Key

Science 10

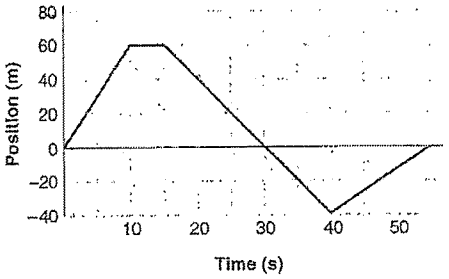
Physics Review

scalar (magnitude) vector (magnitude + direction)

1. What is the difference between distance and displacement?

2. How would you calculate displacement? $\vec{d}_f - \vec{d}_i$

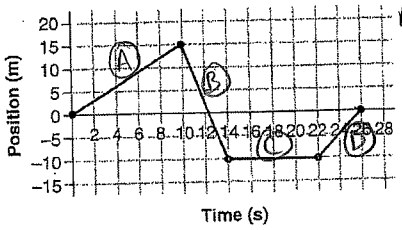
3. How would you calculate distance? $d_f - d_i$



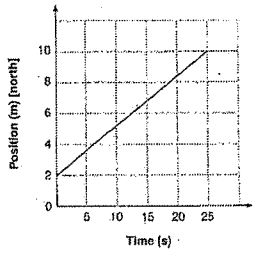
4. What is the position at 20 s? +40 m

5. What is the velocity from 20 s to 40 s? +4 m/s

6. Describe the velocity for each of the time intervals.

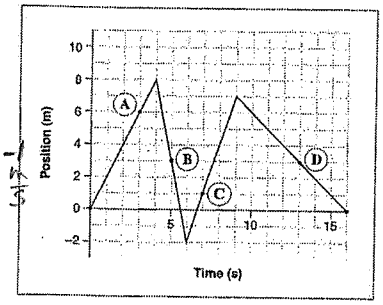


A → +1.5 m/s
B → −6.25 m/s
C → 0 m/s
D → +2.5 m/s



7. The graph shows the motion of a rolling ball.
How would you calculate the velocity of the ball?

$\vec{v} = \frac{\Delta \vec{d}}{\Delta t}$ / $\vec{v} = \frac{\vec{d}_f - \vec{d}_i}{t_f - t_i}$



8. Calculate the velocity for each lettered section.

A → $\frac{8-0}{4-0} = \frac{8}{4} = +2$ m/s

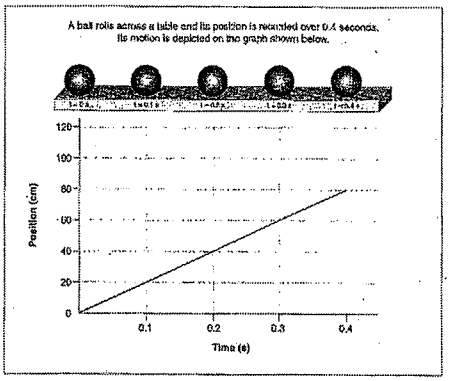
B → $\frac{(-2)-(+8)}{6-4} = \frac{-10}{2} = -5$ m/s

C → $\frac{+7-(-2)}{9-6} = \frac{9}{3} = +6$ m/s

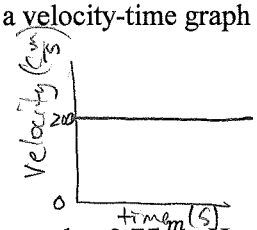
D → $\frac{0-(+7)}{16-9} = \frac{-7}{7} = -1$ m/s

9. What is the position of the ball at 0.30 s? +60 m

10. How would you calculate the velocity of the ball? $\frac{y_2 - y_1}{x_2 - x_1}$ / $\frac{\vec{d}_f - \vec{d}_i}{t_f - t_i}$



11. What would a velocity-time graph that corresponds to the position-time graph look like?



12. A spider can crawl at 0.75 $\frac{m}{s}$. How long would it take the spider to crawl 7 m across a kitchen floor?

$\vec{v} = \frac{\vec{d}}{t}$ / $0.75 = \frac{7.0}{t}$ / $t = 9.33$

13. Kurtis walks at 33 $\frac{km}{h}$ for 3.3 h. How far does he walk?

$\vec{v} = \frac{\vec{d}}{t}$ / $33 = \frac{\vec{d}}{3.3}$ / $\vec{d} = 108.9$ km / $\vec{d} = +110$ km

14. A hockey puck slides across the ice, moving at 4.3 $\frac{m}{s}$. How far will it travel in 0.50 s?

$\vec{v} = \frac{\vec{d}}{t}$ / $4.3 = \frac{\vec{d}}{0.50}$ / $\vec{d} = +2.15$ m

15. A car travels 240 km in 2 .0 h and another 140 km in 1.5 h. What is the average velocity of the car for the entire trip?

$\vec{v} = \frac{\vec{d}}{t}$ / $\vec{v} = \frac{380}{3.5}$ / $\vec{v} = +110$ Km

16. A honey bee flies 32 m [$North$] in 10 s. What is its average velocity?

$\vec{v} = \frac{\vec{d}}{t}$ / $\vec{v} = \frac{+32}{10}$ / $\vec{v} = +3.2 \frac{m}{s}$ (NORTH)

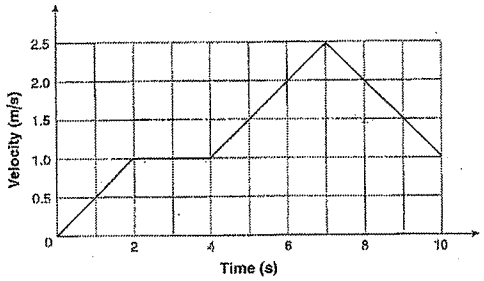
17. What is required for a car to have a negative acceleration? Slowing down.

