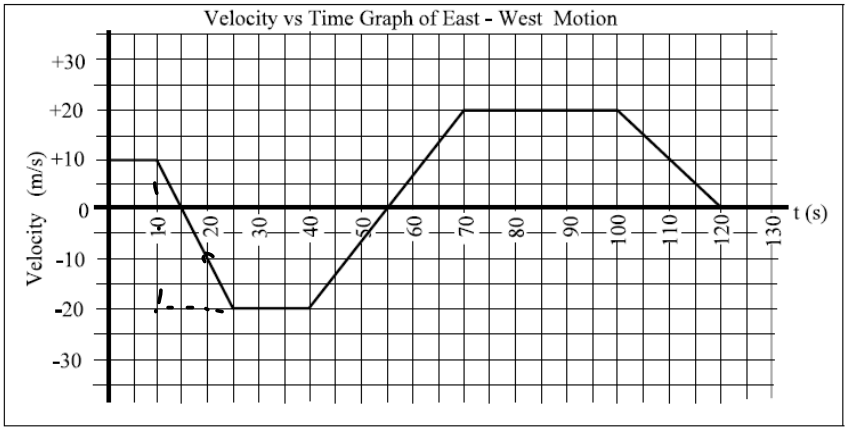
Motion Graph # 8




1. What is the object's velocity at the 20 s point? $-10\ m/s$

2. What is the acceleration at the 5 s point? ⊖ 水平

3. What is the acceleration at the 15 s point? $-2\ m/s^2$

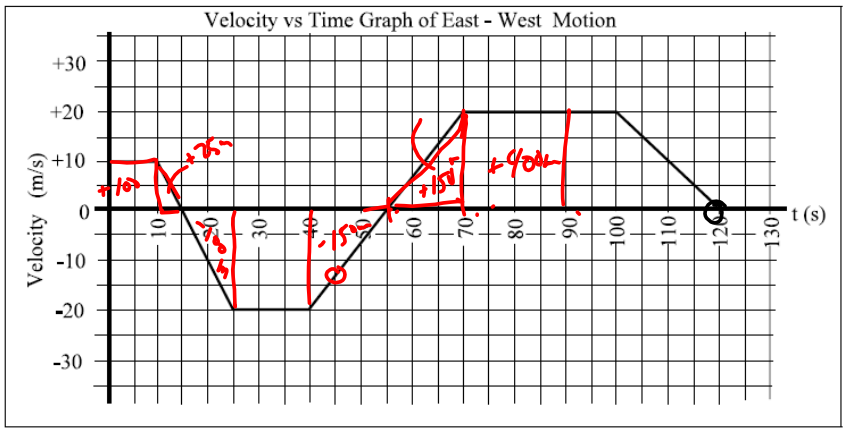
4. What is the acceleration at the 110 s point? $-1\ m/s^2$

5. During what time intervals is the object travelling East? ⊖ 15, 55–120 s

slope

$+\vec{v}$

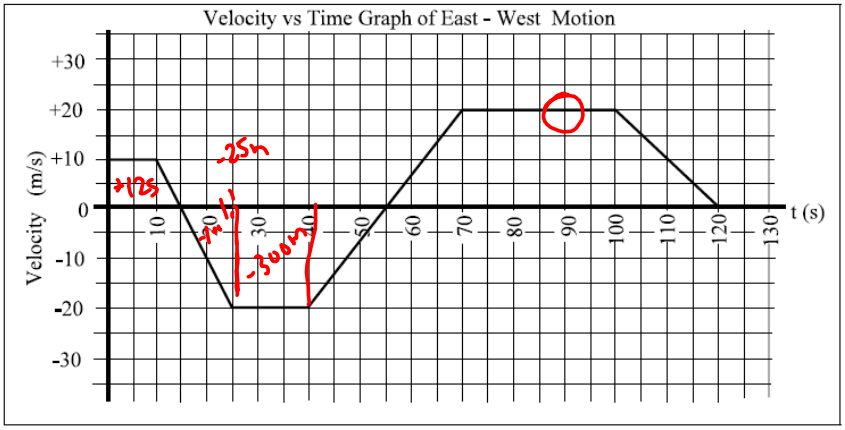
Motion Graph # 8




v-t
$\vec{d}$ = Σ areas
d = Σ |areas|

6. When is the object stopped? v = 😊 15, 55, 120 - 130 s
7. What is the displacement at the 25 s point? +25 m
8. What is the distance travelled in the first 25 s? 225 m
9. What was the average velocity for the first 25 s? $\vec{d}/t$ = +1 m/s
10. What is the object doing at the 45 s point? $+\vec{a}$, v = -, $\vec{v}$ = -13.02 m/s
slowing down travelling West

