

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

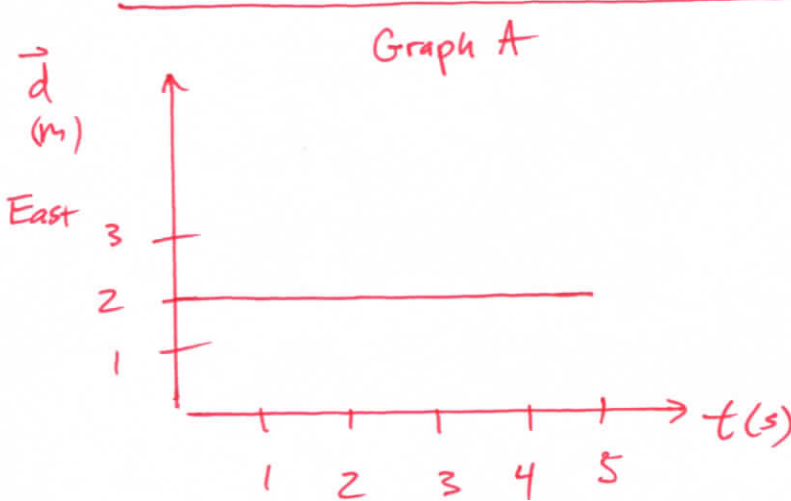
Find the slope

m: _____

What is the unit of slope?

unit: _____

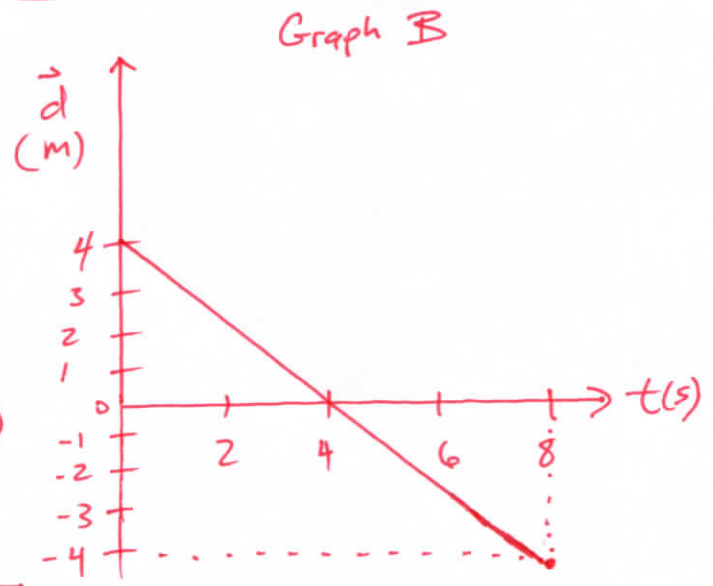
Where have you seen this unit before?



