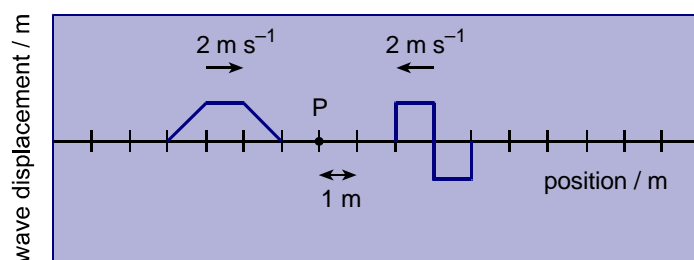


## TAP 320 - 3: Superposition of waves: a drawing exercise

This is a question on superposition of waves. You will need two pieces of A4 graph paper.

### Superposing waves

The diagram below shows a snapshot of two waves approaching each other.



Take a sheet of A4 graph paper and copy the initial graph, taking up about one-quarter of the sheet.

1. Draw three new sets of axes, one below the other, and draw the waveform observed after one second, two seconds and three seconds. Label each!
2. You have drawn wave displacement against position graphs. On a separate sheet of graph paper draw a displacement against time graph for point P over the three second period.

### Hints

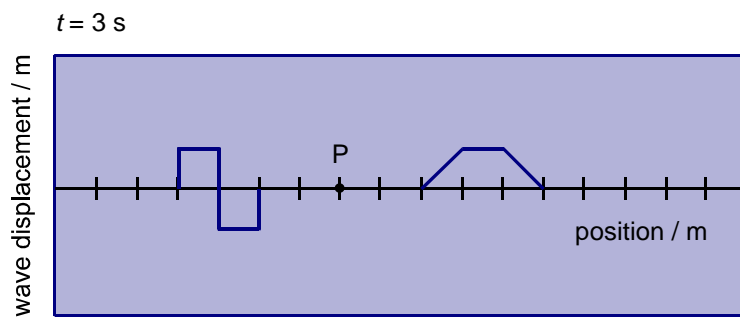
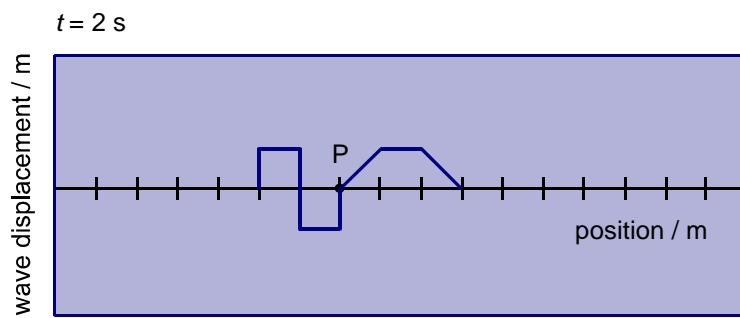
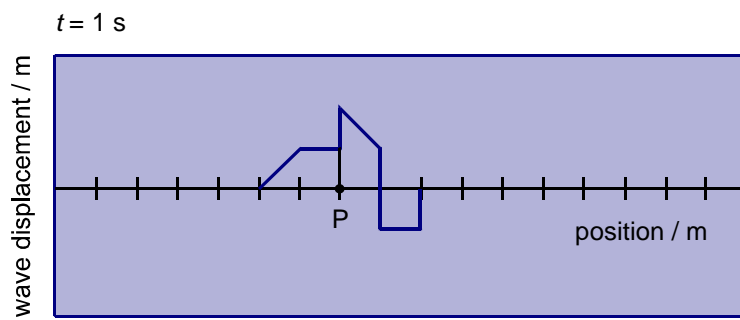
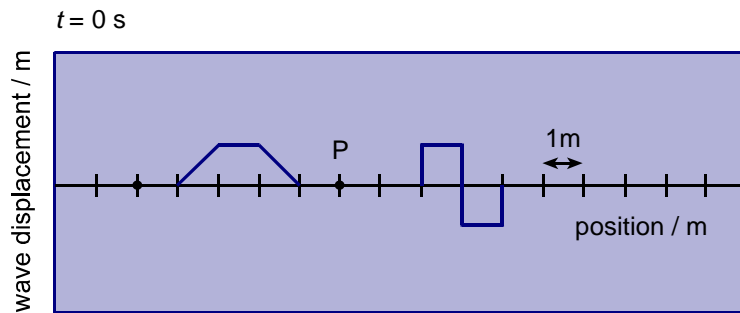
1. Remember that a 'wave-profile' is like a 'snapshot'. One second later one wave will have moved 2 m to the right and the other 2 m to the left. Draw both waves in lightly and then draw the superposition pattern with a darker line. The superposition pattern is just the two waves added together.
2. At zero seconds point P is at zero displacement. Use your answers to part 2 to find the displacement of P at one, two and three seconds and plot these points on a displacement–time graph. Then think carefully about the movement of P during each second.

### Practical advice

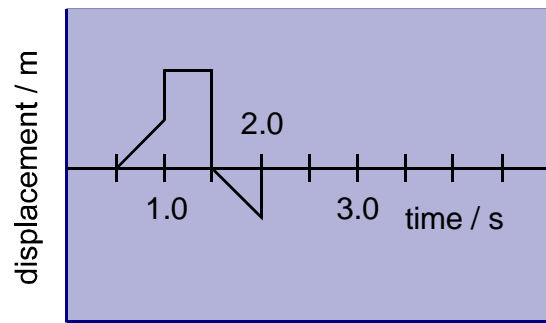
This gives further pencil and paper practice on ideas of superposition. Question 2 points to the important distinction between wave displacement–position graphs and displacement–time graphs.

Answers and worked solutions.

1



2.



**External reference**

This activity is taken from Advancing Physics chapter 6, display 20W