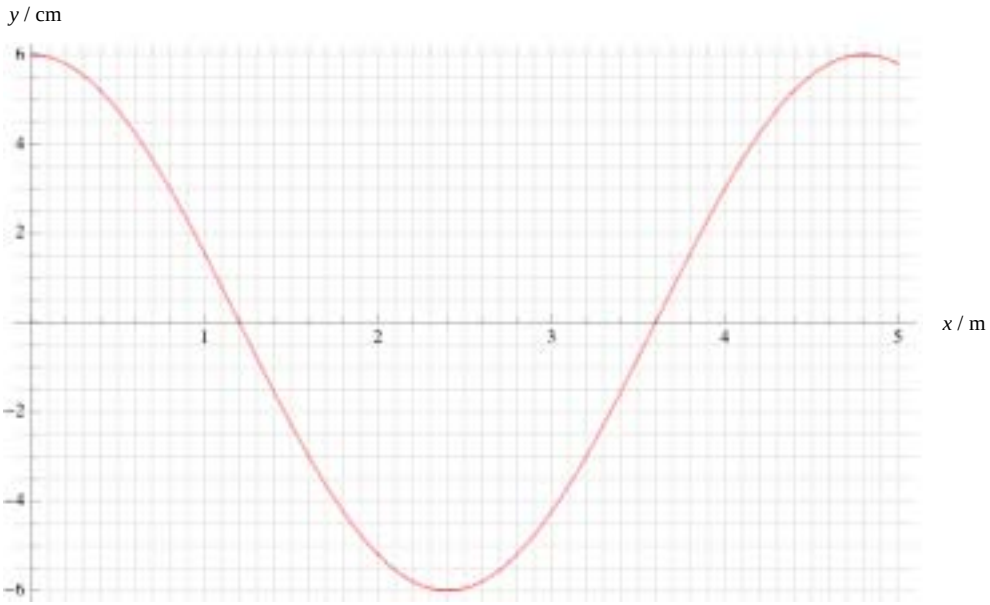
Extension Worksheet – Topic 4, Worksheet 2

1 The graph shows the variation with distance (in m) of the displacement (in cm) of a transverse wave at a particular time. The frequency of the wave is 45 Hz. The wave is directed to the right.



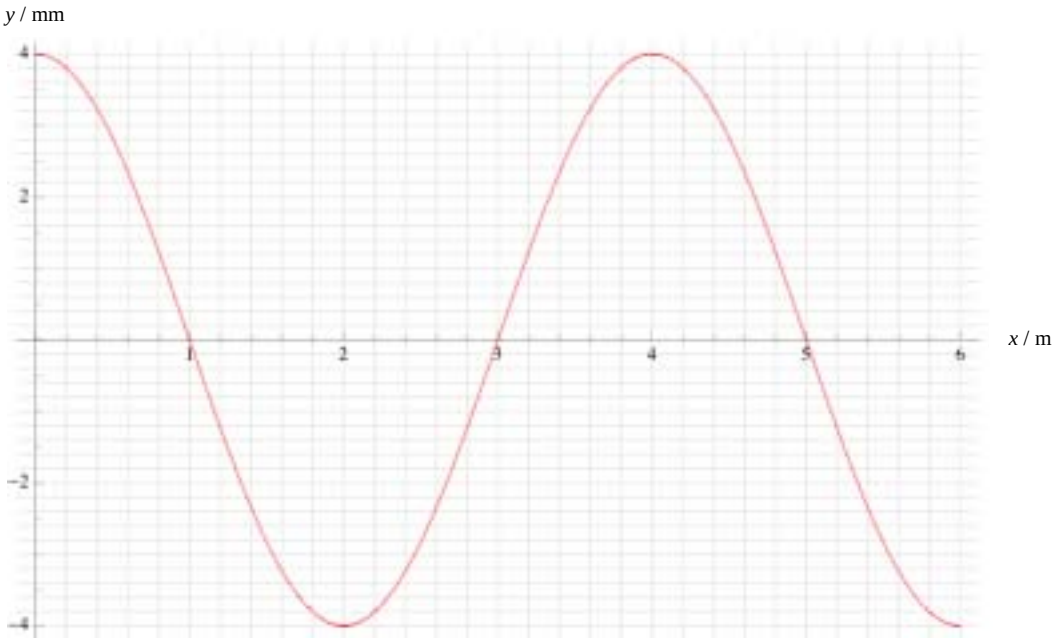
a Calculate the speed of the wave. [2]

b Calculate the velocity (magnitude and direction) of a point at a distance of 4.5 m in the medium where the wave is travelling. [3]

c Draw the displacement of the wave a quarter of a period later. [1]

2 For the previous problem mark a point on the wave where the velocity of a point in the medium is maximum in magnitude (mark this with the letter V) and a point where the acceleration is maximum in magnitude (mark this with the letter A). [2]

3 The graph shows the variation with distance (in m) of the displacement (in mm) of a longitudinal wave of frequency 25 Hz at $t = 0$ s. The wave is travelling to the right. Positive displacements indicate displacements to the right.

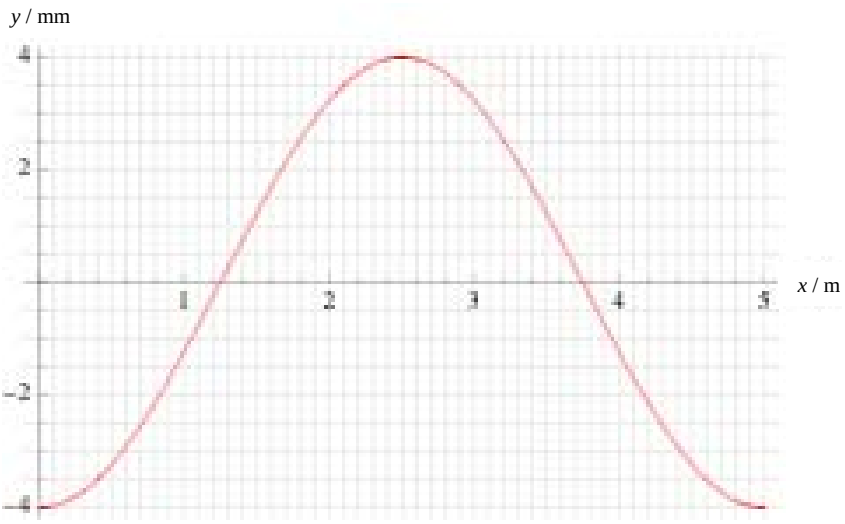


a Calculate the speed of the wave. [1]

b Calculate the velocity of the particle at position $x = 1.0$ m at $t = 0$ s. [3]

c On the same axes draw a graph to show the variation with distance of the displacement of this wave at $t = 0.01$ s. [2]

4 The graph shows the variation with distance (in m) of the displacement (in mm) of a longitudinal wave. The wave is directed to the right. Positive displacements indicate displacements to the right.



Mark a point in the medium which is at the centre of a compression (C) and one that is at the centre of a rarefaction (R). [2]