Motion Graph # 8




11. When did the object first return to the starting point?

12. What was the object's average speed in the first 40 s?

13. What was the average velocity in the first 40 s?

14. What is the object doing at the 90 s point?

1.25s 20 m/s, 25m

26 - 27s 1 mark

25 - 30s ½ mark

26.25 s

$d = 225 + 300m$

$d/t = \frac{525m}{40s} = 13m/s$

$\vec{d} = +225 - 300m$

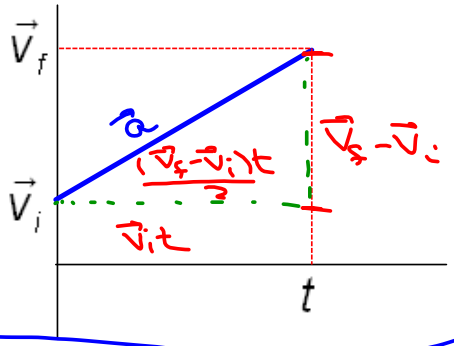
$\vec{d}/t = \frac{-275m}{40s} = -6.9m/s$

Const $\vec{v}$ | E

const $\vec{v}$ = +20 m/s → E or +20 m/s

$\vec{a}$ = ☺

Questions for quest?




From yesterday

$\vec{a}t = \vec{V}_f - \vec{V}_i$

$\vec{d}$ = Area

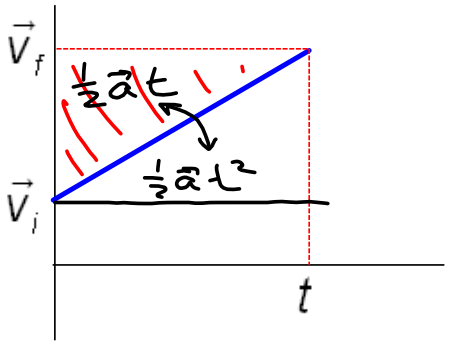
= Area$_{\triangle}$ + Area$_{\square}$

= $\frac{bh}{2}$ + $bh$

= $\frac{(\vec{V}_f-\vec{V}_i)t}{2} + \vec{V}_i t$

= $\frac{1}{2}\vec{a}t\,t + \vec{V}_i t$

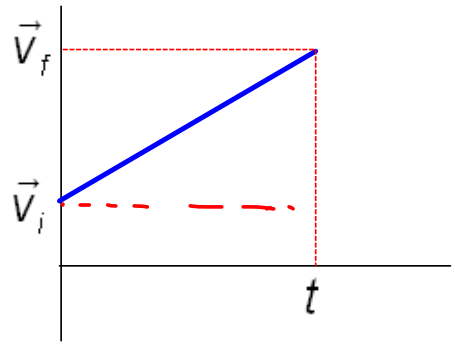
$$\vec{d} = \vec{V}_i t + \frac{1}{2}\vec{a}t^2$$




Or looking at in another way. . .

$\vec{d}$ = Area ▭ − Area ◺

$$\vec{d} = \vec{V}_i t - \frac{1}{2}\vec{a}t^2$$




Or another way still. . .

$$\vec{d} = A_{\square} + A_{\triangle}$$

$$= \vec{V}_i t + \frac{(\vec{V}_f - \vec{V}_i)t}{2}$$

$$= \vec{V}_i t + \frac{1}{2}\vec{V}_f t - \frac{1}{2}\vec{V}_i t$$

$$= \frac{1}{2}\vec{V}_i t + \frac{1}{2}\vec{V}_f t$$

$$= \frac{1}{2}(\vec{V}_i + \vec{V}_f)t$$

$$\boxed{\vec{d} = \left(\frac{\vec{V}_i + \vec{V}_f}{2}\right)t}$$

$\vec{d} = \vec{V}_{ave}\, t$

$$\boxed{\vec{V}_{ave} = \frac{\vec{V}_i + \vec{V}_f}{2}}$$ ← when $\vec{a}$ is constant (single straight line)

Kinematics Equations:

$\vec{d} = \vec{v}_{ave} t$ → always

→ $\vec{v}_f = \vec{v}_i + \vec{a}t$ ⇒ missing $\vec{d}$

$\vec{d} = \vec{v}_i t + \frac{1}{2}\vec{a}t^2$ ⇒ missing $\vec{v}_f$

$\vec{d} = \vec{v}_f t - \frac{1}{2}\vec{a}t^2$ ⇒ missing $\vec{v}_i$

$\vec{v}_{ave} = \frac{\vec{v}_i + \vec{v}_f}{2}$ OR $\vec{d} = \frac{\vec{v}_i + \vec{v}_f}{2} t$ ⇒ missing $\vec{a}$

for constant $\vec{a}$ only

No equation without time.

Homework: Quest tomorrow on d-t and v-t graphs.
page 1: d-t graph 10 questions
page 2: v-t graph 10 questions

## Attachments

d-t graphs.pdf

phys 11 v vs t graphs.pdf