What is the slope of Graph A? _____

What is the distance traveled? _____

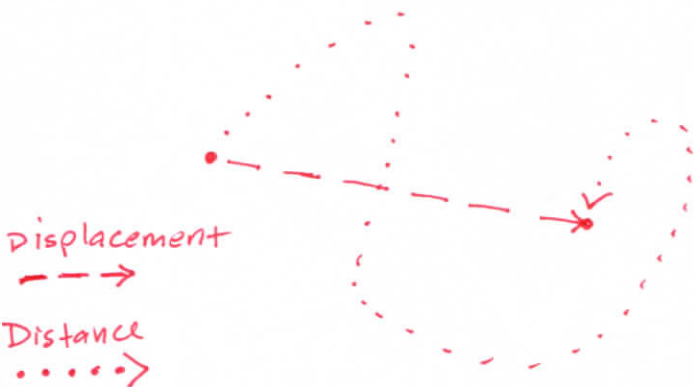
What is the displacement? _____



Slope of Graph B: _____

Distance traveled: _____

Displacement: _____

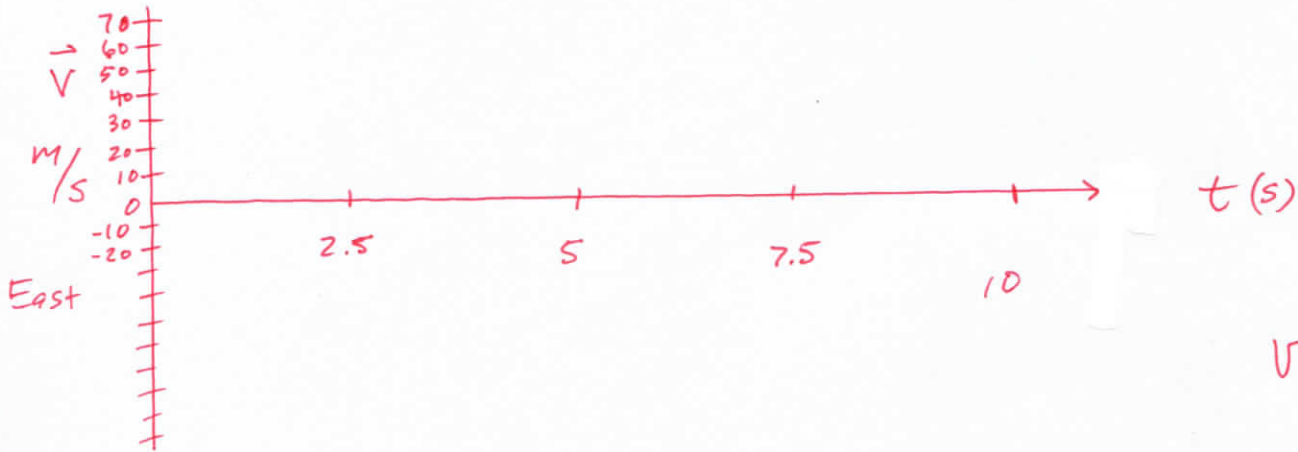
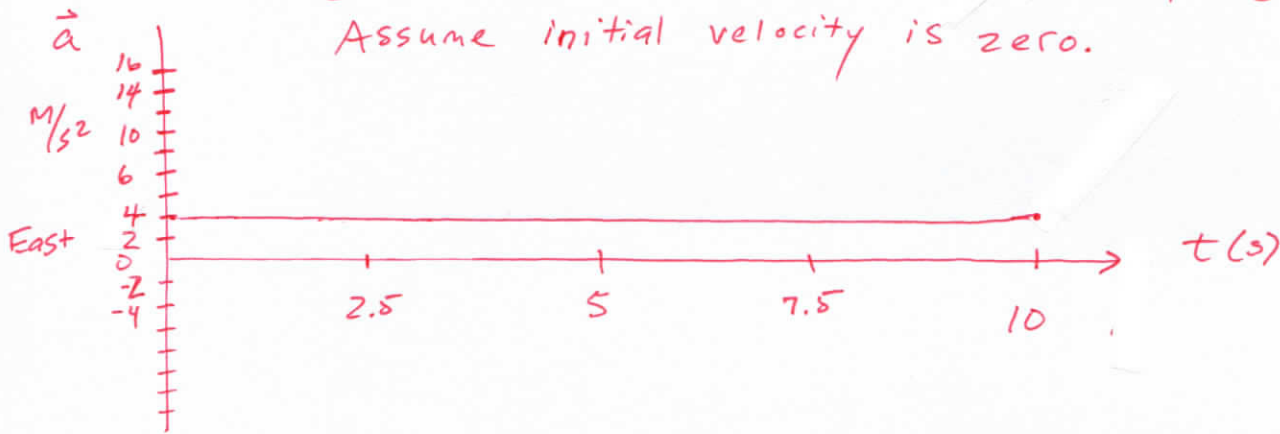


Displacement is the shortest distance from initial to final position.

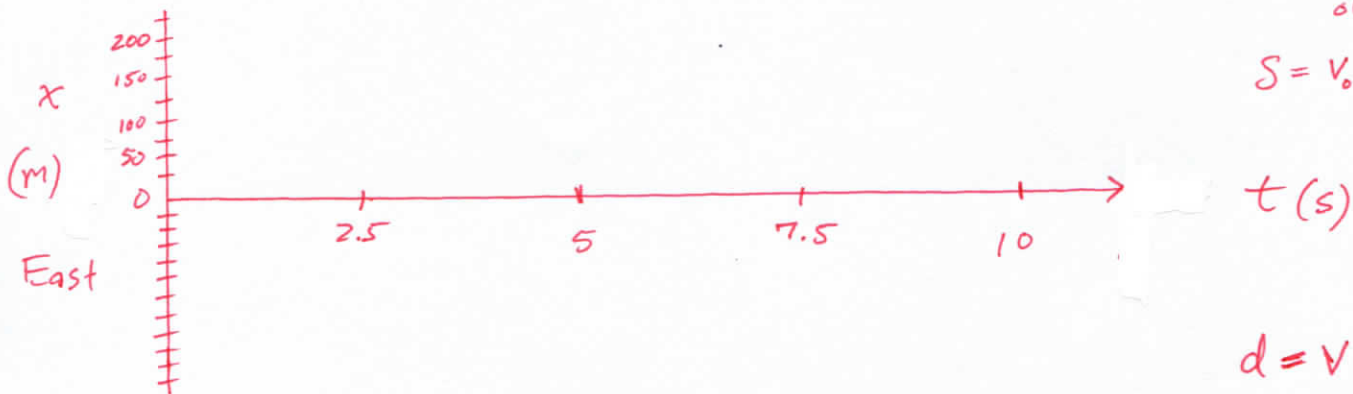
Distance is the length traveled from initial to final position.

