

COMPETITION

1. Does a car speedometer measure (a) speed (b) velocity (c) both?

A

2. When an object moves with constant velocity, does its average velocity during any time interval differ from its instantaneous velocity at any instant? (a) For constant velocity, instantaneous velocity equals to average velocity (b) For constant velocity, instantaneous velocity does not equal to average velocity

A

3.If one object has a greater speed than a second object, does the first necessarily have a greater acceleration? (a) Yes (b) No

B

4. If one object has a greater speed than a second object, does the first necessarily have a greater acceleration? **Give an example using two apples both will be dropped from the top of Empire State Building, 1 second apart:**

5. Compare the acceleration of a motorcycle that accelerates from 80 km/h to 90 km/h with the acceleration of a bicycle that accelerates from rest to 10 km/h in the same time. (a) SAME (B) NOT SAME

A

6. Can an object have a northward velocity and a southward acceleration?

(A) Yes (b) No

A

7. Can the velocity of an object be negative when its acceleration is positive?

(A) Yes (b) No

A

8. Give an example where both the velocity and acceleration are negative by using an apple:

Falling apple from certain height has neg velocity and neg acceleration

9. (A) Can an object be increasing in speed as its acceleration decreases? (B) Give an example using a train (which is moving at 10KPH)

(A) Yes.

(B) A train is moving at 10 KPH. After 1 hour, it gets accelerated and moved speed of 30 km/hr. and after another hour, speed increase to 40 km/hr.

10. A train is moving at 10 KPH. After 1 hour, it gets accelerated and moved speed of 30 KPH. and after another hour, speed increase to 40 KPH. Find its acceleration (A) after 1 hour and (B) after 2 hour.

(A) 20 KM/Hr/Hr

(B) 10 KM/Hr/Hr

11. Two cars emerge side by side from a tunnel. Car A is traveling with a speed of 60 km/h and has an acceleration of 40 km/h/min. Car B has a speed of 40 km/h and has an acceleration of 60 km/h/min. Which car is passing the other as they come out of the tunnel?

Car A is passing the car B as they come out of the tunnel, but Car B would catch up at a later point.

12. A baseball player hits a ball straight up into the air. It leaves the bat with a speed of 120 km/h. In the absence of air resistance, how fast would the ball be traveling when it is caught at the same height above the ground as it left the bat?

-120 km/hr (Newton's 3rd Law of motion)

13. As a freely falling object speeds up, what is happening to its acceleration—does it (a) increase, (B) decrease (C) stay the same? (Ignore air resistance)

C

14. As a freely falling object speeds up, what is happening to its acceleration—(A) increase, (B) decrease, (C) stay the same? (Don't ignore air resistance)

B

15. You travel from point A to point B in a car moving at a constant speed of 70 km/h. Then you travel the same distance from point B to another point C, moving at a constant speed of 90 km/h. What is your average speed for the entire trip from A to C ? (Answer must be in SI with 4 sig fig)

78.75 m/s

16. Can an object have zero velocity and nonzero acceleration at the same time? Use an apple to give example.

Yes (Instant of reversing direction).

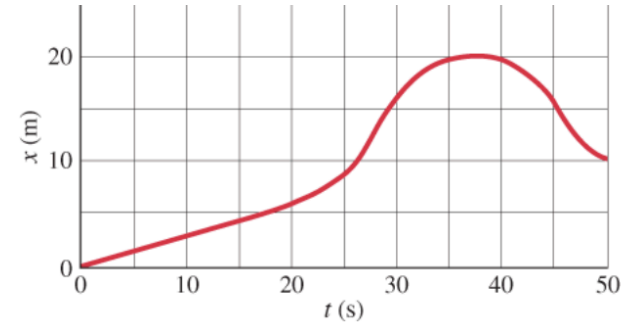
17. Can an object have zero acceleration and nonzero velocity at the same time?

Yes (constant velocity has zero acceleration)

18. Which of these motions is *not* at constant acceleration: (a) a rock falling from a cliff, (b) an elevator moving from the second floor to the fifth floor making stops along the way, (c) a dish resting on a table?

