Question

The table gives the velocity vms^{-1} of an electric milk float t seconds after starting from rest.

t	0	2	4	6	8	10	12
v	0	3.0	4.7	5.8	6.6	7.1	7.3

Use Simpson's rule to estimate the distance travelled in 12 seconds.

Answer

Now distance travelled in time T, $S = \int_0^T v\,dt$

Here $T = 12$ and we have 7 ordinates $y_1 \to y_7$ and from table the spacing of x values gives $h = 2$

$$\begin{aligned} S &= \frac{2}{3} \times (\underbrace{0 + 7.3}_{y_1 + y_7} + 4(\underbrace{3.0 + 5.8 + 7.1}_{y_2 + y_4 + y_6}) + 2(\underbrace{4.7 + 6.6}_{y_3 + y_5})) \\ &= \underline{62.333 = 62m} \text{to 3s.f.} \end{aligned}$$