

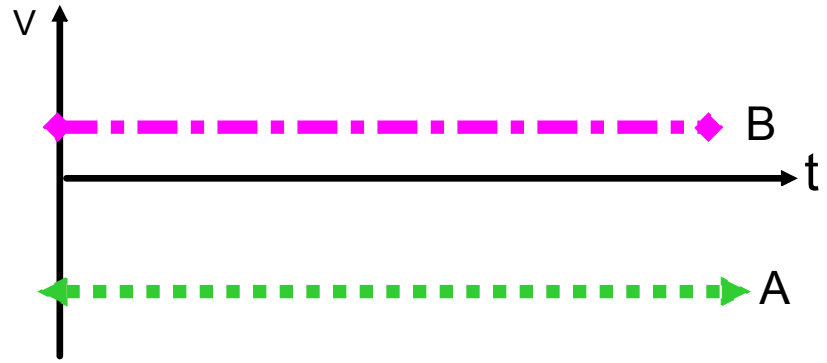
Describe the motion of A and B
and how you know



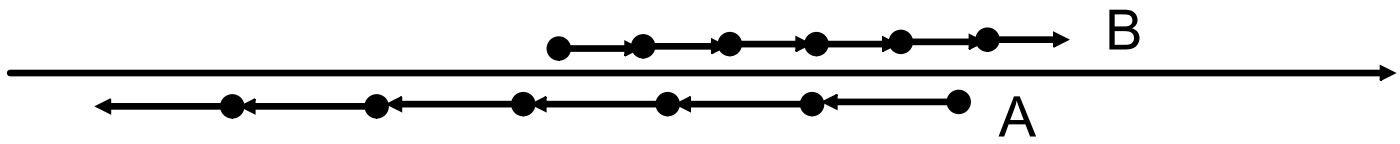
STATION 2:



Draw a velocity graph for A and B



Draw a motion map for A and B

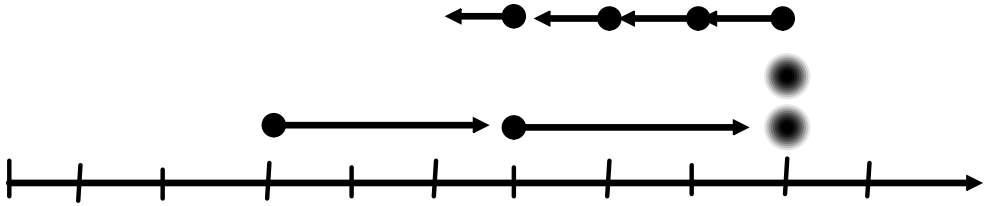


Describe the motion of A and B and how you know.

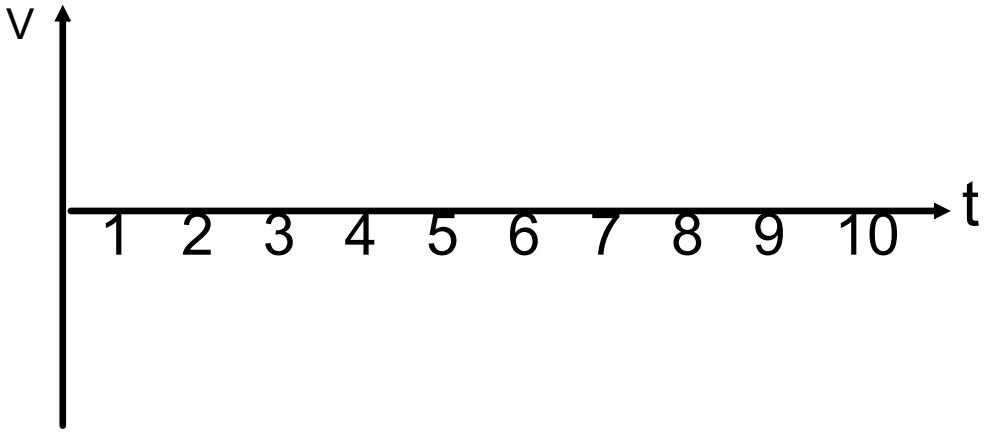
- B starts away from zero and travels at a slow positive velocity
- A starts further away from zero than be and travels toward zero quickly.
- I know this because A has a negative steep slope and B has a positive less steep slope.

STATION 3:

Draw a position vs. time graph for this motion map

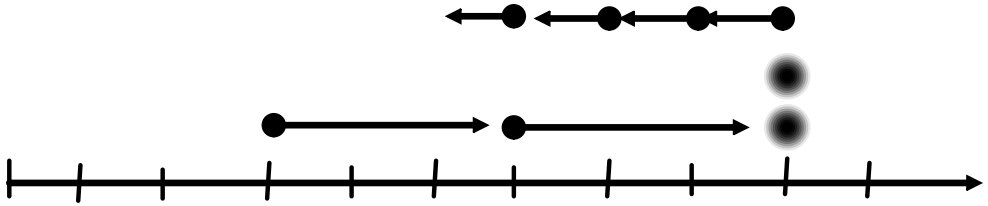


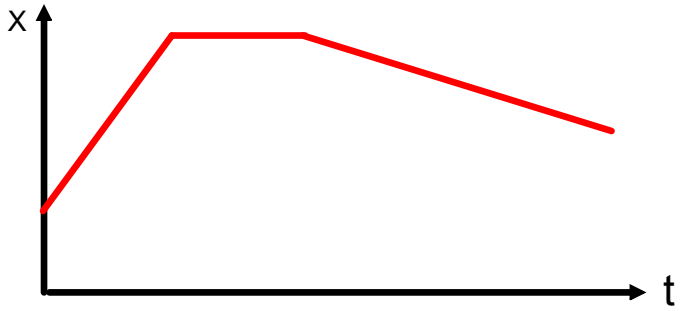
You are driving along at 40 m/s for 10 seconds.
Draw a velocity time graph for this situation.
On the graph, represent the distance you traveled between 4-7 seconds.
How far did you travel during this time?