* Distance is a scalar. Displacement is a vector.

Constant Acceleration until time 10 seconds.
Assume initial velocity is zero.



$$v = a \cdot t$$



$$d = \frac{1}{2} a t^2$$

or

$$s = v_0 t + \frac{1}{2} a t^2$$

$$d = v \cdot t$$

Was velocity constant?

What if you take the derivative of the distance / time equation?

What if you take another derivative?

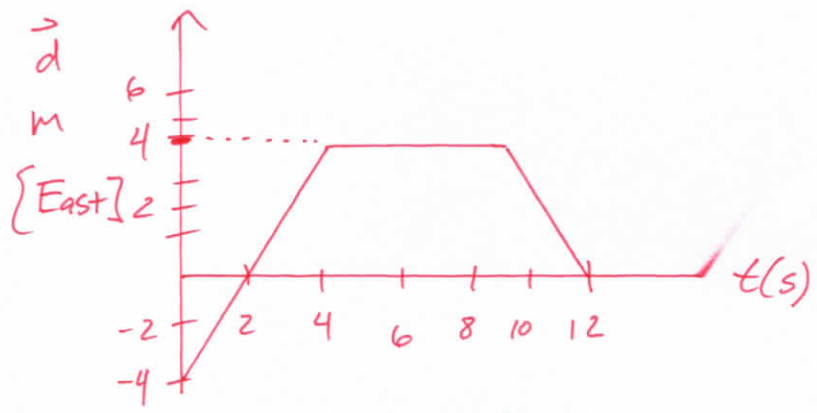
What is wrong? $d = (a \cdot t)(t)$



~~$d = a t^2$~~ WRONG!

WHY?

Position v. time



Find the velocity for all three sections.

A:

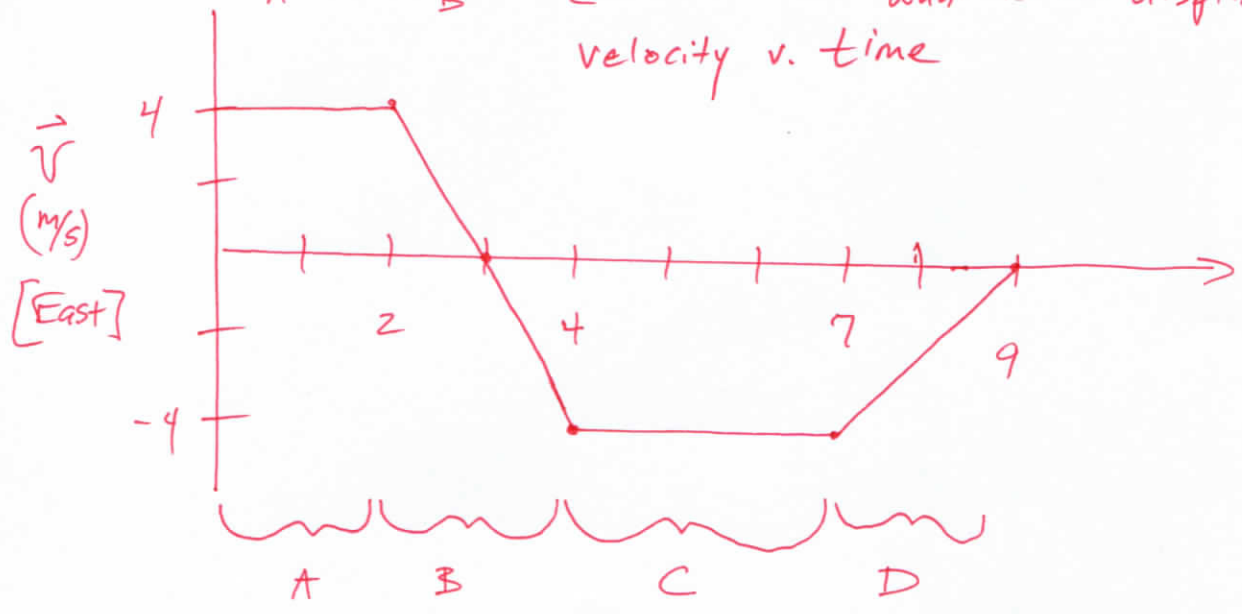
B:

C:

What is the distance? _____

What is the displacement? _____

Velocity v. time



Give the distance traveled during intervals A, B, C and D.

