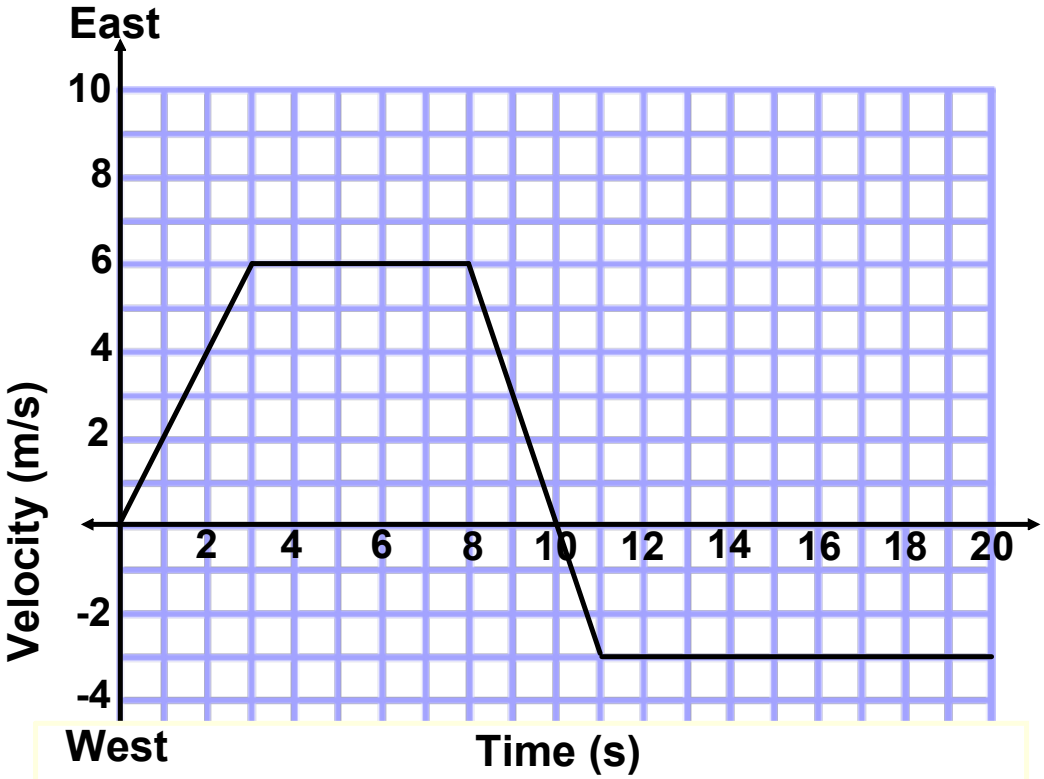
Velocity - Time Analysis Questions: Guided Practice



Qualitative Analysis (no calculations)

1. In what direction was the initial acceleration?
2. Describe the direction of the velocity and acceleration between 8 and 11 seconds.
3. For how many seconds was the object not accelerating?
4. At what time(s) did the object change directions?
5. Did the object spend more time traveling east or west?
6. In which direction did the object cover the most distance?
7. Was the final displacement of the object east or west of the starting point?

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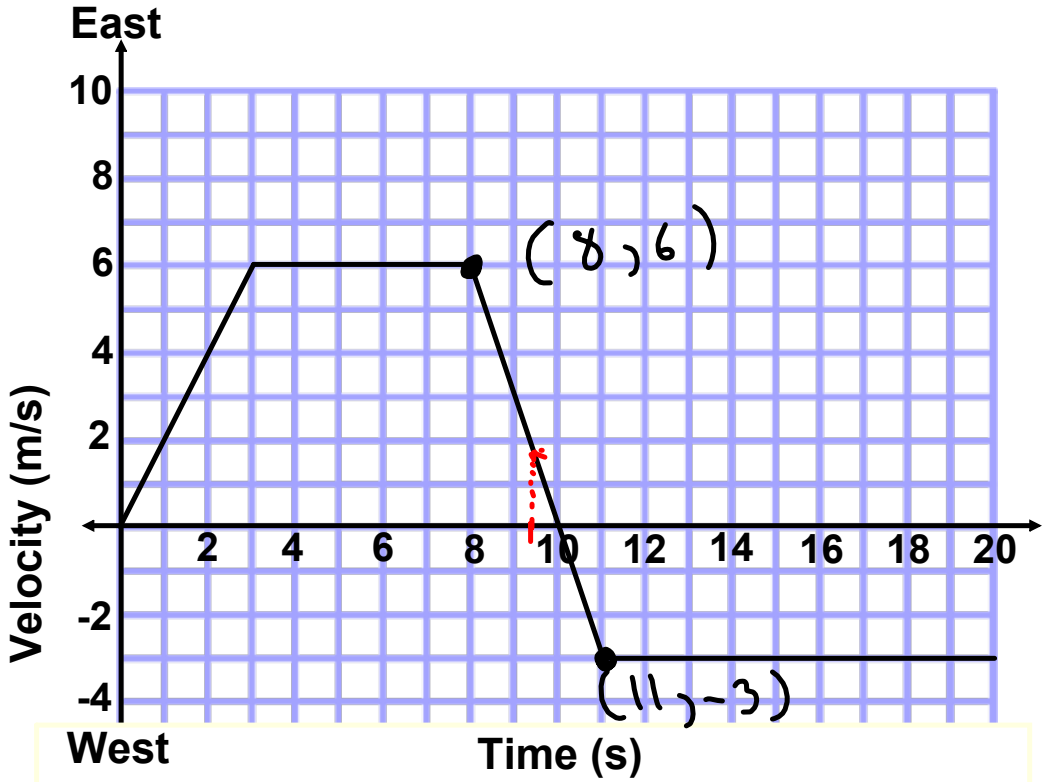

Quantitative Analysis (calculations)

1. Calculate the initial acceleration.
2. Calculate the distance traveled during the first 6 seconds.
3. Calculate the total distance traveled east.
4. Calculate the total distance traveled west.
5. Calculate the position at the 20 s mark.
6. Calculate the average velocity and speed for the 20 s.
7. Calculate the acceleration at the 9.31 s mark.

1. $\vec{a}$ = slope

$\vec{a} = \frac{6-0}{3-0} = \boxed{2\ m/s^2}$

2. dist = area

$= \frac{h(b_1+b_2)}{2} = \frac{6(6+3)}{2} = \boxed{27m}$

3. d_{East} = top area

$d_{East} = d_1 + d_2$, $d_1 = 27m$

$d_2 = \frac{6(2+4)}{2} = 18\ m$

$d_{East} = 27+18 = \boxed{45m}$

4. d_{west} = bottom area

$= \frac{h(b_1+b_2)}{2} = \frac{3(10+9)}{2} = \boxed{28.5m}$

5. $\vec{d}_f$ = Area Top − Bottom

$= 45 - 28.5$

$\boxed{\vec{d}_f = 16.5m}$

d = Area Top + Bottom ← Total Dist

$= 45 + 28.5 = \underline{73.5m}$

6. $\vec{v}_{avg} = \frac{\vec{d}}{t} = \frac{16.5}{20} = \boxed{0.83\ m/s}$

$v_{sp} = \frac{d}{t} = \frac{73.5}{20} = \boxed{3.68\ m/s}$

7. $\vec{a}$ = Slope $\frac{y_2-y_1}{x_2-x_1} = \frac{-3-6}{11-8} = \frac{-9}{3} = \boxed{-3\ m/s^2}$

Attachments

moving-man_all.jar