STATION 3:

Draw a position vs. time graph for this motion map





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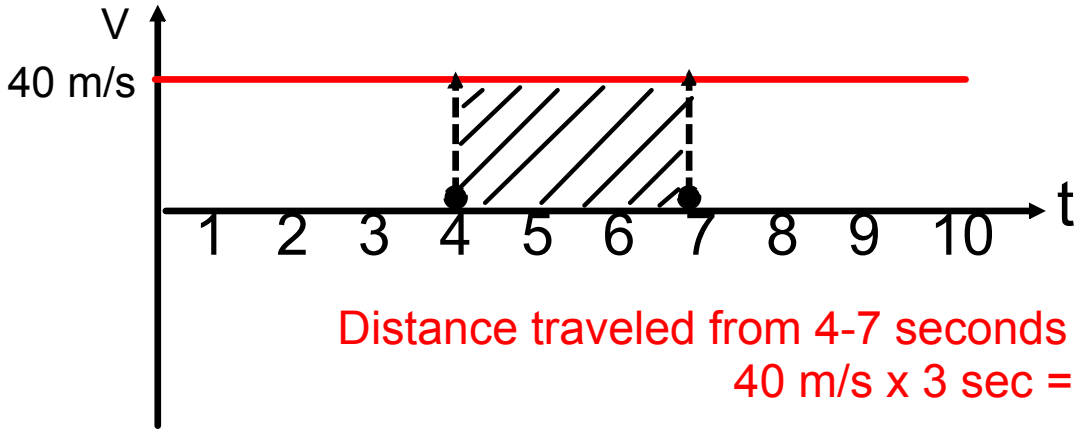


Distance traveled from 4-7 seconds = area under v vs. t graph.
40 m/s x 3 sec = 120 m

STATION 4:

You are running a marathon. You run the first 10 miles, at 4 mi/hr. You forgot to get water at the last rest stop, so you run back 3 miles at 5 mi/hr.
What is your:

a) Trip distance?

b) Displacement?

c) Average speed?

d) Average velocity?

STATION 4:

You are running a marathon. You run the first 10 miles, at 4 mi/hr. You forgot to get water at the last rest stop, so you run back 3 miles at 5 mi/hr. What is your:

a) Trip distance?

10 miles
-3 miles

Distance = 13 total miles

b) Displacement?

+10 miles
-3 miles

Displacement = 7 miles

c) Average speed?

Ave Speed = Distance/Time

*Find total time first

10 miles = 2.5 hr
4 mi/hr

3 miles = .6 hr
5 mi/hr

Total Time = 2.5 + .6 = 3.1 hours

Ave Speed = 13 miles = 4.2 mi/hr
3.1 hrs

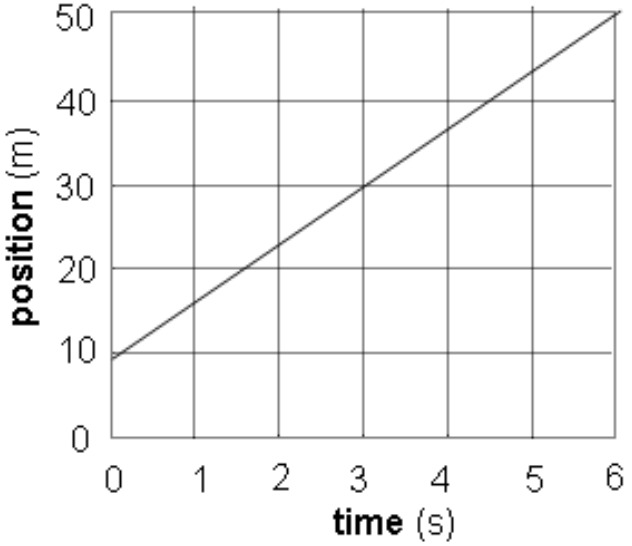
d) Average velocity?

Ave Velocity = Displacement/Time

= 7 miles = 2.5 mi/hr
3.1 hrs

STATION 5:

Determine the **average speed** of the object who produced a graph like the one to the right.

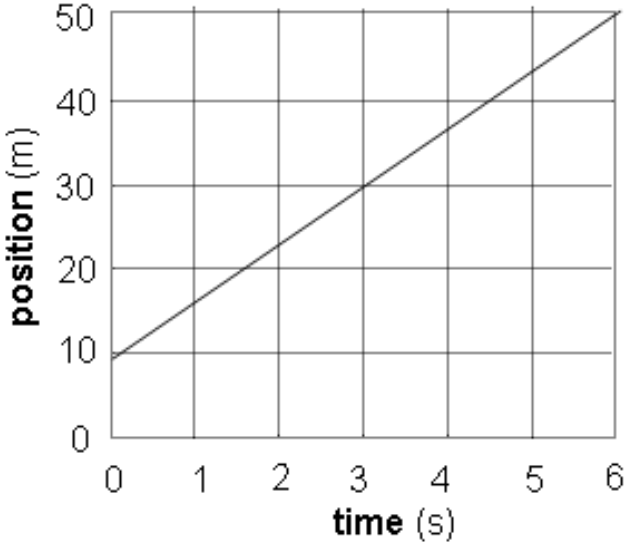


Write a mathematical equation for the relationship between position and time.

