

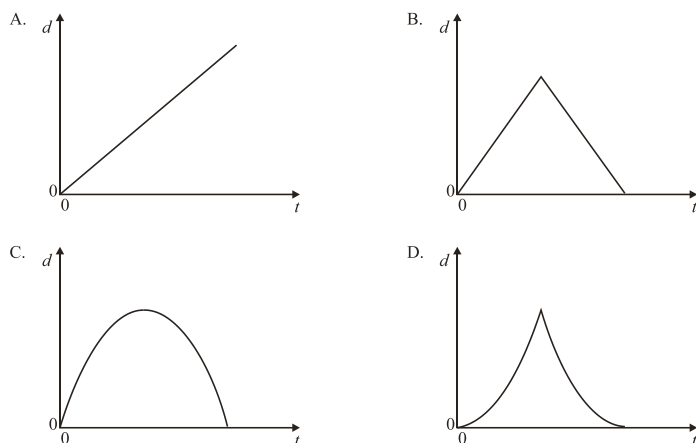
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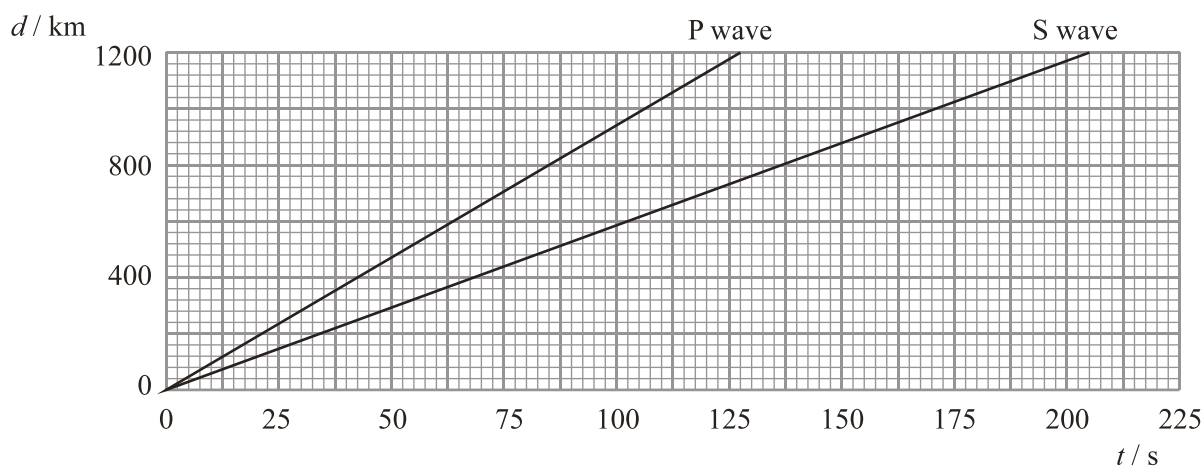
Mr Rawson

Position and Displacement 2

1. An athlete runs round a circular track at constant speed. Which one of the following graphs best represents the variation with time t of the magnitude d of the displacement of the athlete from the starting position during one lap of the track?



2. The centre of an earthquake produces both longitudinal waves (P waves) and transverse waves (S waves). The graph below shows the variation with time t of the distance d moved by the two types of wave.



- A. Use the graph to determine the speed of:

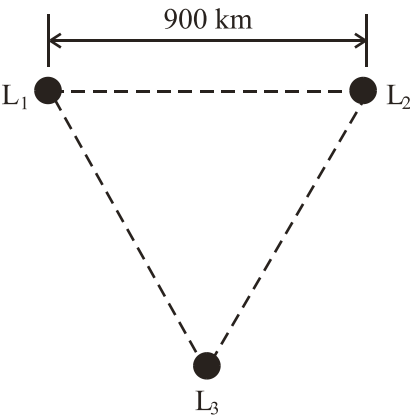
i. the P waves

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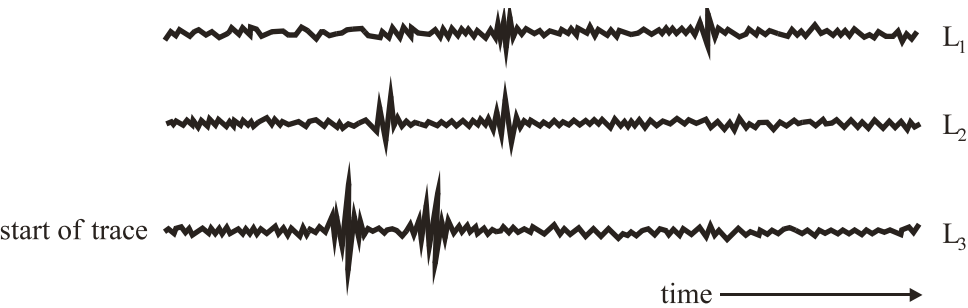
ii. the S waves

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The waves from an earthquake close to the Earth’s surface are detected at three laboratories L1, L2 and L3. The laboratories are at the corners of a triangle so that each is separated from the others by a distance of 900 km, as shown in the diagram below.



The records of the variation with time of the vibrations produced by the earthquake as detected at the three laboratories are shown below. All three records were started at the same time.



On each record, one pulse is made by the S wave and the other by the P wave. The separation of the two pulses is referred to as the S-P interval.

- B. i. On the trace produced by laboratory L2, identify, by reference to your answers in (c), the pulse due to the P wave (label the pulse P).
- ii. Using evidence from the records of the earthquake, state which laboratory was closest to the site of the earthquake.
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- iii. State three separate pieces of evidence for your statement in (b)(ii).
1.
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2.
-
3.
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- iv. The S-P intervals are 68 s, 42 s and 27 s for laboratories L1, L2 and L3 respectively. Use the graph, or otherwise, to determine the distance of the earthquake from each laboratory. Explain your working.

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Distance from L1= km

Distance from L2= km

Distance from L3= km

- v. Mark on the diagram below the likely source location of the earthquake.