A: _____ B: _____ C: _____ D: _____

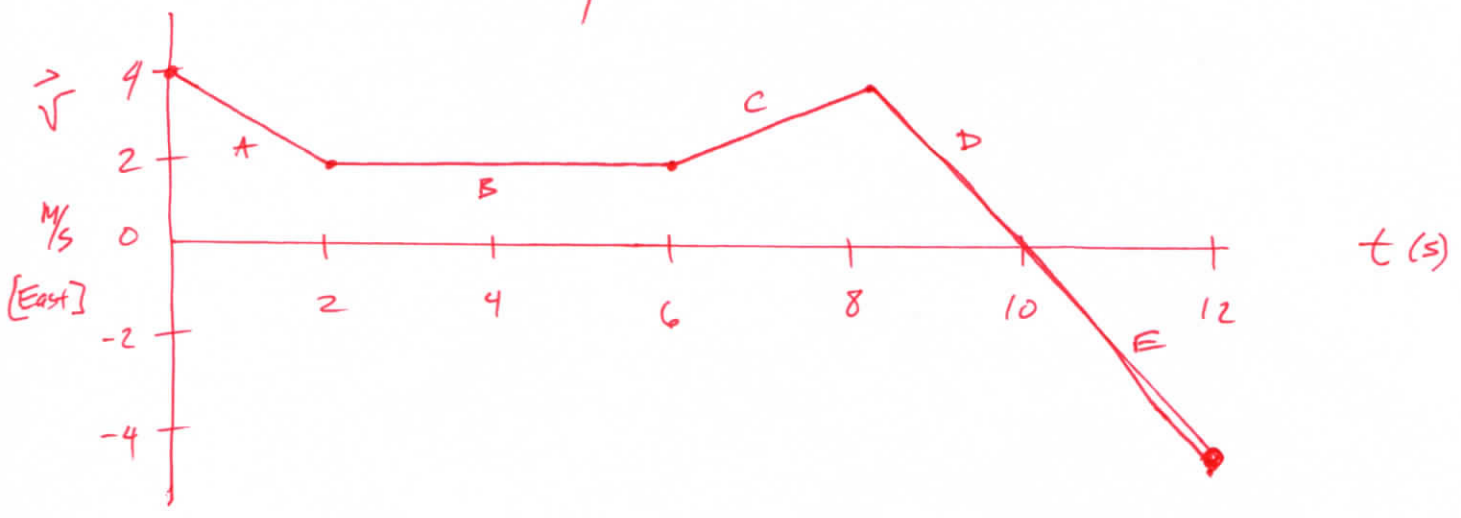
What is the total distance traveled? _____

What is the displacement? _____

What was the velocity? _____

What was its speed? _____

Velocity v. time



	A	B	C	D	E
Slope (+, -, 0)					
Accelerating?					
Direction of velocity					
SU, SD, C					
Acceleration					

SU = speed up
 SD = slow down
 C = constant

+ = positive slope
 - = negative slope
 0 = zero slope

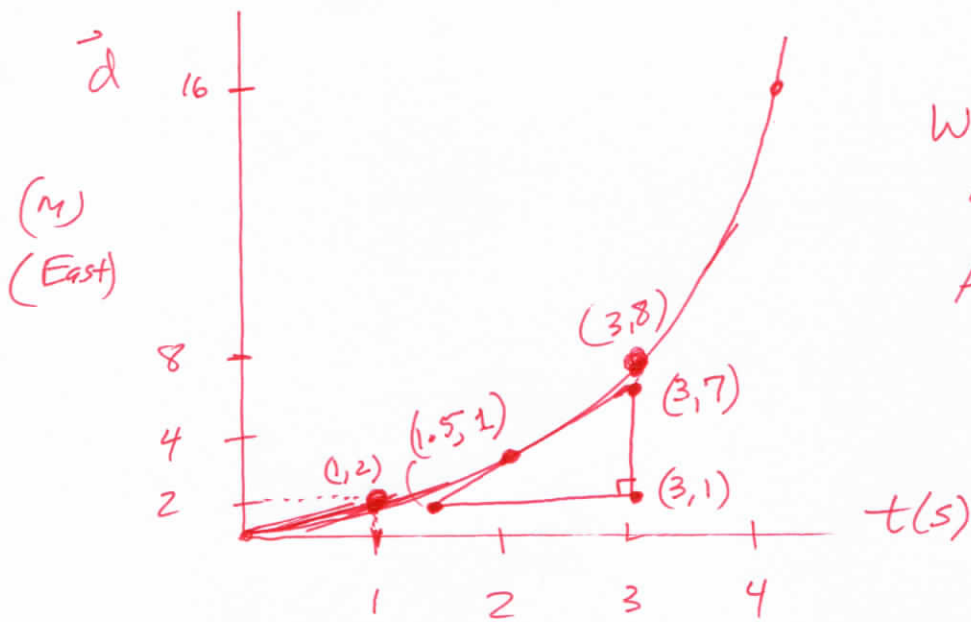
$$a = \frac{V_f - V_i}{\Delta t}$$

$V < 0$	$V > 0$	$V > 0$	$V < 0$
and	and	and	and
$a > 0$	$a < 0$	$a > 0$	$a < 0$
Slowing down	Slowing down	Speeding up	Speeding up

