Support for

Motion Graphs

IB MYP Criterion C
IGCSE

These notes are prepared by
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The purpose is to support students with understanding, learning and connecting the concept with real situation.

Learning target : This sheet is designed as a practice sheet for students on the concept of "graphical representation of motion in one dimension "

Basic understanding needed : Students should have understanding of distance/ time graphs, displacement/ time graphs, speed/time graphs, velocity/time graphs and acceleration/time graphs.

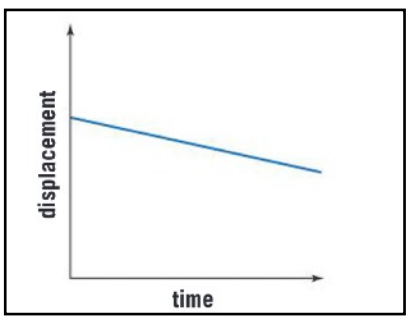
Focus Criteria - Criterion C
Student will be expected to : interpret and analyse the above mentioned graphs

Below is the reference from the book " MYP physics 4 & 5 - Oxford " Use this clip as a reference to interpret and analyse the graphs underneath as asked ?

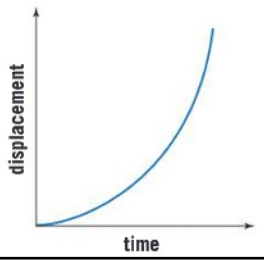
Sometimes we need to accurately predict an object's motion rather than just rely on intuition; one way of doing this is with a graph.

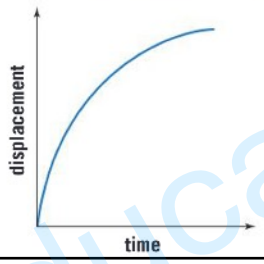
A displacement–time graph plots an object's displacement against time. The velocity is the rate of change of the displacement, that is, the change in displacement divided by the time taken. This can be found from the gradient of the graph.

A straight line graph with a constant gradient indicates that in any given time period, the change in displacement is the same. Therefore, the object has a constant velocity.

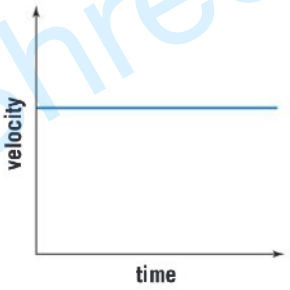


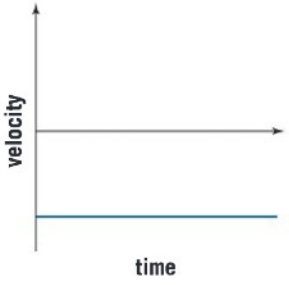
If the displacement–time graph is curved, then this shows that the speed is not constant and so the object is accelerating or decelerating.





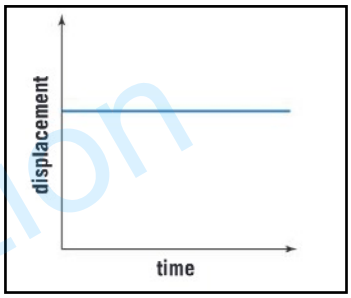
Another way of showing an object's motion is by plotting a velocity–time graph. Here velocity, rather than distance is plotted against time. In this case, the gradient of the graph represents the acceleration.



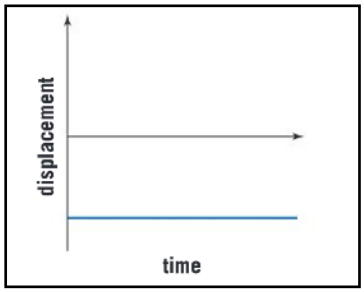


Q1. Use the below graph to answer the questions that follow

a. Explain why the object is stationary.

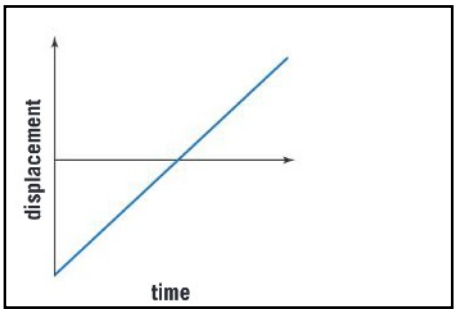


b. This shows a negative displacement. What does this indicate about the position of an object with reference to the observer ?

