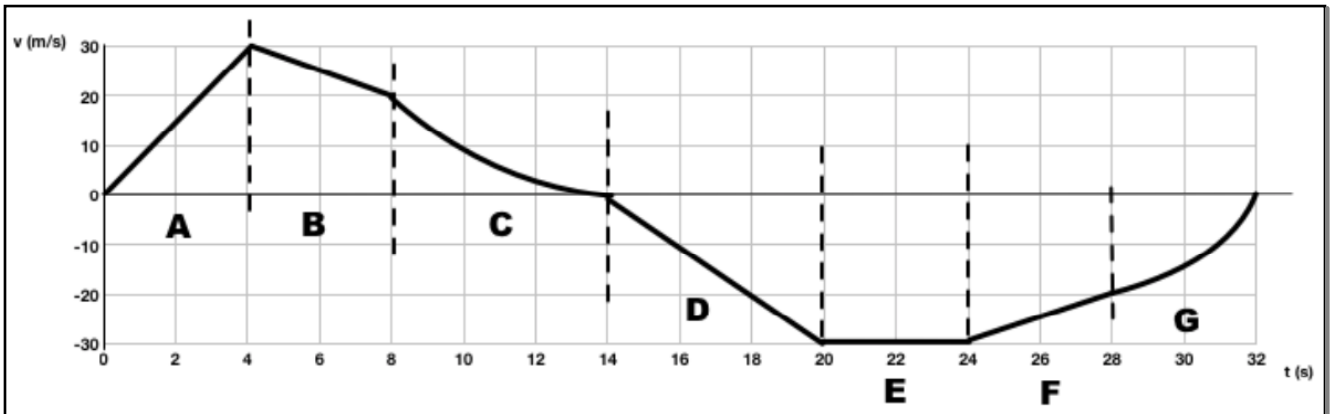
Terminology & Reminders

Magnitude = number, ignoring sign (direction)

On a velocity graph:

- positive velocity = moving right (or up)
- negative velocity = moving left (or down)
- slope is acceleration
- area between graph & zero line is Δx

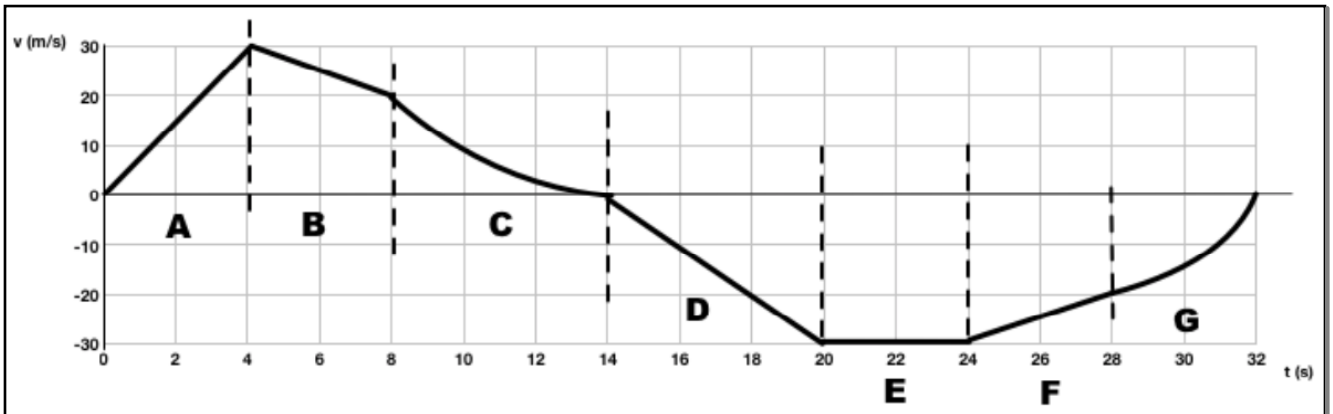


Regions with positive velocity	
Regions with negative velocity	

Regions with positive acceleration	
Regions with negative acceleration	
Regions of zero acceleration	

Moments of zero velocity	
Instants of turn-arounds	

Regions of non-constant (changing) acceleration	

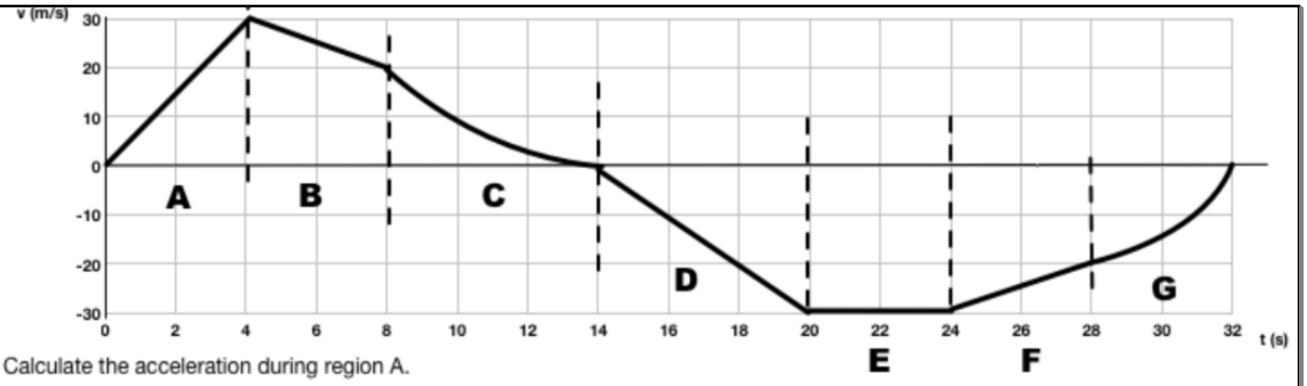


Regions with positive velocity	**A, B, C**
Regions with negative velocity	**D, E, F, G**