If velocity and acceleration vectors are in the same direction, you are speeding up. Opposite directions, you are slowing down.

Position v. time

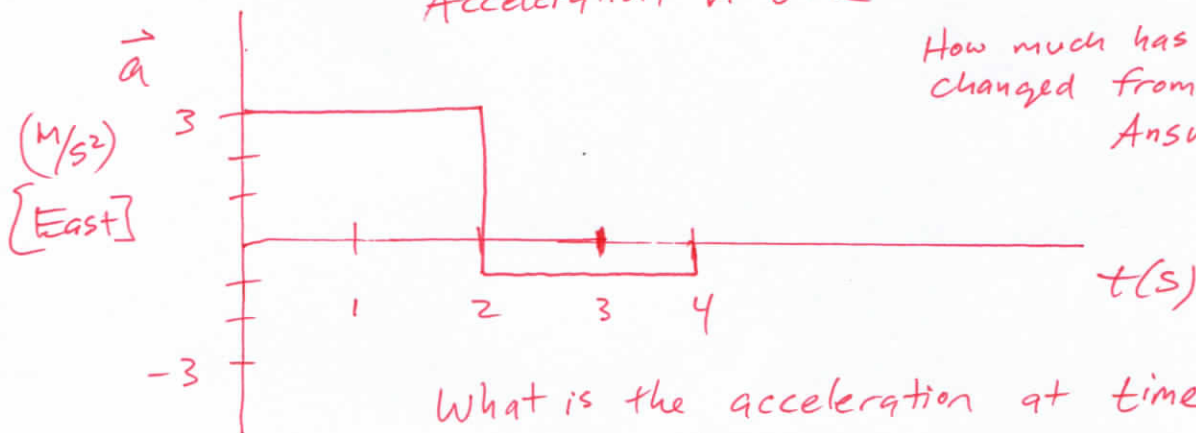
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What is the velocity at 2 seconds?

Answer: _____

Acceleration v. time



How much has velocity changed from $t=0$ to $t=2$?

Answer: _____

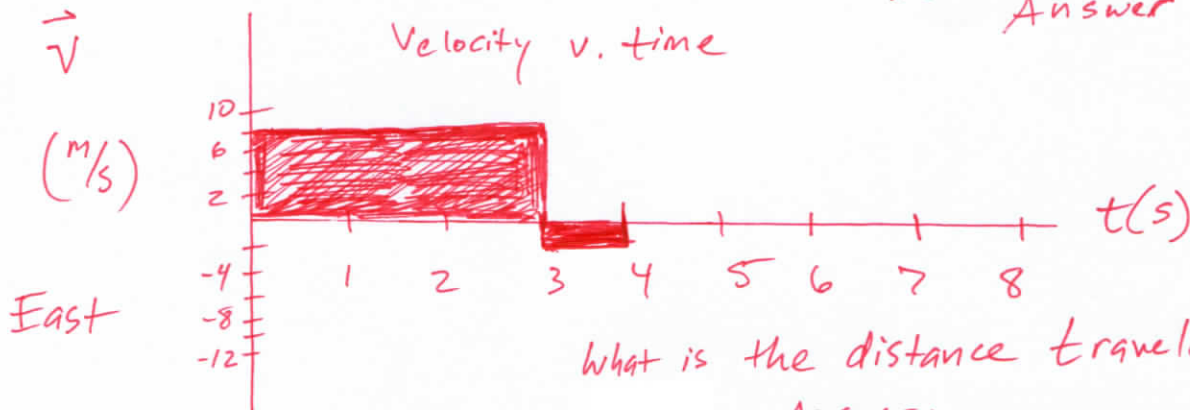
What is the acceleration at time 3?

Answer: _____

Which direction is the acceleration vector at time 3 seconds?