B

19. Describe in words (Not in Numbers) the velocity and acceleration b/w(0-20 sec)

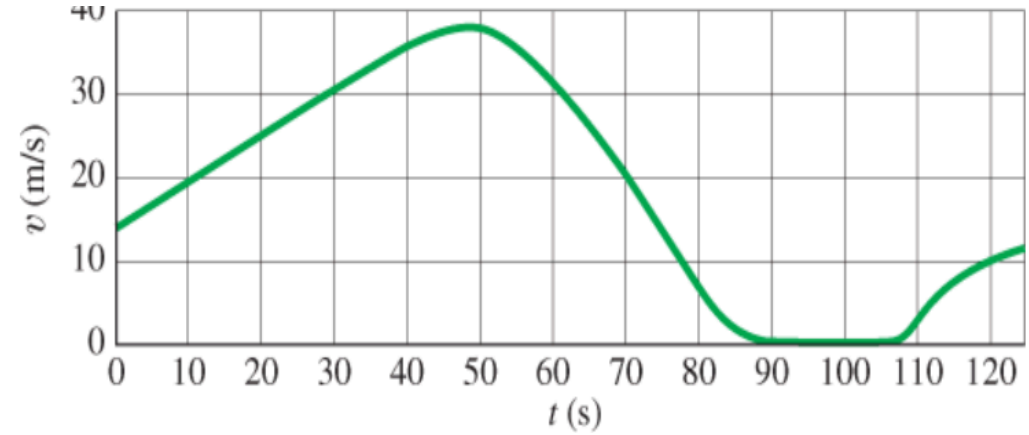


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$V = \text{Constant}$

$A = 0$

20. What is the initial velocity of the graph



Initial velocity is about 13 m/s

21. If you are driving 95 km/h along a straight road and you look to the side for 2.0 s, **how far** do you travel during this inattentive period? (Answer must be in SI unit and nearest whole number).

53 Meter

22. A rolling ball moves from $x_1 = 8.4$ cm to $x_2 = -4.2$ cm during the time from $t_1 = 3.0$ s to $t_2 = 6.1$ s. What is its **average velocity** over this time interval? (Answer must be in cm/s and two decimal place).

-4.06 cm/s

23. A bird can fly 25 km/h. How long does it take to fly 3.5 km? (Answer is in hour and two Sig Fig)

.14 hour

24. You are driving home from school steadily at 95 km/h for 180 km. It then begins to rain and you slow to 65 km/h. You arrive home after driving 4.5 h. (a) How far is your hometown from school? (Answer must be in KM)

350 KPH

25. You are driving home from school steadily at 95 km/h for 180 km. It then begins to rain and you slow to 65 km/h. You arrive home after driving 4.5 h. What was your average speed in KPH?

78 KPH

26. A person jogs eight complete laps around a 400-m track in a total time of 14.5 min. Calculate (a) the average speed in SI unit and (b) the average velocity in SI unit

(A) 3.68 m/s (b) 0 m/s

27. Every year the Earth travels about 10^9 km as it orbits the Sun. What is Earth's average speed in km/h (Answer must be in Scientific Notation)

1.14×10^5 km/h

28. A car traveling 95 km/h is 210 m behind a truck traveling 75 km/h. How many seconds will it take the car to reach the truck?

38 SEC

29. Calculate the average speed of a complete round trip in which the outgoing 250 km is covered at 95 km/h, followed by a 1 hour lunch break, and the return 250 km is covered at 55 km/h. (Answer must be in KPH and whole number)

Average speed 61 KPH

30. Two locomotives approach each other on parallel tracks. Each has a speed of 155 km/h with respect to the ground. If they are initially 8.5 km apart, how long will it be before they reach each other? (Answer must be in minutes and two sig fig)

1.6 min

31. An automobile traveling 95 km/h overtakes a 1.30-km-long train traveling in the same direction on a track parallel to the road. If the train's speed is 75 km/h, how long does it take the car to pass it? (Answer must be in hour and Scientific Notation)

