This task is about using data to find out more about earthquakes.

An earthquake struck the South Island of New Zealand about 10:17 a.m. yesterday morning. Below are the seismograph records from three different recording stations; A, B, and C. (See map of the South Island for their location).



a) For each station measure (in millimetres) the distance between the beginning of the P wave and the beginning of the S wave.

Station A: distance between P and S wave = _____ mm.

Station B: distance between P and S wave = _____ mm.

Station C: distance between P and S wave = _____ mm.

b)The distance between the P and the S wave, i.e., the information from part a) can be used to calculate how far each station was from the epicentre of the earthquake. Use Table I below to work out these distances.

Table I - Relationship between time and distance between P and S waves and distance from epicentre								
Distance between P and S waves (mm)	5	10	15	21	26	30	36	41
Time between P and S waves (seconds)	4	7	10	14	17	21	24	28
Distance from epicentre (km)	25	50	75	100	125	150	175	200

i) Station A was _____ km away.

ii) Station B was _____ km away.

iii) Station C was _____ km away.

- c) Use the distances you calculated in b) above, and the scale on the map of the South Island to show where the epicentre of the earthquake was located. Use a compass to find this point on the map of the South Island, then mark this point with an **X**.
- d)Another seismograph recording station which is further away from the epicentre than A, B, or C is located at point D in the South Island (see map). In the space below draw a recording that could have come from this station, and label the P and S waves. Your drawing only needs to be an approximation of such a recording.

Station D		
	Map of South Island showing locations of seismograph recording stations.	
	50	



e) Use the data from **Station A** to complete the statements to calculate the magnitude of this earthquake.

i) Use Table I to calculate the time difference between the arrival of the P and S waves for Station A.

Time difference = _____ seconds

ii) Measure the maximum amplitude of the S wave (on the seismograph record) in Station A in millimetres.

Amplitude of S wave = _____ mm

iii) On the diagram below draw a line between these two points to find the earthquake's magnitude.



iv) What is the magnitude of this earthquake? _____

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