Using your mathematical equation, predict the object's location at t = 10 seconds.

STATION 5:

Determine the **average speed** of the object who produced a graph like the one to the right.



Ave speed of X vs. T = Slope

$$\frac{50\text{-}10\ \text{m}}{6\text{-}0\ \text{sec}} = \boxed{6.67\ \text{m/s}}$$

Write a mathematical equation for the relationship between position and time.

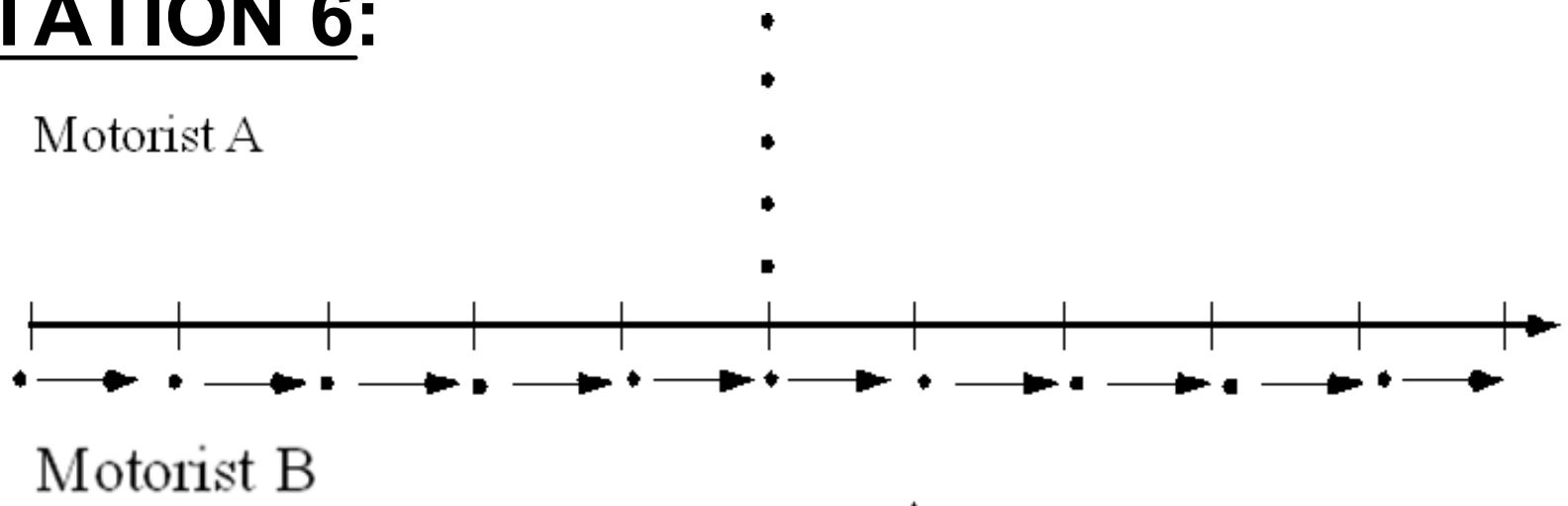
Use $y = mx + b$

$$x = (6.67\text{m/s})t + 10\text{m}$$

Using your mathematical equation, predict the object's location at t = 10 seconds.

$$x = (6.67\text{m/s})(10\text{sec}) + 10\text{m} = \boxed{76.67\text{m}}$$

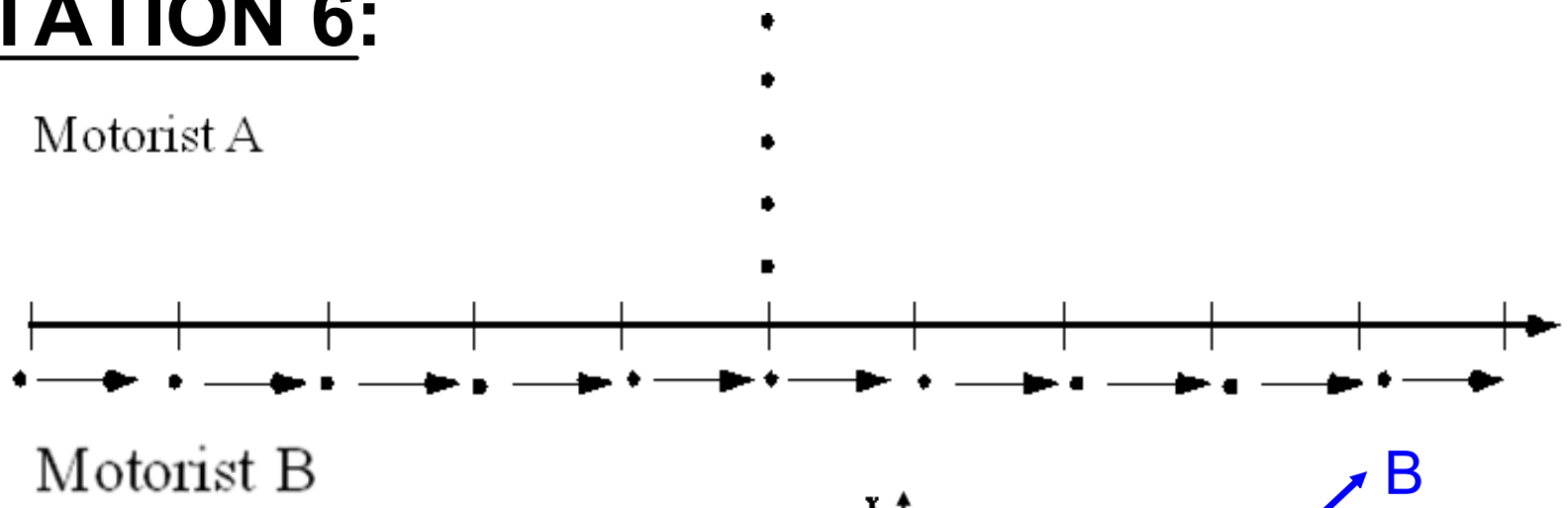
STATION 6:



Make a qualitative position vs. time graph to represent the motion maps above.