7.65×10^{-3} hour

32. An automobile traveling 95 km/h overtakes a 1.30-km-long train traveling in the same direction on a track parallel to the road. If the train's speed is 75 km/h. What are the distance travelled by the car in opposite direction? (Answer must be in KM and Two Decimal Place)

.73 km

33. A stone is dropped from the top of a cliff. It is seen to hit the ground below after 3.55 s. How high is the cliff? (Whole number and SI unit)

62 meter

34. Estimate :

how long it took King Kong to fall straight down from the top of the Empire State Building, 380 m high (SI unit and one decimal place)

8.8 seconds

35. A King Kong to fall straight down from the top of the Empire State Building, 380 m high (SI unit and two decimal place). Find its velocity just before it is landing

86.24 m/s

FINAL (6 Problems)

36. A ball player catches a ball 3.4 s after throwing it vertically upward. What height did it reach?)SI unit and 2 sig fig)

14 meter

37. A baseball is hit almost straight up into the air with a speed of 25 m/s. Estimate : how high it goes

32 Meter

38. A baseball is hit almost straight up into the air with a speed of 25 m/s. Estimate how long it is in the air. (SI unit and 3 sig fig)

5.10 second

39. A kangaroo jumps straight up to a vertical height of 1.45 m. How long was it in the air before returning to Earth? (SI unit and 3 sig fig)

1.09 second

40. The best rebounders in basketball have a vertical leap (that is, the vertical movement of a fixed point on their body) of about 120 cm. What is their initial “launch” speed off the ground? (SI unit and 3 sig fig)

4.85 m/s

41. The best rebounders in basketball have a vertical leap (that is, the vertical movement of a fixed point on their body) of about 120 cm. How long are they in the air? (SI unit and 2 sig fig)

.99 sec

42. Denmark is a small Scandinavian country with a land area of roughly 42,000 km². The land area of the United States is roughly 9,161,000 km². How many times bigger is the United States?

The US is 218 times larger than Denmark

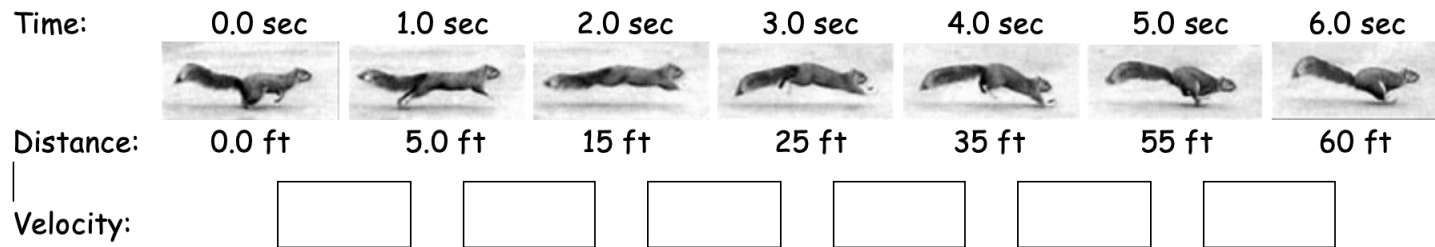
43. Although Denmark is pretty small compared to the US, it turns out to be pretty roomy. First, estimate how large an area a person takes up when standing. How many people could you fit in Denmark?

42 Billion

44. Could the entire world's population fit in Denmark, if everyone were willing to stand? (A) Yes (B) No

Yes.

45. A squirrel is running along a fence. Mr. Bari, curious about squirrel velocities, has shrewdly observed at which fence post the squirrel is located at one-second intervals. After the squirrel has run away, Mr. Bari measures the spacing between two adjacent fence posts to be 5 ft. Based on his observations, Mr. Bari estimates the squirrel's velocity between measurements. (Fill in your estimates in the boxes above, using an appropriate number of significant figures.)



Velocity:

46. A squirrel is running along a fence. Mr. Bari, curious about squirrel velocities, has shrewdly observed at which fence post the squirrel is located at one-second intervals. After the squirrel has run away, Mr. Bari measures the spacing between two adjacent fence posts to be 5 ft. By taking the average of the above velocities, calculate the squirrel's average velocity over the entire 6 seconds.

3.048 m/s