18. What is required for a car to have a positive acceleration? Speeding up.

19. A ball rolls down a ramp from rest and its velocity increases to $+4.0\frac{m}{s}$. Describe its acceleration. linear and forward.

20. What is the velocity at 5.0 s?

+1.5 m/s



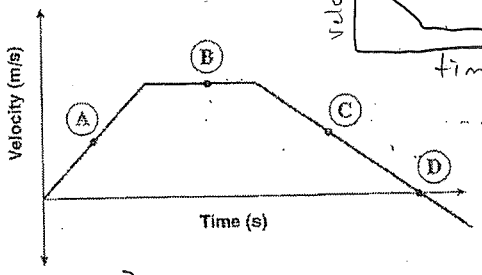
21. Determine the acceleration from 4.0 s to 7.0 s.

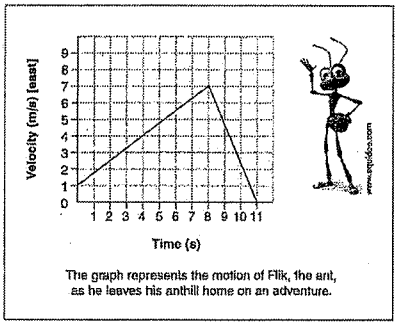
$\vec{a} = \frac{\Delta \vec{v}}{\Delta t}$ / $\vec{a} = \frac{(+2.5)-(+1.0)}{3.0}$ / $\vec{a} = 0.5\,m/s^2$

22. Sketch a velocity-time graph that represents the motion of an object that initially moves with negative acceleration, followed by a constant velocity?

23. Describe the acceleration at each letter. (A) constant acceleration forward (B) zero acceleration (C) constant acceleration backwards (D) stopped.

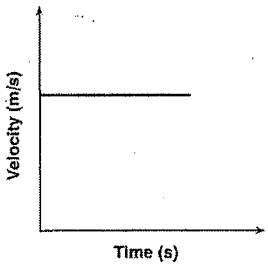
24. Describes the motion of the object.





25. What is Flik's acceleration at $t = 9.0\,s$? $2.\overline{3}\ m/s^2$ East

26. Describe Flik's motion. constant acceleration away from his home and then he slowed down constantly



27. What would the position-time graph look like that is the same motion as the velocity-time graph?

28. A car travelling at $+70\frac{m}{s}$ has an average acceleration of $-6.25\frac{m}{s^2}$. How long does it take the car to stop?

$\vec{a} = \frac{\Delta \vec{v}}{\Delta t}$ / $-6.25 = \frac{0-70}{t}$ / $\vec{a} = 11.2\,s$

29. A spacecraft travelling at $+2250\frac{m}{s}$ slows down at a rate of $-7.9\frac{m}{s^2}$ for 75 s. Determine the final velocity.

$\vec{a} = \frac{\Delta v}{\Delta t}$ / $-7.9 = \frac{\vec{v}_F - (+2250)}{75}$ / $\vec{a} = 1657.5\frac{m}{s^2}$ / $\vec{a} = +1700\ m/s^2$

30. A pitcher throws a baseball with a velocity of $+34\frac{m}{s}$. The batter hits the ball which then travels with a velocity of $-28\frac{m}{s}$. If the ball was in contact with the bat for 0.0020 s, what is the acceleration of the baseball as it makes contact with the bat?

$\vec{a} = \frac{\Delta \vec{v}}{\Delta t}$ / $\vec{a} = \frac{-28-(+34)}{0.0020}$ / $\vec{a} = -31\,000\frac{m}{s^2}$

31. Imagine Superman accelerating at $47\frac{m}{s^2}$ for 2.5 s. If he starts from rest, what is his final speed?

$\vec{a} = \frac{\Delta \vec{v}}{\Delta t}$ / $+47 = \frac{\vec{v}_F - 0}{2.5}$ / $\vec{v}_F = +120\frac{m}{s}$

32. A rollercoaster accelerates at $+6.5\frac{m}{s^2}$. If its initial velocity is $+1.3\frac{m}{s}$, how much time will it take to reach $+25\frac{m}{s}$?

$\vec{a} = \frac{\Delta \vec{v}}{\Delta t}$ / $+6.5 = \frac{(+25)-(+1.3)}{t}$ / $t = 3.6\,s$

33. What is the acceleration of a car as it increases its velocity from $+22\frac{m}{s}$ to $+33\frac{m}{s}$ in 5.0 s?

$\vec{a} = \frac{\Delta \vec{v}}{\Delta t}$ / $\vec{a} = \frac{(+33)-(+22)}{5.0}$ / $\vec{a} = +2.2\frac{m}{s^2}$

34. If Galileo released a cannonball from the Leaning Tower of Pisa, it would accelerate downwards at $9.81\frac{m}{s^2}$, hitting the ground at a speed of $25\frac{m}{s}$. How much time would the cannonball spend in the air?

$\vec{a} = \frac{\Delta \vec{v}}{\Delta t}$ / $-9.81 = \frac{-25-0}{t}$ / $t = 2.6\,s$