Carefully **explain** your reasoning.

STATION 6:



Make a qualitative position vs. time graph to represent the motion maps above.

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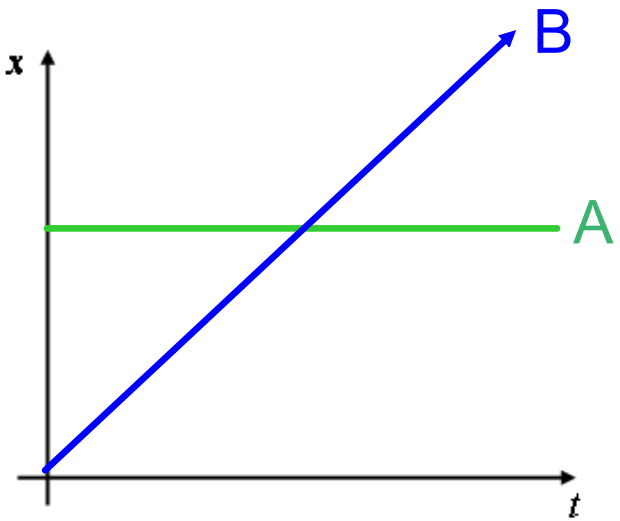
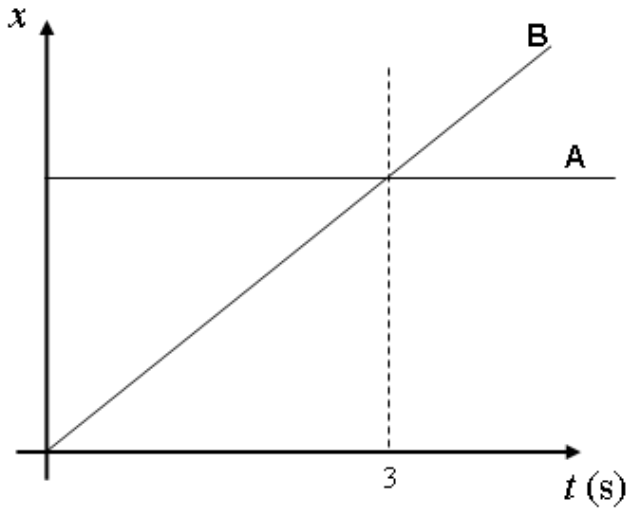


B is traveling at a constant positive velocity because the arrows are equally spaced and in the positive direction. At about halfway toward the end, B passes A which is not moving at some position about halfway between where B starts and ends.

STATION 7:

Student A makes the motion map below for this graph. ⟶

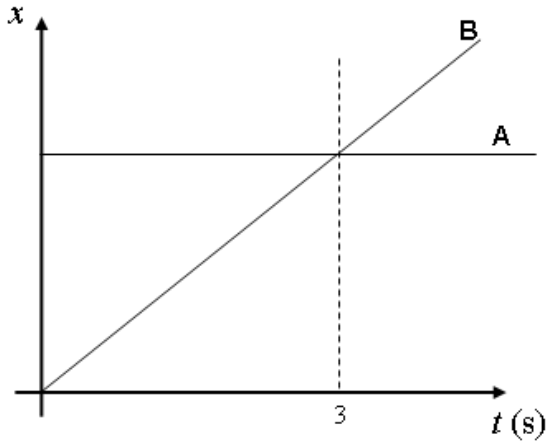


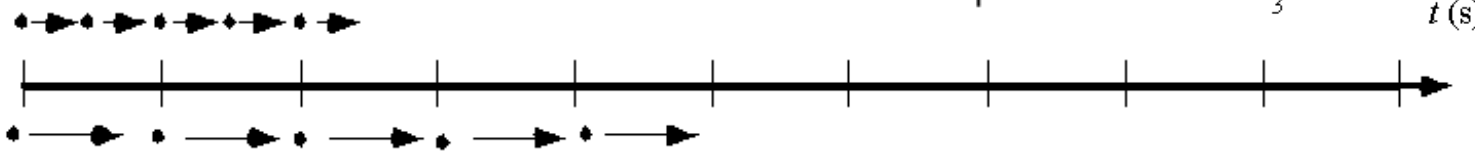
Find any error(s) and correct them.

Explain what, if anything, is wrong with Student A's motion map, and how you corrected the error(s).

STATION 7:

Student A makes the motion map below for this graph. ⟶





Find any error(s) and correct them.

Explain what, if anything, is wrong with Student A's motion map, and how you corrected the error(s).

A's graph is standing still because there is no slope, so the motion map should have dots to represent the motion a little over halfway ahead of where B started.

