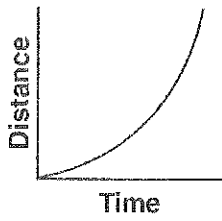


**Topic 2A-Uniform Motion**  
**Skill 12 Con't**

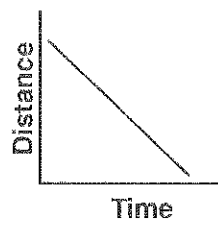
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14. A cart travels with a constant nonzero acceleration along a straight line. Which graph best represents the relationship between the distance the cart travels and time of travel?

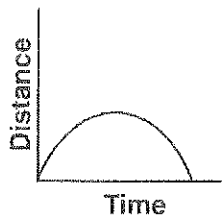
A)



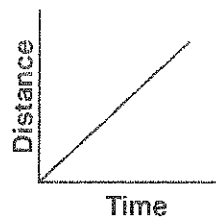
B)



C)



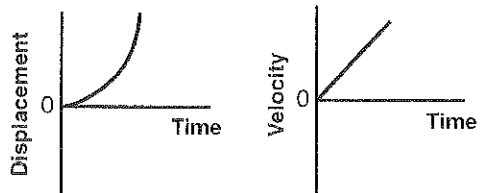
D)



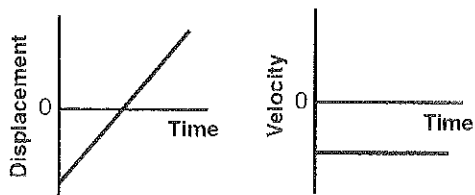
## Topic 2A-Uniform Motion

15. Which pair of graphs represents the same motion of an object?

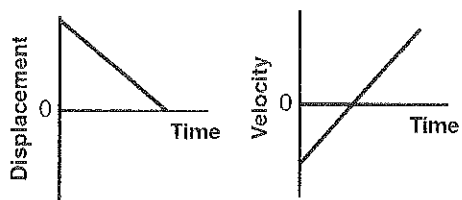
A)



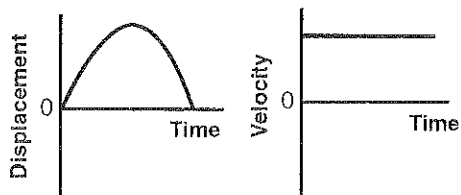
B)



C)

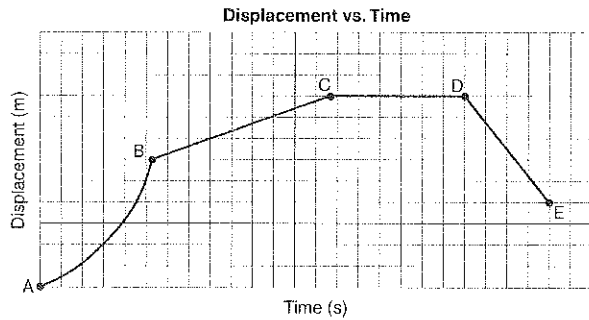


D)



## Topic 2A-Uniform Motion

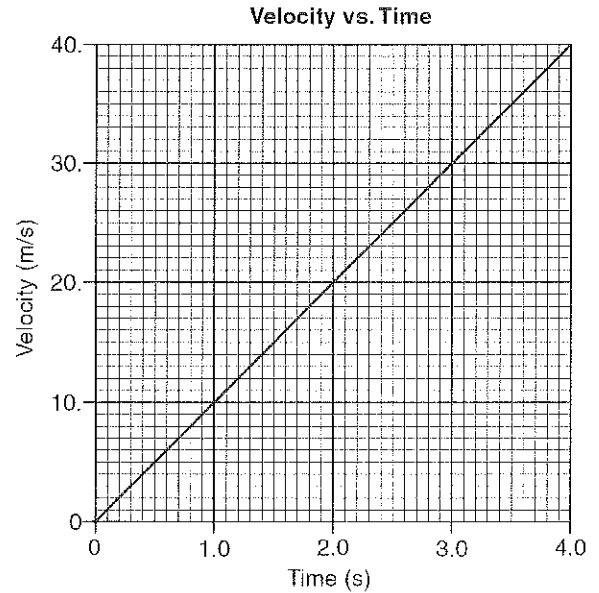
16. The displacement-time graph below represents the motion of a cart initially moving forward along a straight line.



