

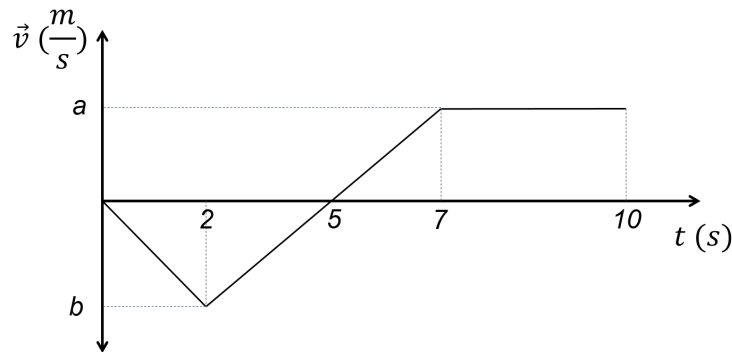
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1. The resistive force (drag force) applied on an object moving in a gas is described by:

$$R = \frac{1}{2} D \rho A v^2$$

where R ($kg \frac{m}{s^2}$) is the resistive force, D is the unitless drag coefficient, A (m^2) is the surface area of the object, and v ($\frac{m}{s}$) is the speed of the object. What quantity does ρ represent? Show your work clearly. **(3 marks)**

2. The period of the moon's orbit is about 28 days and the distance between the centers of the Earth and the Moon is about 385000 km. In one full revolution, find:
- The average velocity of the moon ($\frac{m}{s}$) **(2 mark)**
 - The average speed of the moon ($\frac{m}{s}$) **(2 mark)**
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3. The motion of an object along a straight line is described by the figure below. If $a = 10$ and $b = -5$, determine:
- Total displacement during 10 seconds **(2 mark)**
 - Total distance during 10 seconds **(2 mark)**
 - Average acceleration between $t = 2$ s to $t = 10$ s **(2 mark)**



4. A ball is thrown directly upward with an initial speed of 10 m/s from a height of 30 m. Determine:
- The maximum height from the ground **(2marks)**
 - The time it takes the ball to reach the ground **(2 marks)**
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5. Bob is standing 50 m from an apple tree, where he saw an apple falling from the height of 5 m. He runs towards the tree and catches the apple right before it hits the ground. What was his average speed? (take $g = 10 \frac{m}{s^2}$) **(3 marks)**
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6. If $\vec{A} = (2\hat{i} - \hat{j} + 3\hat{k})$ and $\vec{B} = (\hat{i} + \hat{j} - \hat{k})$ what is $\frac{|\vec{A}-\vec{B}|}{|\vec{A}+\vec{B}|}$? **(3 points)**
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7. The minimum distance required to stop a car moving at 50 km/h is 20 m. What is the minimum stopping distance for the same car moving at 70 km/h, assuming the same rate of acceleration? **(2 points)**
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