Answer: _____

Velocity v. time

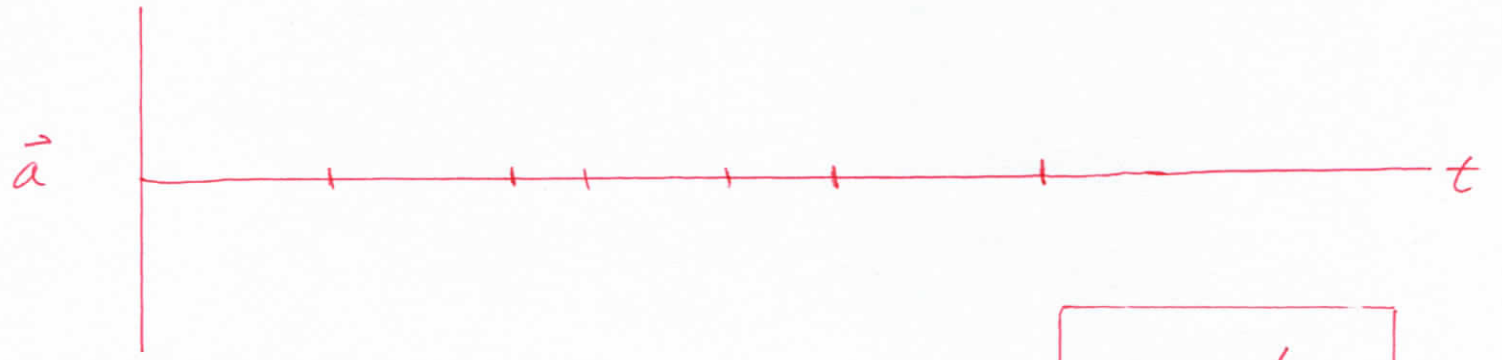
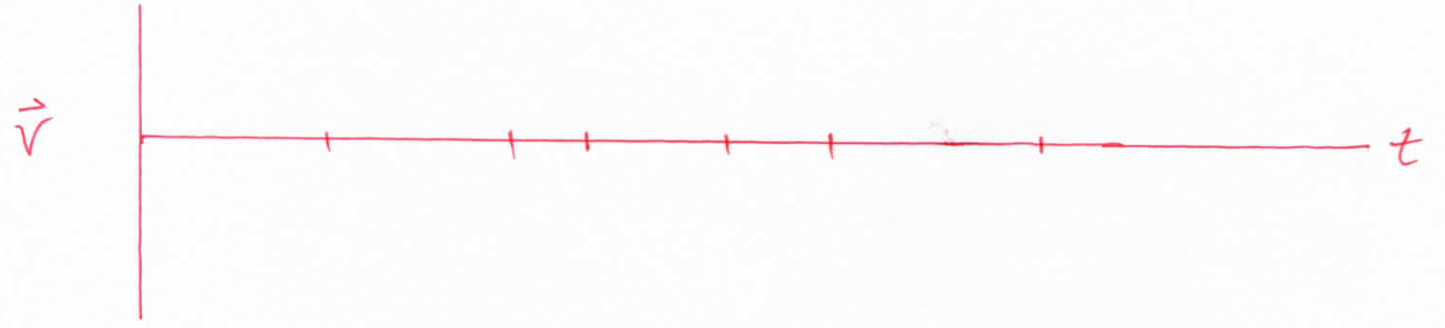
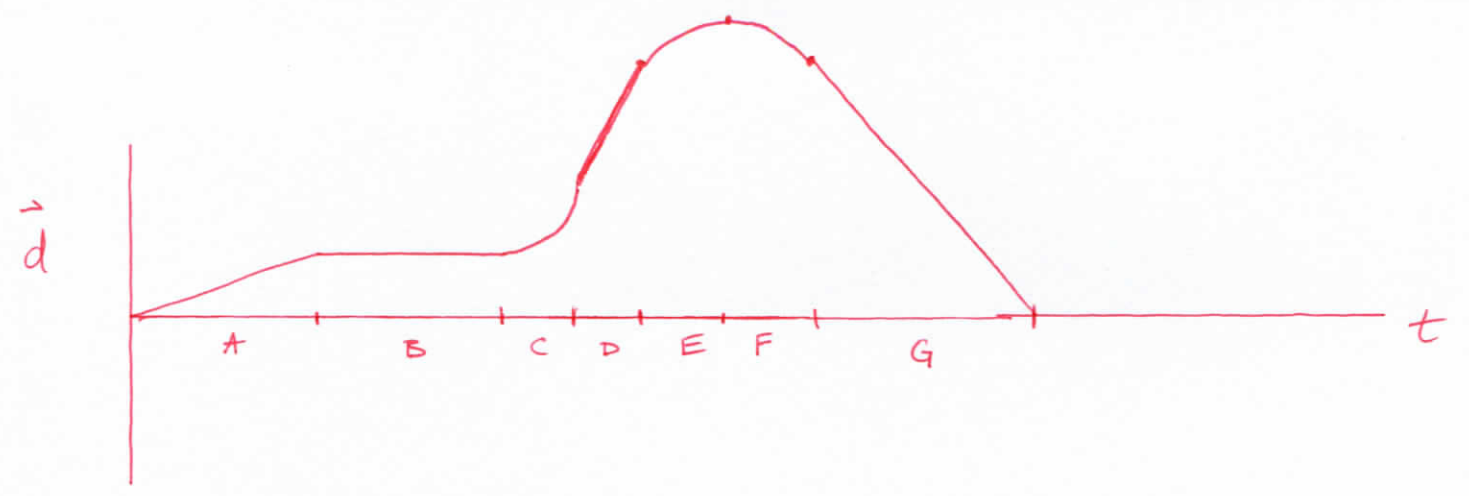