During which interval is the cart moving forward at constant speed?

- A) *AB*   B) *BC*   C) *CD*   D) *DE*

17. The graph below shows the velocity of a race car moving along a straight line as a function of time.



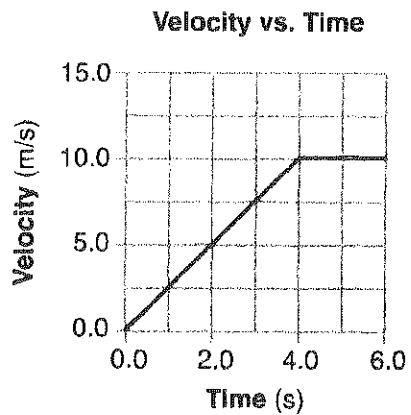
What is the magnitude of the displacement of the car from  $t = 2.0$  seconds to  $t = 4.0$  seconds?

- A) 20. m                      B) 40. m  
C) 60. m                      D) 80. m

## Topic 2A-Uniform Motion

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Base your answers to questions 18 and 19 on the graph below, which represents the motion of a car during a 6.0-second time interval.



18. What is the total distance traveled by the car during this 6.0-second interval?

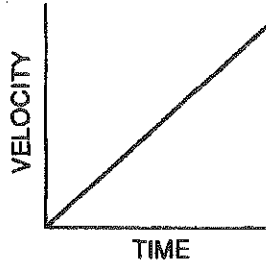
- A) 10. m      B) 20. m      C) 40. m      D) 60. m

19. What is the acceleration of the car at  $t = 5.0$  seconds?

- A)  $0.0 \text{ m/s}^2$       B)  $2.0 \text{ m/s}^2$       C)  $2.5 \text{ m/s}^2$       D)  $10. \text{ m/s}^2$
-

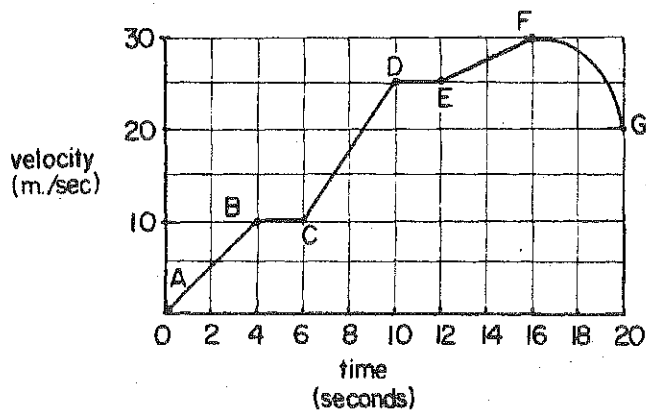
## Topic 2A-Uniform Motion

20. The graph below represents the motion of a body moving along a straight line.



According to the graph, which quantity related to the motion of the body is constant?

- A) speed                      B) velocity  
C) acceleration            D) displacement
21. Base your answer to the following question on the graph below, which shows the velocity of a 1,500-kilogram car during a 20-second-time interval..



During time interval *CD*, the average velocity of the car is

- A) 7.5 m./sec.    B) 17.5 m./sec.    C) 15 m./sec.    D) 35 m./sec.