STATION 8:

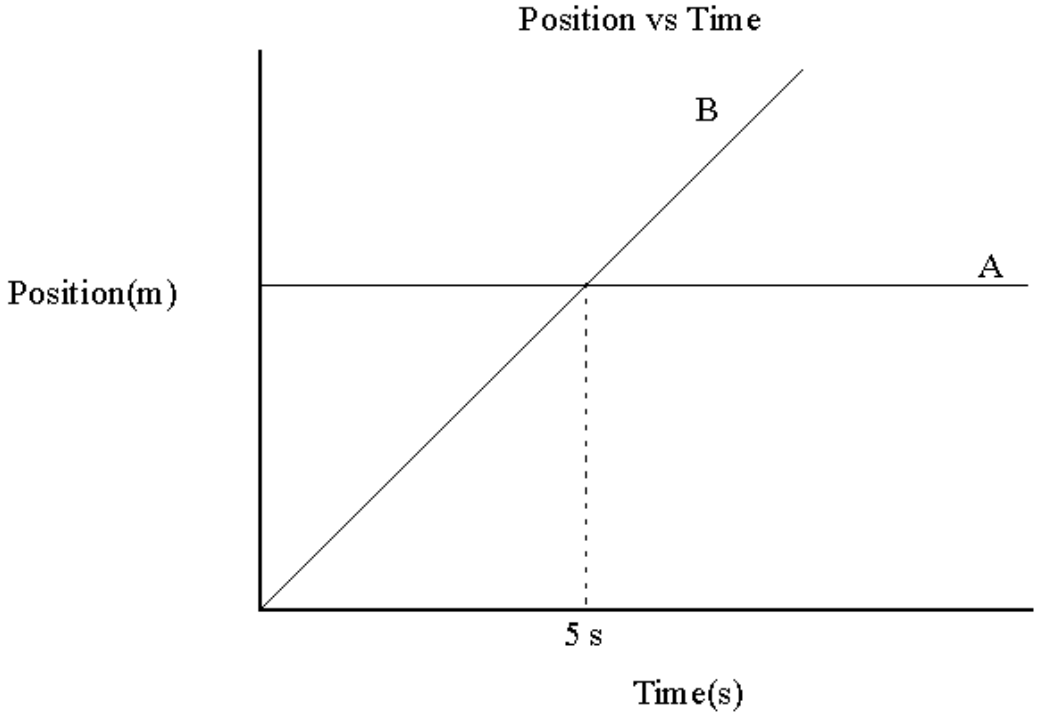
With which, if any, of these students do you agree?

Student A says: Object A moves at a steady pace, while object B increases speed.

Student B says: No, object A and B move the same speed, because they are at the same place at 5.0 s.

Student C says: Yes, A and B are at the same place at 5.0 s, but B over takes A because he is picking up speed.

Consider the position vs. time graph below which shows the motion of objects A and B.



*Write what you **agree** and **disagree** about each of the students responses.

STATION 8:

Consider the position vs. time graph below which shows the motion of objects A and B.

With which, if any, of these students do you agree?

Student A says: Object A moves at a steady pace, while object B increases speed.

Disagree - A is stopped, and B moves at a constant speed.

Student B says: No, object A and B move the same speed, because they are at the same place at 5.0 s.

Disagree - If A and B were moving at the same speed, they would have the same slope (parallel lines).

Agree - They are at the same place at 5.0 sec because they have the same position at that time.

Student C says: Yes, A and B are at the same place at 5.0 s, but B over takes A because he is picking up speed.

Agree - They are at the same place at 5.0 sec because they have the same position at that time.

Disagree - B overtakes A, but B travels at a constant speed while A is stopped.

Station 9:

There are two motorists, A and B. A is at a stop light waiting for it to change, while motorist B passes by at 3.8 m/s. It takes motorist B 5.0 s to pass through the intersection. How wide is the intersection?

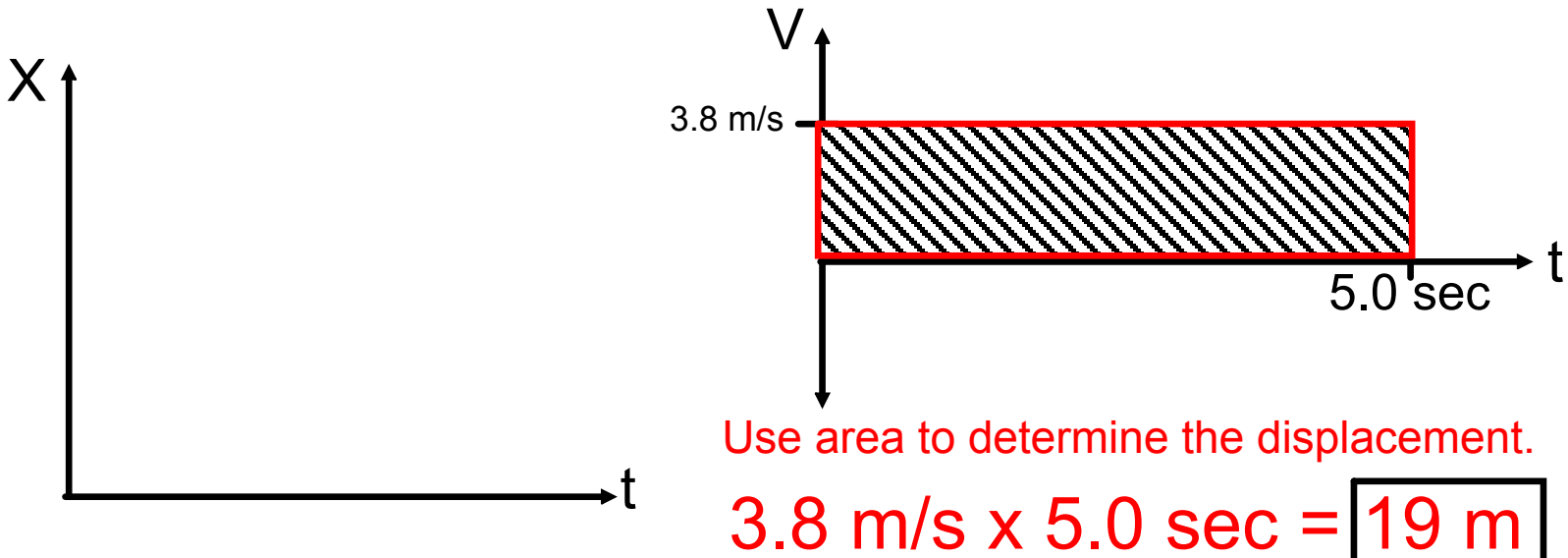
Draw a graph first.