What is the distance traveled?

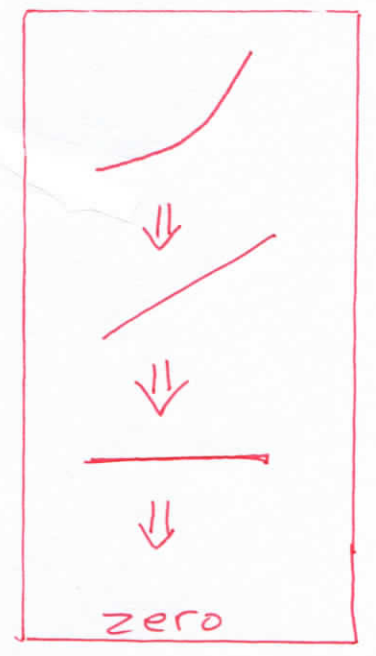
Answer: _____

What is the total displacement?

Answer: _____



area Δ \rightarrow distance v. time \rightarrow slope
area Δ \rightarrow velocity v. time \rightarrow slope
area Δ \rightarrow acceleration v. time \rightarrow slope

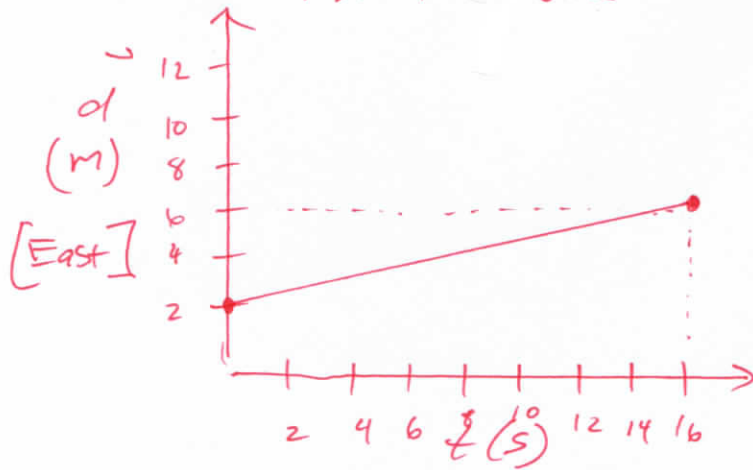


Given the Velocity v. Time Graph, create the Distance v. Time Graph.



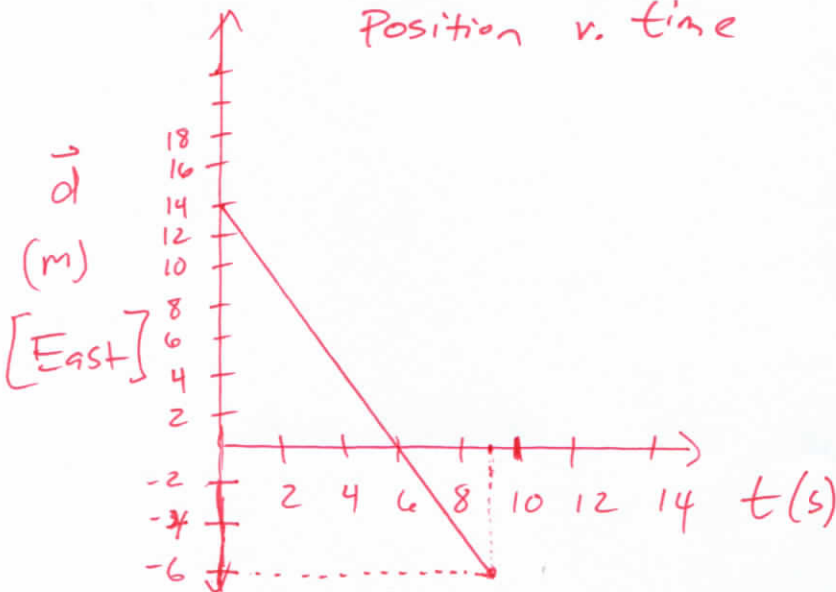
What is the velocity based on the distance v time graphs?

