



PHYSICS

DISTANCE-TIME GRAPHS

Learning Goals

B2.2 - Analyse and interpret position-time graphs of motion in one dimension.

Success Criteria

- What is a D-T graph?
- What does the SLOPE mean on a D-T Graph?
- What is the relationship between slope and speed?
- Is it possible to have a vertical line on an D-T Graph?
- What does a horizontal slope on a D-T Graph mean?
- What is happening if the D-T Graph curves?



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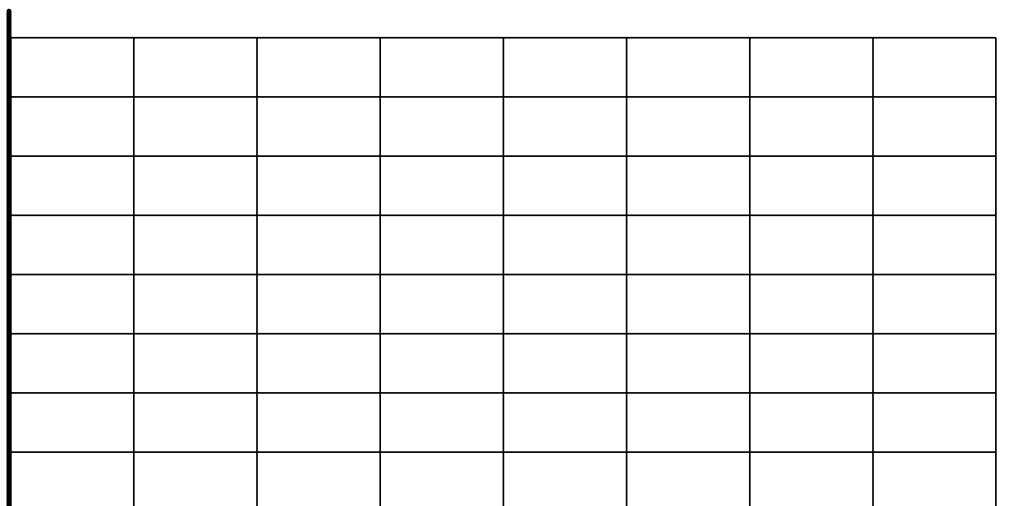
DISTANCE-TIME GRAPHS

A Distance-Time graph (or DT graph), is a graph that represents an object's motion. If the motion involves direction then it is a Displacement-Time graph (or Position-Time Graph). The general form looks like the following:



Ex: Graph the following on a distance-time graph

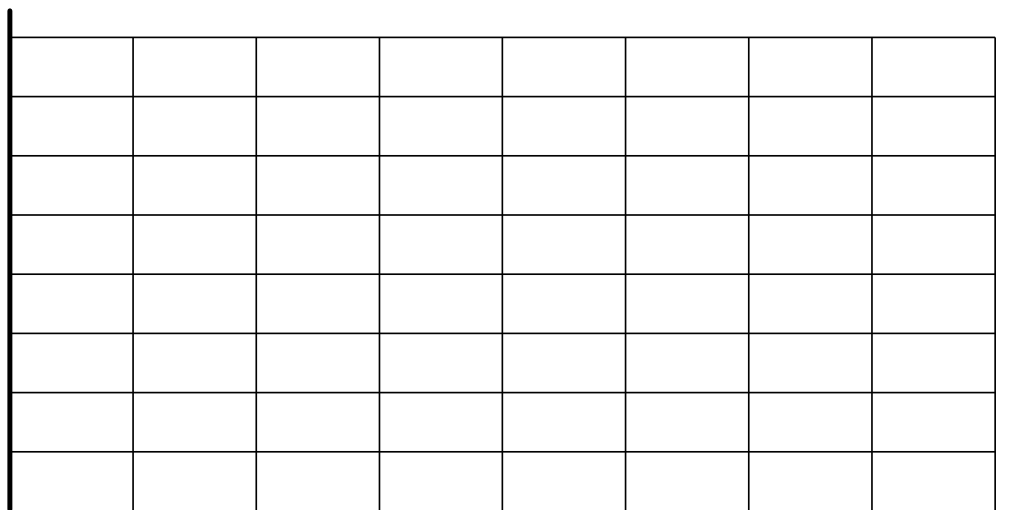
Time (s)	0	1	2	3	4	5	6	7	8
Distance (m)	0	2	4	6	8	8	8	4	0





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DISTANCE-TIME GRAPHS



In order to calculate the speed using a distance-time graph one must find the ***SLOPE*** of the graph.



DISTANCE-TIME GRAPHS

SLOPE FACTS:

1.



2.



3.



4.



5.



