Rafay Zia Mir

Digitally signed by Rafay Zia Mir
DN: cn=Rafay Zia Mir gn=Rafay Zia Mir c=Saudi Arabia l=SA o=www.rafayzia.com e=rafay.mir07@gmail.com
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Speed:

1. **What is magnitude?**
   Answer. The value of the physical quantity is called magnitude. E.g 4m/s. 4 is the magnitude
2. **What is scalar quantity?**
   Answer. A physical quantity that needs only magnitude
3. **What is a Vector quantity?**
   Answer. A physical quantity that needs both magnitude and direction.

4. **What is distance?**
   Answer. The total path taken is called distance.
5. **What is displacement?**
   Answer. The shortest distance between any two points is called displacement. It is a vector quantity.
6. **What is the difference between Distance and Displacement?**
   Answer. Distance is has no direction, it is a scalar. Displacement has direction, it is a scalar.
7. **Define Speed? Write formula and SI Unit.**
   Answer. Distance travelled in unit time is called speed.

$$Speed = \frac{distance}{time}$$

   Units: $\frac{meters}{second}$ OR $\frac{m}{s}$

8. **Define Average Speed? Write formula and SI Unit.**
   Answer. Total distance travelled in total time is called Average Speed.

$$Average\ Speed = \frac{Total\ Distance}{Total\ Time}$$

   Unit= $\frac{meter}{second}$ OR $\frac{m}{s}$
9. **Define Velocity? Write formula and SI unit.**
   Answer. Displacement per unit time is called Velocity. Velocity has direction.

$$Velocity = \frac{Displacement}{Time}$$

   Velocity has the same units as speed
10. **In which case Speed and Velocity become the same?**
    Answer. If there is no direction mentioned, velocity and speed are same.
11. **Can velocity be negative? If so what does negative Velocity mean?**
    Answer. Yes velocity can be negative because it is a vector. Negative velocity means that it has opposite direction. For example, if velocity is positive in rightward direction, negative velocity is in leftward direction.
12. **What is constant or steady speed?**
    Answer. Constant OR Steady speed means that equal distance is travelled every second.
13. **What is variable speed?**
    Answer. In variable speed, different distance is travelled every second.

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14. What is meant be constant or steady Velocity?

Answer. Constant OR Steady Velocity means that neither the speed is changing not the direction.

15. What is variable velocity?

Answer. If either the speed changes or the direction changes, the velocity is said to be variable.

16. What is the difference between Speed and Velocity?

Answer. Speed is scalar and Velocity is vector. For example, 4m/s is speed, however, 4m/s due North is Velocity.

17. Define acceleration? Write formula and units.

Answer. Change in Velocity in unit time is called acceleration.

$$acceleration = \frac{Final\ Velocity - Initial\ Velocity}{Time}$$

Can be written as $a = \frac{V_f - V_i}{t}$

Unit of acceleration is $\frac{m}{s^2}$

18. In what cases acceleration is produced?

Answer. Acceleration is produced when either speed changes of direction changes.

19. Complete the table.

Direction Changes	Speed Changes	Acceleration produced?
No	No	No
Yes	No	Yes
No	Yes	Yes
Yes	Yes	Yes

20. What does that mean when Acceleration is positive?

Answer. It means that speed has increased.

21. What does that mean when Acceleration is negative?

Answer. It means that speed has decreased.

22. What does that mean when acceleration is zero?

Answer. It means there is no change in Velocity and object is moving with constant velocity in the same direction.

23. What is deceleration? Write formula and units.

Answer. Negative acceleration is called deceleration. It has the same formula and unit as the acceleration. We do not write the negative sign in deceleration. For example, we never say that deceleration is -5 m/s^2, we say that deceleration is $5m/s^2$ because deceleration already means negative.

24. What is gradient?

Answer. Rise/Run is called Gradient.

25. What is slope?

Answer. Slope is the same as gradient

26. What is a distance-time graph?

Answer. It is a graph in which we plot time along x-axis and distance along y-axis.

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27. How do we find speed from distance-time graph?

Answer. Find the slope of distance-time graph, the value of the slope is the value of speed.