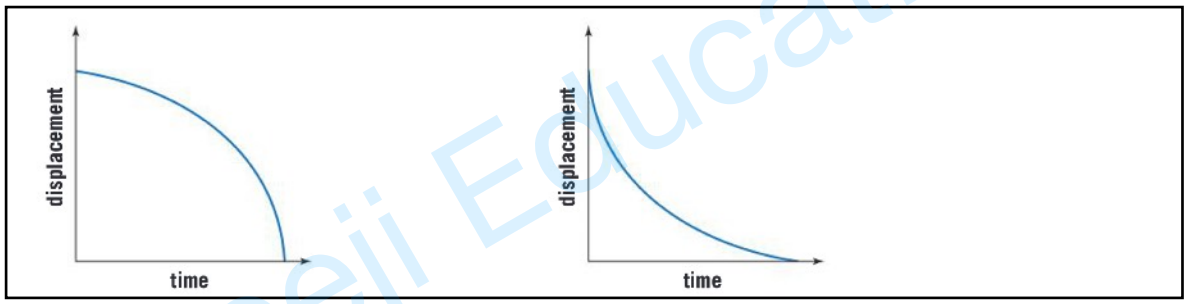


c. An object is moving away from the observer. It starts behind the observer and them moves past it. Justify this with reference to graph.

d. An. Object is moving towards the observer at constant velocity. Justify with reference to graph.



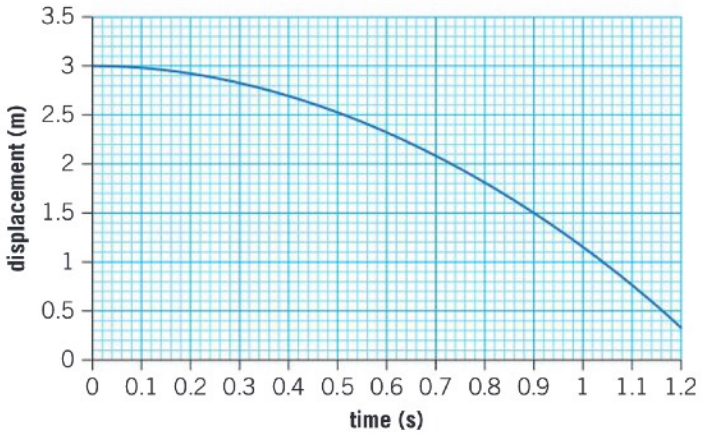
Q2. Use the below reference to answer the questions that follow : a.



a. Explain the motion of the first graph above.
b. Differentiate between the two graphs above.

Q3. Use the below reference to answer the questions that follow :

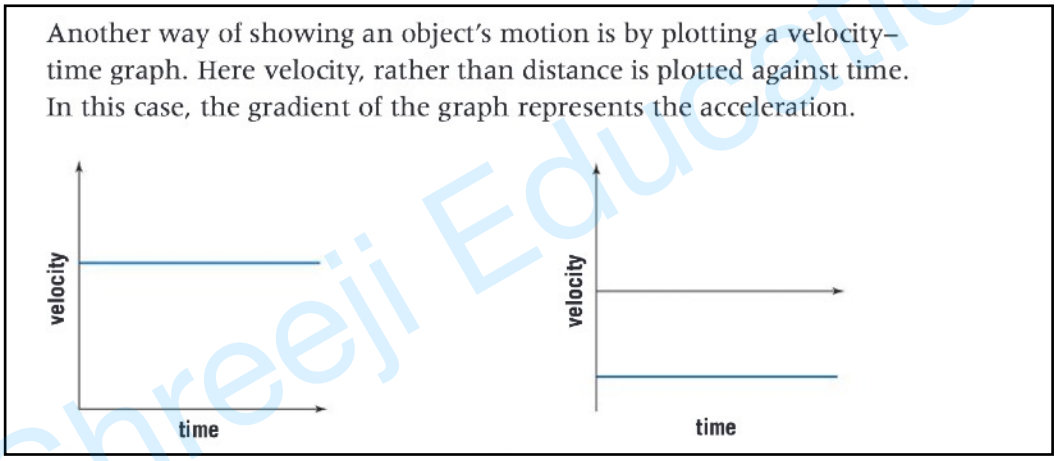
Here is the displacement–time graph for an object in free fall on the surface of Mars.