Station 9:

There are two motorists, A and B. A is at a stop light waiting for it to change, while motorist B passes by at 3.8 m/s. It takes motorist B 5.0 s to pass through the intersection. How wide is the intersection?

Draw a graph first.

The velocity is given, so draw a velocity graph.



Use area to determine the displacement.

3.8 m/s x 5.0 sec = 19 m

The intersection is 19 meters wide.

STATION 10

Mack is running south at 5 m/s and Adam is running north at 6 m/s. At time t= 0, Adam is 150 m away from Mack.

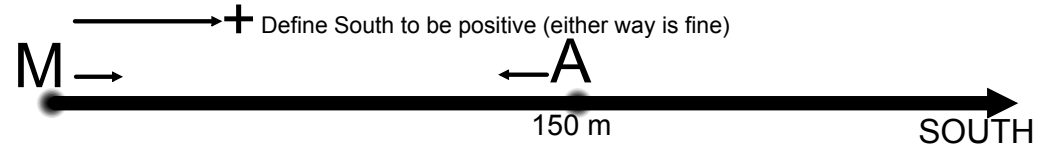
A) How much time has passed when they meet?

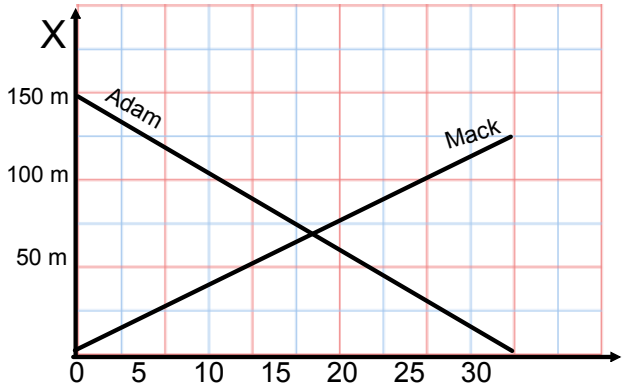
B) At what position do they meet?

STATION 10

A) How much time has passed when they meet?

B) At what position do they meet?





$X_f = \vec{v}t + X_o$

Mack:
X_{fM} = ?
v = +5 m/s
t = ?
x_o = 0m

Adam:
X_{fA} = ?
v = -6 m/s
t = ?
x_o = +150m

$X_{fM} = (+5m/s)t + 0m$ $X_{fA} = (-6m/s)t + 150m$

*When Mack and Adam meet, X_{fM} and X_{fA} are equal.
(They are at the same position.)

$(+5m/s)t + 0m = (-6m/s)t + 150m$

$(11m/s)\ t = 150m$

t = 13.6 seconds have passed when they meet.

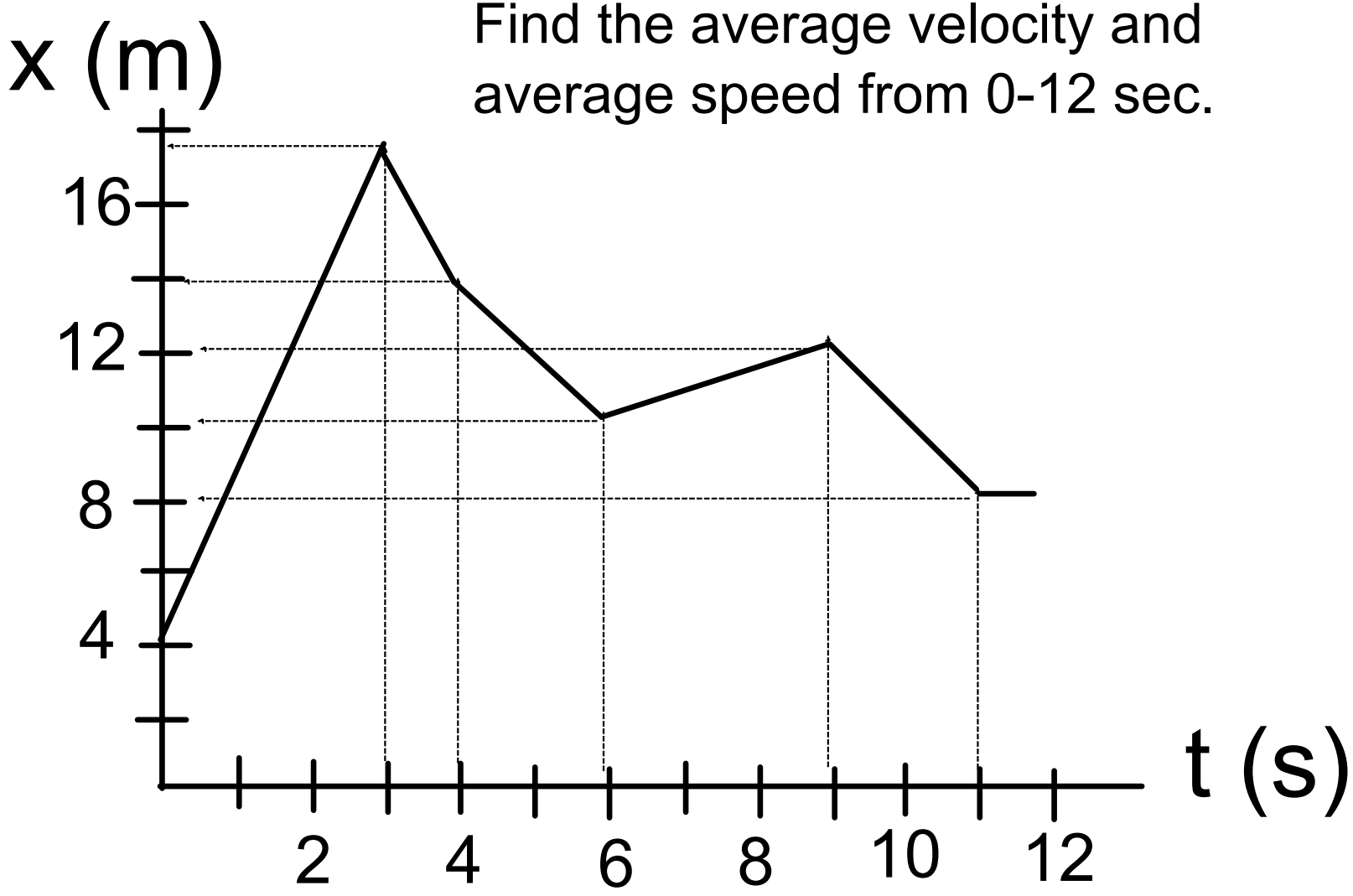
Take t and plug into one of the equations to find out their position.