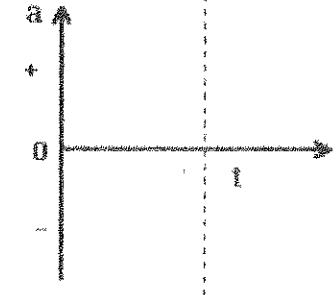
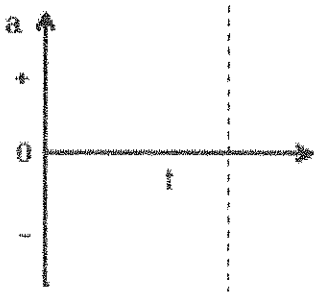
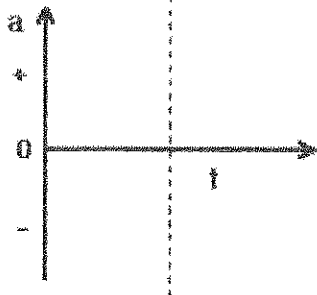
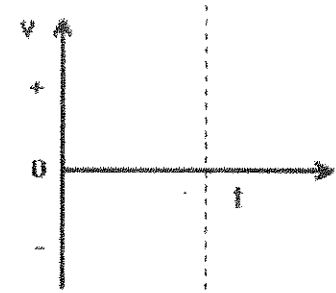
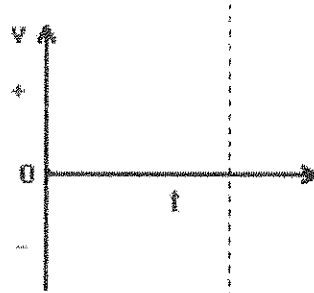
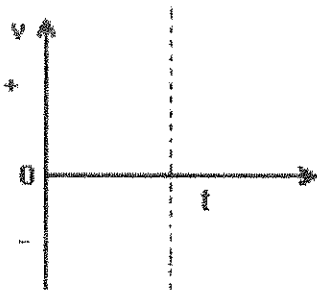
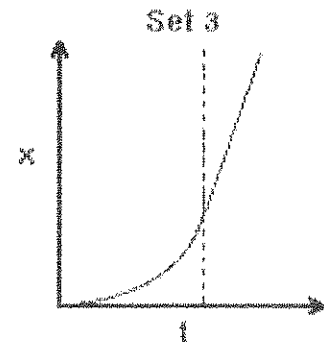
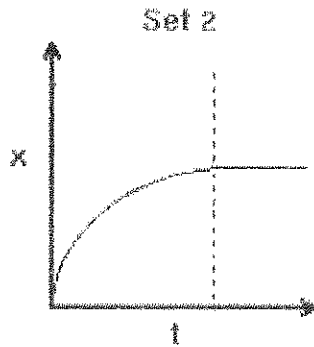
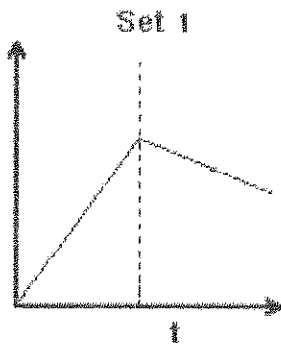
## Topic 2A-Uniform Motion

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22. Describe the motion of each of the following objects from the dot diagrams. Assume reference point (ie observer) is to the left. (you can use words, a graph or both)

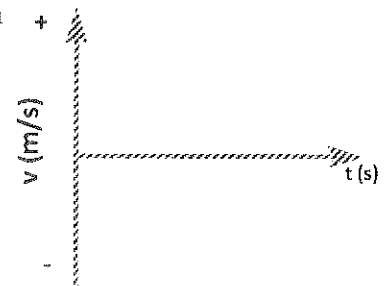


23. Below each **position vs time** graph sketch the corresponding **velocity vs time** and **acceleration vs time** graphs.



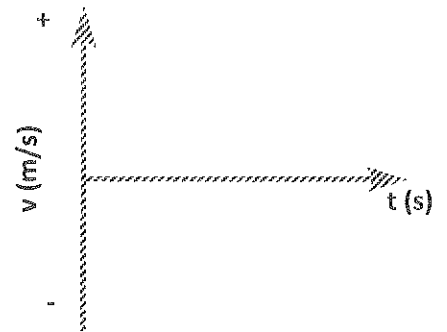
24. A poorly tuned Yugo can accelerate from rest to a speed of 28 m/s in 20 s.

a) What is the average acceleration of the car?



b) What distance does it travel in this time?

25. At  $t = 0$  a car has a speed of  $30 \text{ m/s}$ . At  $t = 6 \text{ s}$ , its speed is  $14 \text{ m/s}$ .  
What is its average acceleration during this time interval?