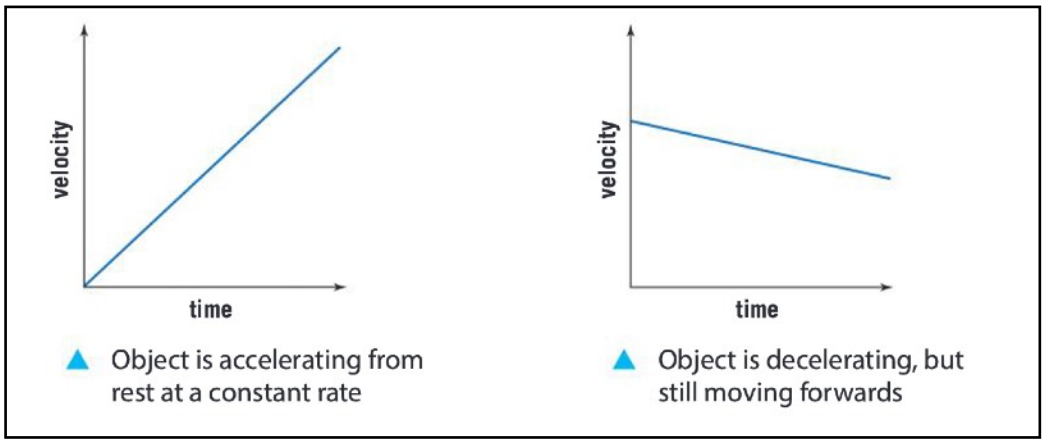
a. Validate the statement with reasoning “The object is dropped from rest “
b. Calculate the average speed over the first 0.9 seconds.

Q4. Use the reference to answer the questions that follow :

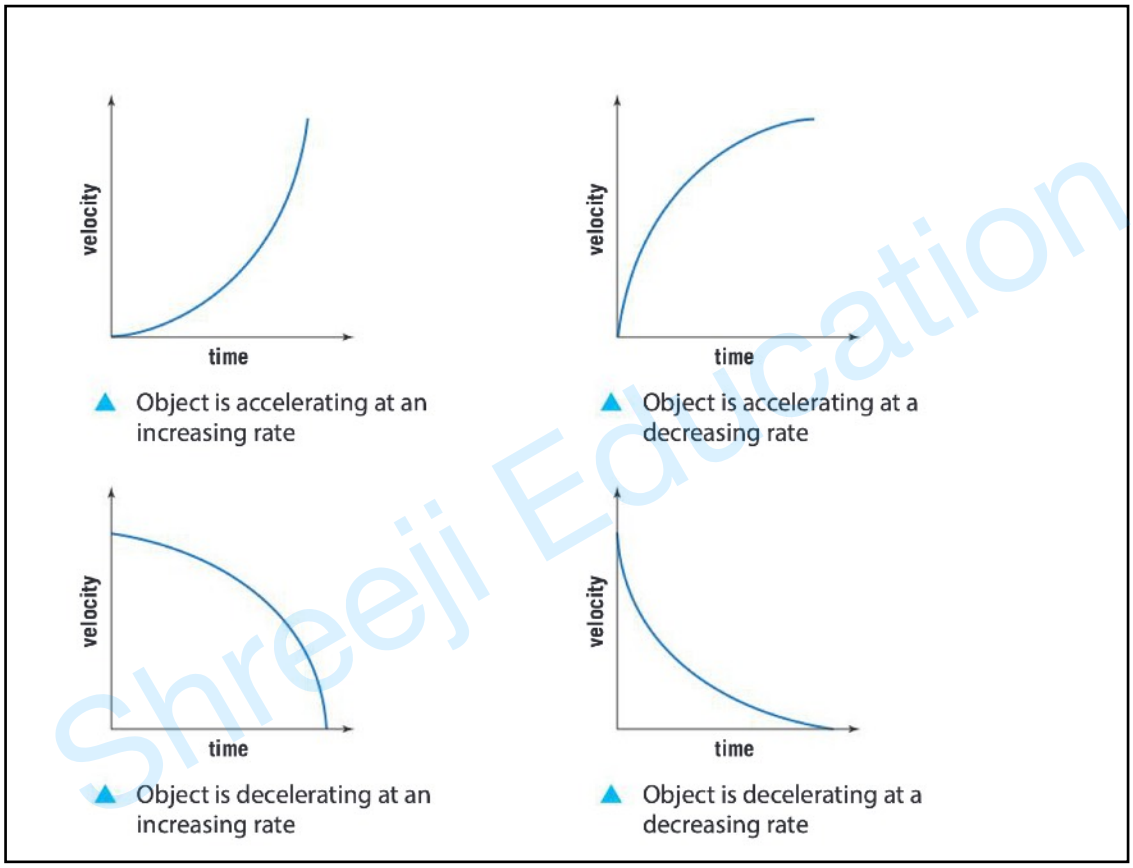
a. The object is travelling at a constant velocity is represented in first figure above. Interpret what can be said about the motion in second figure where the velocity is negative.



b. Justify the motion with reasoning as shown between the two graphs shown below:



Q5. Analyse the below graphs with reference to the motion described below each graph.



Reference - MYP physics 4 and 5 - Oxford