$X_{fM} = (+5m/s)(13.6sec) + 0m = 68.2$ meters

They are at 68.2 meters from zero position when they meet.

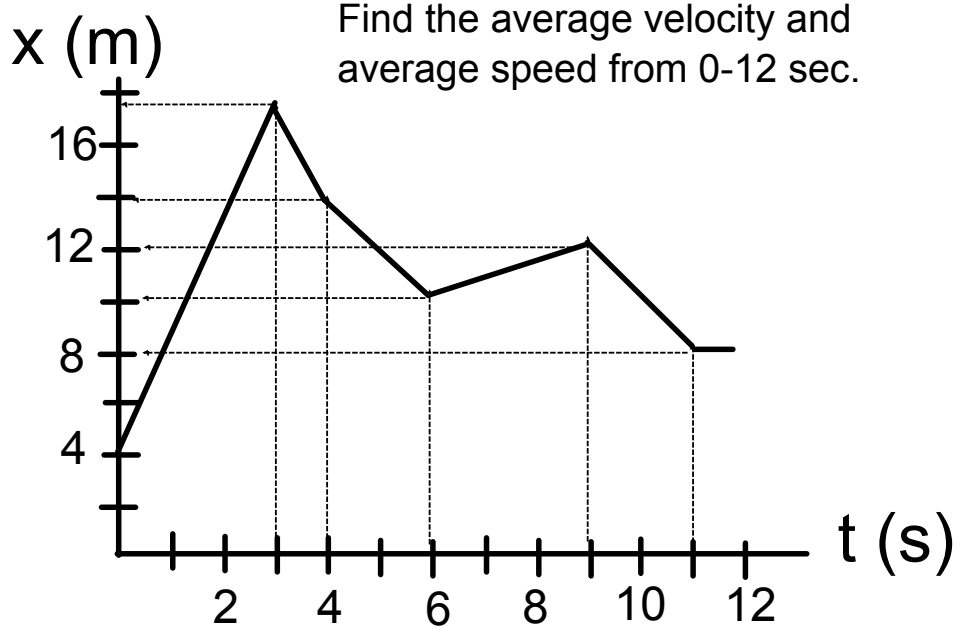
STATION 11

Find the average velocity and average speed from 0-12 sec.