Position v time



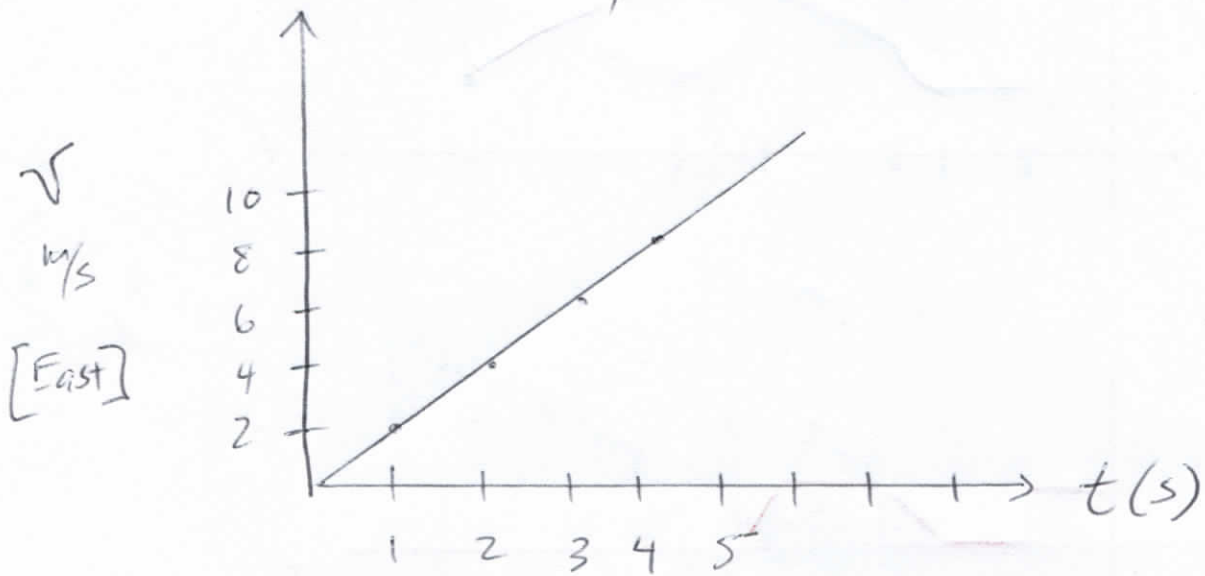
Answer: _____

Position v. time



Answer: _____

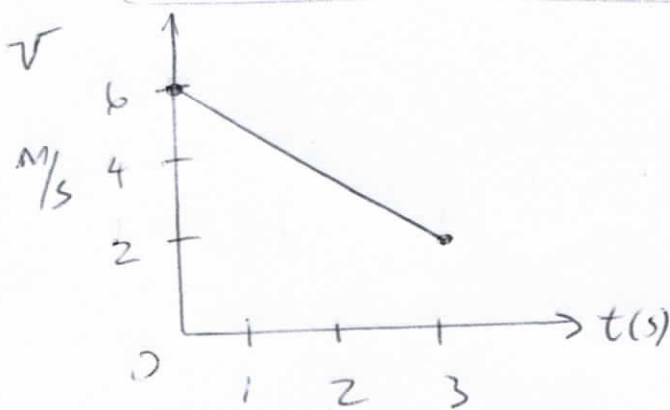
Velocity v time Graph



Find the slope: _____

What is the unit for slope? _____

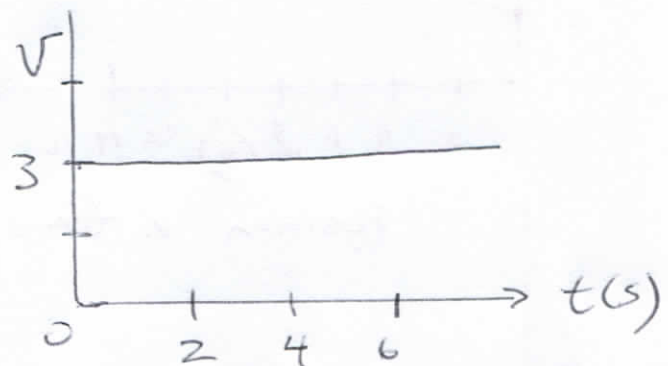
Where have you seen this unit before?



What is the acceleration?

Is the object:

- Speeding up
- slowing down
- neither



What is the acceleration?

Is the object:

- speeding up
- slowing down
- neither