**Skill 13 - Head Problems – Practice**

26. A toy RC car accelerates from rest to  $10 \text{ m/s}$  in  $2.5$  seconds. What is the acceleration of the car?  
What is the distance travelled by the toy car during this time? (Show your work using mini equations)

$\Delta v$	$v_i$	$v_f$	$\bar{v}$	$d$	$a$	$t$

27. Find the distance covered by an object that accelerates from rest at a rate of  $5 \text{ m/s}^2$  for  $6$  seconds. (Show your work using "mini" equations)

$\Delta v$	$v_i$	$v_f$	$\bar{v}$	$d$	$a$	$t$



28. Sid E. Slicker is strolling through Central Park when it begins to rain. He increases his speed uniformly from 0.5m/s to 3m/s in a time of 3seconds to escape the deluge. What is Sid's average speed during this time? What is the distance covered during this time?

$\Delta v$	$v_i$	$v_f$	$\bar{v}$	$d$	$a$	$t$

29. Dinah Saur accelerates her Segway from rest to 7km/hr over a time of 1 min. What is the average speed of the Segway? What is the distance traveled during that minute?

$\Delta v$	$v_i$	$v_f$	$\bar{v}$	$d$	$a$	$t$

**Use kinematics equations to solve quantitative problems**

30. A mob of roller-skating zombies starts roll down a hill from an initial speed of zero. The hill is 1500m long and will allow the zombies to accelerate uniformly at  $2.5\text{m/s}^2$ . How much time do you and your brainy pals at the bottom of the hill have to come up with a plan before zombies arrive? What is the final velocity of the zombies?
31. A snowboarder moving at a constant 5m/s reaches a steeper slope and begins to accelerate at  $2\text{m/s}^2$  for a distance of 300m. What is the speed of the rider when they reach the bottom of the slope?

32. A giraffe trotting at 1 m/s spots a lion and accelerates away at  $0.5\text{m/s}^2$  for 2 seconds. What is the distance traveled by the giraffe during this time period?

33. What is the final speed of a shark with an initial velocity of 2m/s that accelerates at  $1.5\text{m/s}^2$  for a distance of 10m?

**Mixed Kinematic Problems:**

Use equations or “Head Problems” to solve the problems below. For either method show your work. The grids are a good way to keep track of what you know or what you might be able to find out regardless of method selected.

$$a = \frac{\Delta v}{t}$$

$$\bar{v} = \frac{d}{t}$$

$$\bar{v} = \frac{v_i + v_f}{2}$$

$$v_f = v_i + \Delta v$$

Kinematics equations

$$v_f^2 = v_i^2 + 2ad$$

$$v_f = v_i + at$$

$$d = v_i t + \frac{1}{2} at^2$$

Reminder ( $\Delta v$  is usually only helpful when the object is not starting from rest)

34. A rocket accelerates upward from rest with a uniform acceleration of  $4.0\text{ m/s}^2$ . How far will the rocket have traveled in 8.0 s?

$\Delta v$	$v_i$	$v_f$	$\bar{v}$	$d$	$a$	$t$

35. The brakes on a car permit it to decelerate at the rate of  $-3 \text{ m/s}^2$ . What distance is required to stop the car when it is moving  $18 \text{ m/s}$ ?

$\Delta v$	$v_i$	$v_f$	$\bar{v}$	$d$	$a$	$t$

36. A solar-powered aircraft starting from rest reaches lift-off speed of  $20 \text{ m/s}$  in  $300 \text{ meters}$ . What is the acceleration of the plane?

$\Delta v$	$v_i$	$v_f$	$\bar{v}$	$d$	$a$	$t$

37. A motorcycle traveling  $30.0 \text{ m/s}$  decelerates at the rate of  $-2.0 \text{ m/s}^2$ . What distance does it travel, and what time does it take for the cycle to come to rest?

$\Delta v$	$v_i$	$v_f$	$\bar{v}$	$d$	$a$	$t$

38. Tests on the new Aston Martin show that it can accelerate from  $39.7 \text{ m/s}$  to  $96.2 \text{ m/s}$  in  $4.352 \text{ seconds}$ . What distance does the car travel in that time? What is the car's acceleration in this period

$\Delta v$	$v_i$	$v_f$	$\bar{v}$	$d$	$a$	$t$