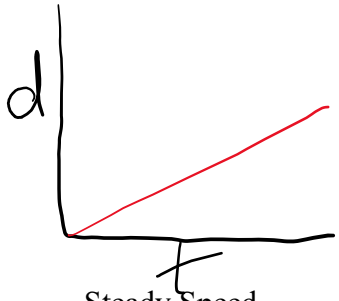
28. You are given with two distance-time graphs, how would you check which of them has higher speed?

Answer. The one that has greatest slope has highest speed.

29. You are given with a distance-time graph, how can you check if there was acceleration produced or not?

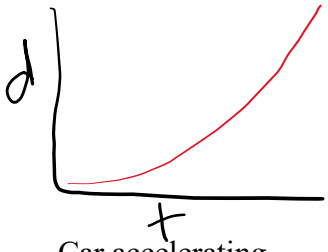
Answer. If the slope of distance-time graph is constant(not changing), that means there is no acceleration.

30. Draw the **shapes** of different distance-time graphs.

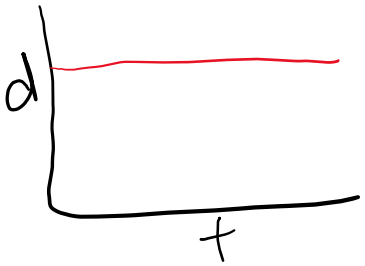


Steady Speed

Higher Steady Speed



Car accelerating



Car stopped

31. What is Speed-time graph?

Answer. In this graph, we plot time along x-axis and Speed along y-axis.

32. What is a Velocity-Time graph?

Answer. In this graph, we plot time x-axis and Velocity along y-axis.

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33. What is the difference between Speed-time and Velocity-time graph?
Answer. Speed-time graph does not go below x-axis, however, Velocity-time graph can go below x-axis. If the graph goes below x-axis then it means that object is going in opposite direction.

34. How will you find the acceleration from Speed-time or Velocity-time graph?
Answer. Find the slope, value of slope of the speed-time(velocity-time) graph is the value of acceleration.

35. How will you find the distance travelled from Speed-time or Velocity-time graph?
Answer. Find the area under the graph, the value of area is the value of distance travelled.

36. What is the area of triangle?
Answer. Area of triangle= $\frac{1}{2}$ Base × Height

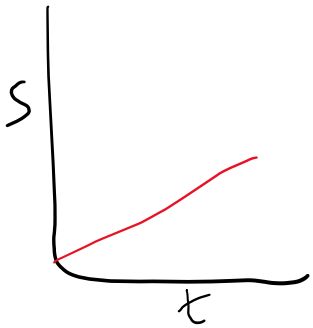
37. What is the area of rectangle?
Answer. Area of rectangle= Base × Height

38. How will you find the distance travelled if the graph neither looks like a rectangle nor it looks like a triangle?
Answer. Break the graph into small parts where every small part either looks like a triangle or rectangle. Find the individual areas of all the parts, add them up. You will get the area of the whole graph.

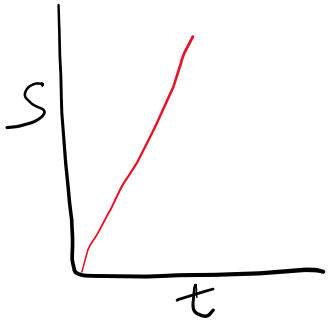
39. Draw the shapes of different speed-time graphs.

Constant Speed

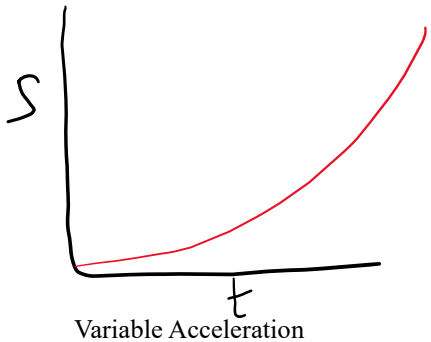
Zero Acceleration



Constant Acceleration



Higher Constant Acceleration



Variable Acceleration

40. What does a horizontal line mean in distance-time graph?
    Answer. A horizontal line means the object is stationary(not moving)

41. What does a straight line going up mean in distance-time graph?
    Answer. It means the speed is constant.

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