Moments of zero velocity	**t = 14 s, 32 s**
Instants of turn-arounds	**t = 14 s**

Regions with positive acceleration	**A, F, G**
Regions with negative acceleration	**B, C, D**
Regions of zero acceleration	**E**

Regions of non-constant (changing) acceleration	**C, G**



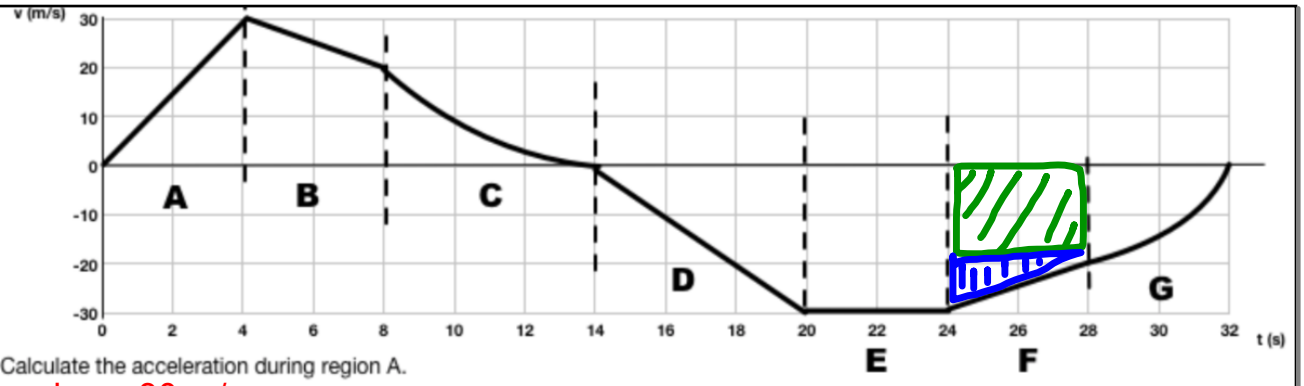
Calculate the acceleration during region A.

Calculate the acceleration during region B.

Calculate the average acceleration during region C.
(Why do you think we have to say "average" here?)

Calculate the change in position during region F.

At what moment is the object the farthest to the right of where it started at t = 0?



Calculate the acceleration during region A.

rise: +30 m/s
run: 4 sec

$$\frac{+30 \text{ m/s}}{4 \text{ s}} = +7.5 \text{ m/s}^2$$

Calculate the acceleration during region B.

rise: -10 m/s
run: 4 sec

$$\frac{-10 \text{ m/s}}{4 \text{ s}} = -2.5 \text{ m/s}^2$$

Calculate the average acceleration during region C.
(Why do you think we have to say "average" here?)

rise: -20 m/s
run: 6 sec

$$\frac{-20 \text{ m/s}}{6 \text{ s}} = -3.33 \text{ m/s}^2$$

Calculate the change in position during region F.

rectangle:

bh = (4 s)(-20 m/s) = -80 m

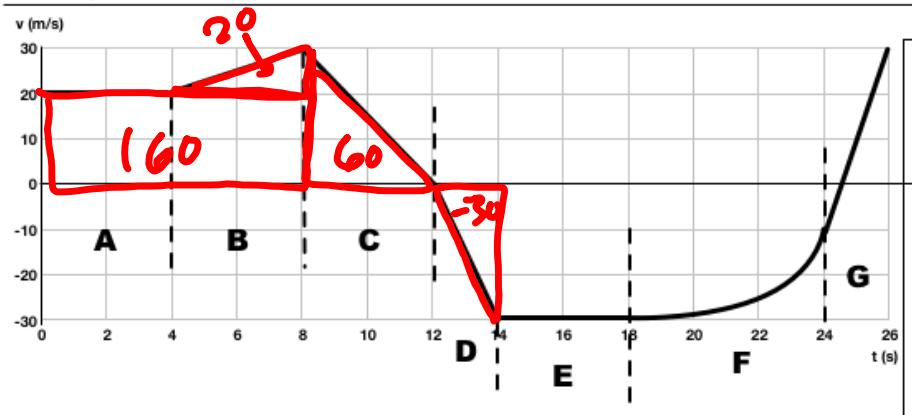
triangle:

1/2bh = 1/2(4 s)(-10 m/s) = -20 m

total = -100 m

At what moment is the object the farthest to the right of where it started at t = 0?

t = 14 s (most positive area up to that point.)



Regions of + velocity:
A, B, C, part of G

Regions of - velocity:
D, E, F, part of G

Regions of + accel:
B, F, G

Regions of - accel:
C, D

Regions of 0 accel:
A, E

Region of non-const. accel:
F

Region that includes a turn-around:
G (& between C & D?)

Region of greatest magnitude of accel:
G

Calculate the accelerations of regions A, B, C, and D.

$a_A=0$; $a_B=+2.5\ m/s^2$; $a_C=-7.5\ m/s^2$; $a_D=-15\ m/s^2$

Calculate the total change in position from t = 0 to t = 18 s.

$\Delta x = 90\ m$