STATION 11

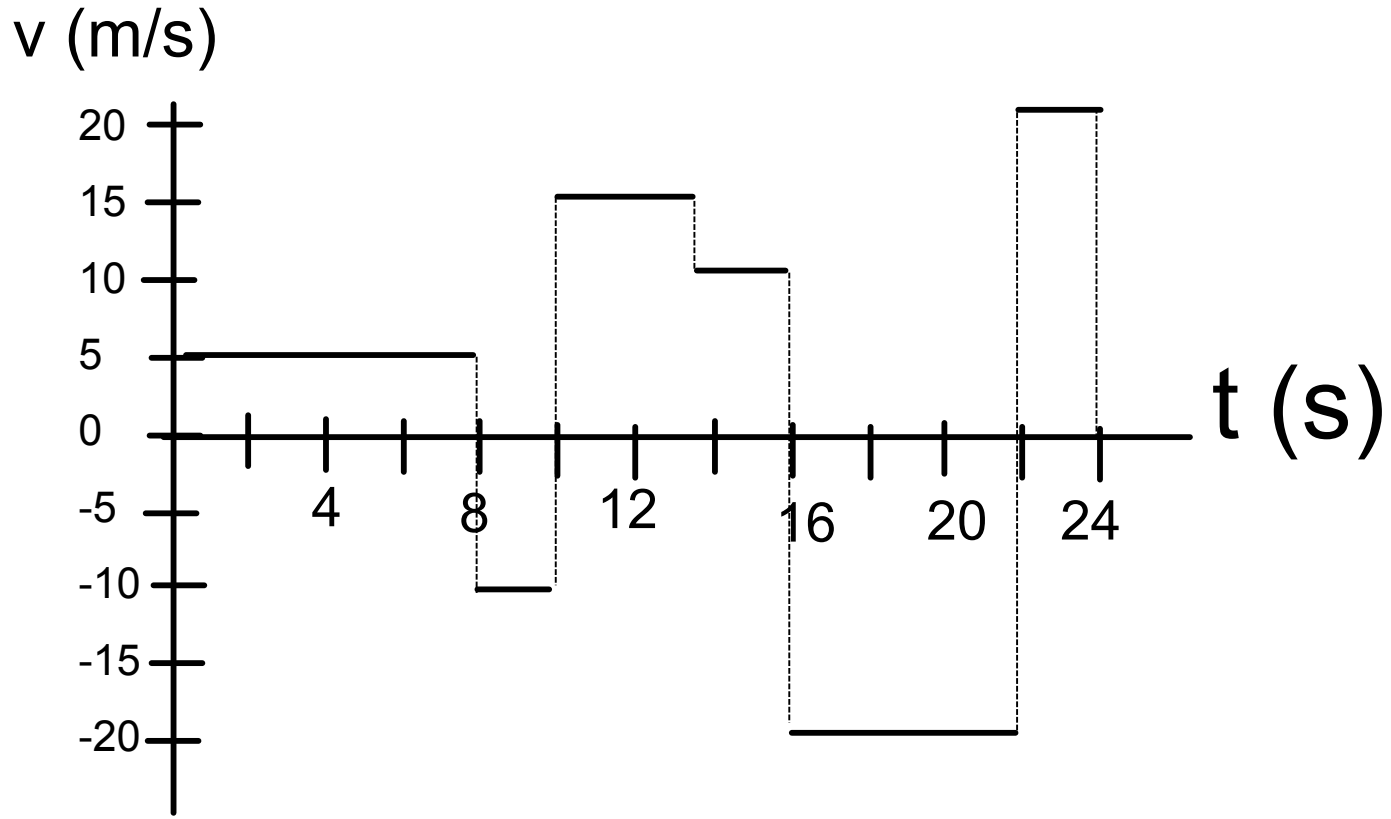
Find the average velocity and average speed from 0-12 sec.



$$\text{Ave } v = \vec{\bar{v}} = \frac{\Delta x}{\Delta t} = \frac{8 - 4\text{m}}{12\text{s}} = \frac{4\text{m}}{12\text{s}} = \boxed{.33 \text{ m/s}}$$

$$\text{Ave Speed} = v = \frac{d}{t} = \frac{28 \text{ m}}{12\text{s}} = \frac{28}{12} = \boxed{2.33 \text{ m/s}}$$

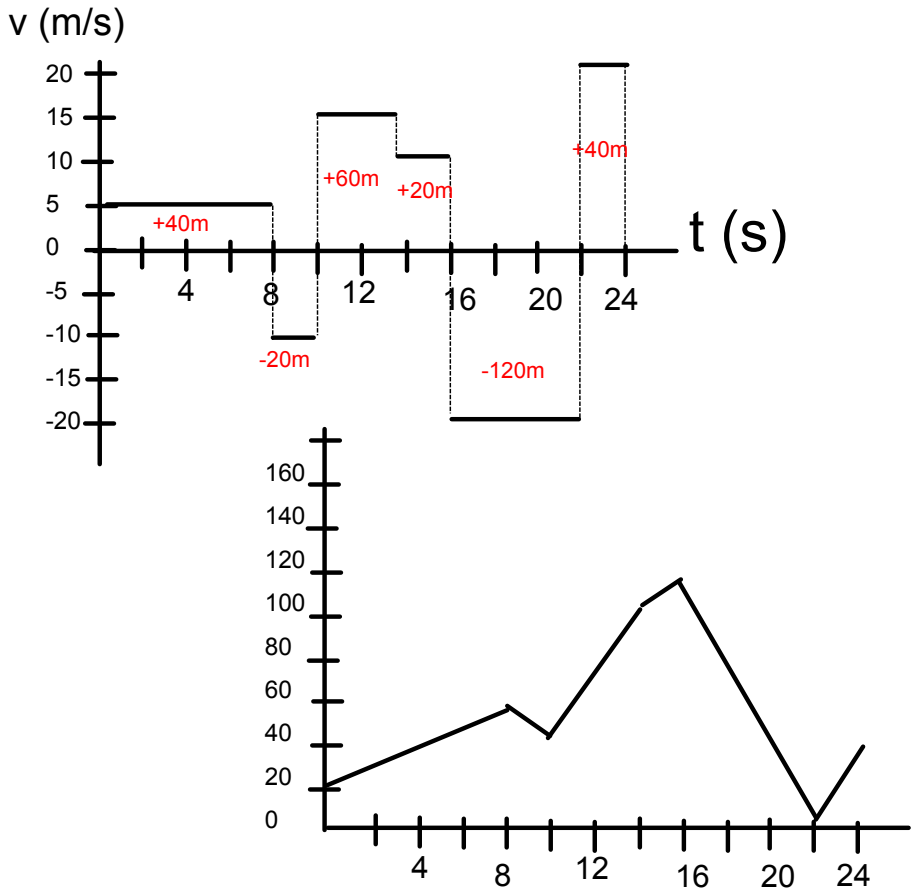
STATION 12



Draw the x vs. t graph displacement of the object that produced this velocity vs time graph.

What is the total displacement?

STATION 12



Draw the x vs. t graph displacement of the object that produced this velocity vs time graph.

What is the total displacement?

40-20+60+20-120+40 = +20m