

1D Motion Problems Review

Equations

$$\bar{v} = \frac{d}{t} \quad a = \frac{v_f - v_i}{t} \quad \bar{v} = \frac{v_f + v_i}{2} \quad d = v_i t + \frac{1}{2} a t^2 \quad v_f = v_i + a t$$

Constant Velocity

1. A car has a constant velocity of 25 m/s for 30 seconds. How far does it travel?

2. A person walking with a constant velocity travels 300 meters in 7 minutes. What was their velocity?

3. A bird flies 50 meters at a constant speed of 2 m/s. How long did it take?

Constant Acceleration (Vertical Motion)

4. A ball is dropped from a height of 2 meters.
 - a. How long does it take to fall?

 - b. What is its velocity just as it hits the ground?

5. A rock is dropped and falls for 2.5 seconds.
 - a. How far does it fall?

 - b. What is its velocity just as it hits the ground?

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6. A ball is dropped from a height of 0.75 meters.
 - a. How long does it take to fall?

 - b. What is its velocity just as it hits the ground?

7. A ball is launched straight up with an initial velocity of 15 m/s.
 - a. How long does it take to reach its maximum height?

 - b. How long does it take to reach the ground?

 - c. What was its maximum height?

8. Another ball is launched straight up in the air and takes 3 seconds to reach its maximum height.
 - a. What was its initial velocity?

 - b. How long does it take to reach the ground?

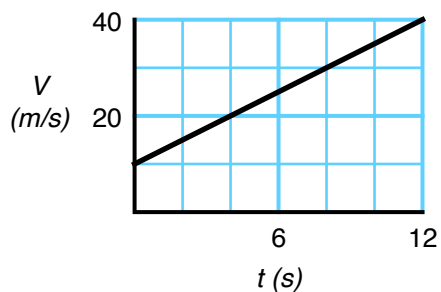
 - c. What was its maximum height?

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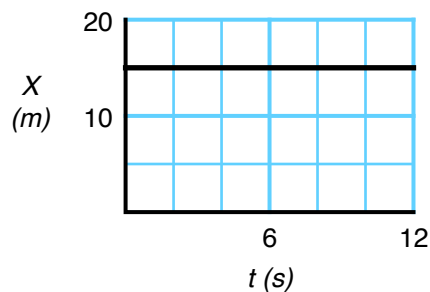
Motion Graphs

When you see a graph that has a straight line, you know that something has to be constant. In each of the following graphs, determine what is constant (position, velocity or acceleration) and its value.

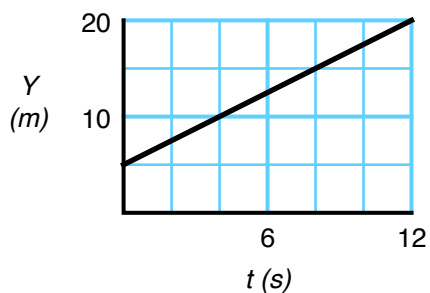
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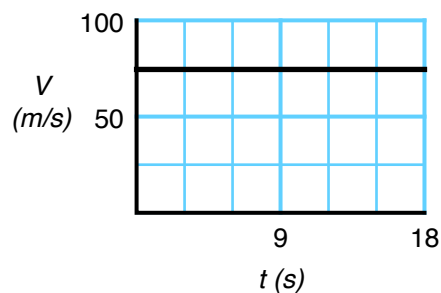
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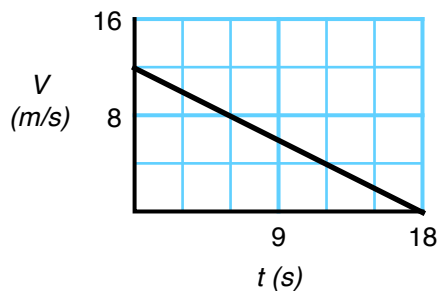
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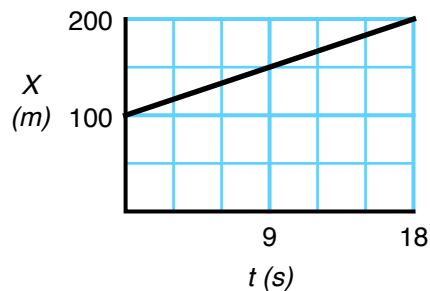
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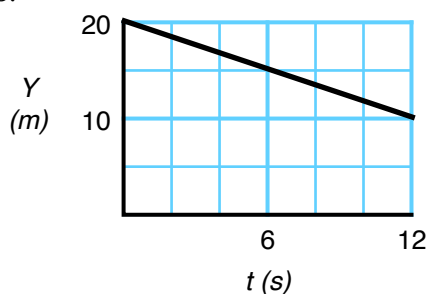


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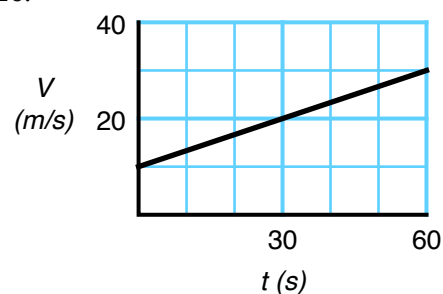


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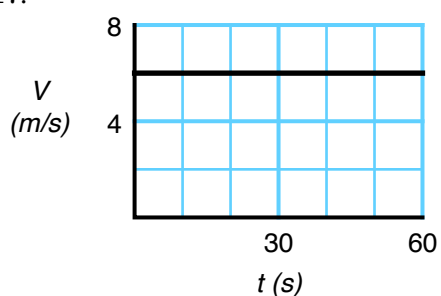
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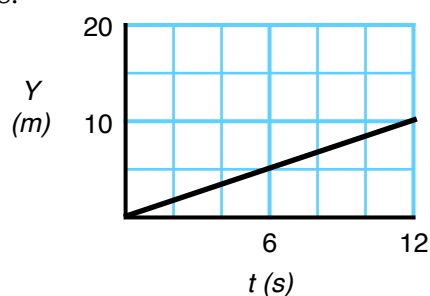
16.



17.



18.

**Answers:**

- | | | |
|--|---------------------------------------|-------------------------|
| 1) 750 m | 2) 0.71 m/s | 3) 25 s |
| 4. a) 0.63 s b) -6.3 m/s | 5. a) 31.3 m b) -25 m/s | |
| 6. a) 0.39 s b) -3.9 m/s | 7. a) 1.5 s b) 3 s c) 11.25 m | |
| 8. a) 30 m/s b) 6 s c) 45 m | 9) acceleration, 2.5 m/s ² | |
| 10) position, 15 m | 11) velocity, 1.25 m/s | 12) velocity, 75 m/s |
| 13) acceleration, -0.75 m/s ² | 14) velocity, 5.56 m/s | 15) velocity, -0.83 m/s |
| 16) acceleration, 0.33 m/s ² | 17) velocity, 12 m/s | 18) velocity, 0.83 m/s |