1.3 - Distance-Time Graphs

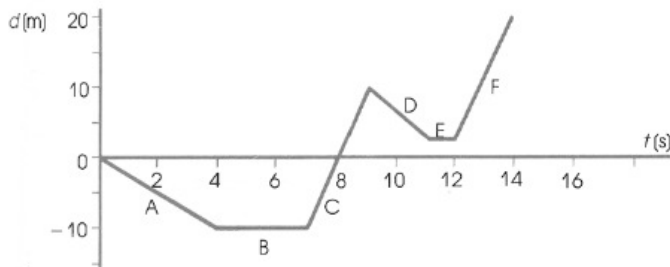


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HOMWORK

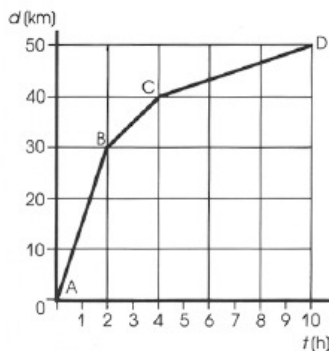
Motion Graphs Worksheet

1. Find the velocity in each section of the following position-time graph. (-2.5 m/s , 0 , 10 m/s , -3.8 m/s , 0 , 8.8 m/s)



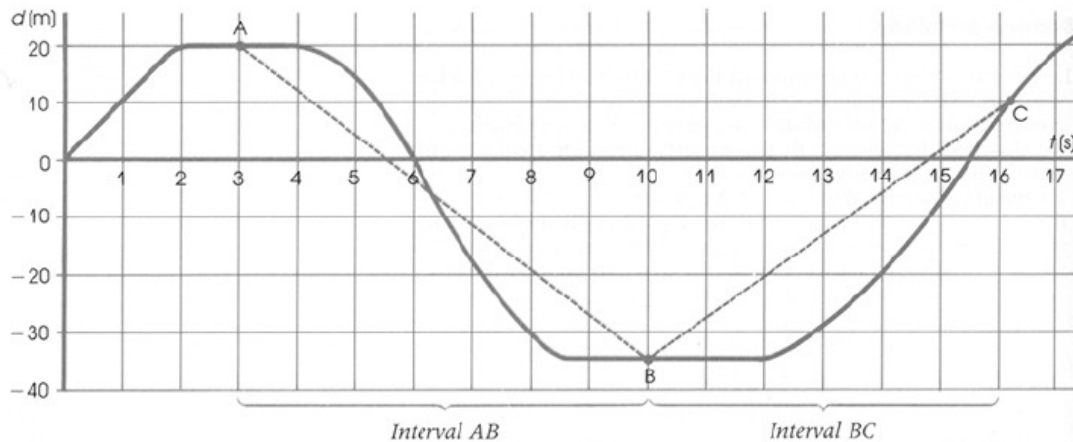
2. Using the graph below, determine the average velocity for these intervals:

- AB (15 km/h)
- AD (5.0 km/h)
- BD (2.5 km/h)



3. Using the graph below, determine the average velocity for each of the following sections.

- $t = 0 \text{ s}$ to $t = 2 \text{ s}$ (10 m/s)
- $t = 6 \text{ s}$ to $t = 12 \text{ s}$ (-5.8 m/s)
- $t = 6 \text{ s}$ to $t = 15.5 \text{ s}$ (0)



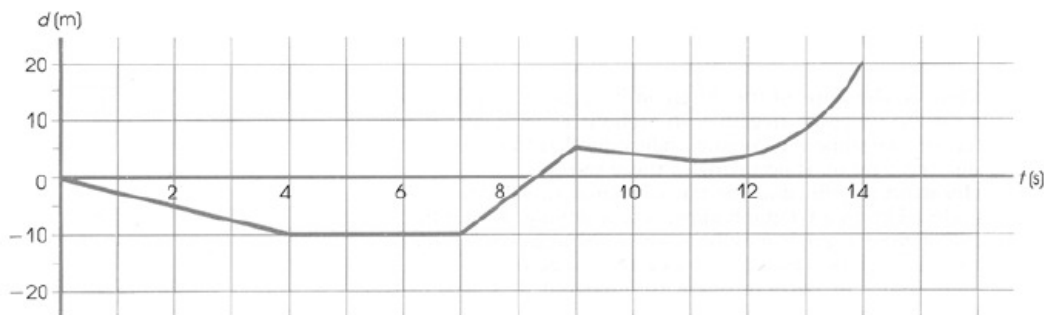
1.3 - Distance-Time Graphs



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HOMEWORK

4. The following graph is that of an object moving in a straight line. East is considered as the positive direction.
- Determine the position of the object after 7.0 s . (-10 m)
 - The graph shows five distinct sections. Briefly, and in general terms, describe the motion of the object in each of these sections.
 - Considering the whole journey, calculate the average velocity. (1.4 m/s)
 - Find the instantaneous velocity at $t = 13\text{ s}$. (8 m/s)
 - Using an appropriate scale, draw a velocity-time graph from the position-time graph.



5. This graph below describes the motion of an object moving in a straight line. At the beginning it is going east. From the graph determine each of the following.
- the object's displacement in the first 3.0 s (200 m [E])
 - the object's displacement between $t = 3.0\text{ s}$ and $t = 5.0\text{ s}$ (0)
 - the total displacement of the object in 14 s (0)
 - the average velocity of the object from $t = 0$ to $t = 8.0\text{ s}$ (17.5 m/s [E])

