

A train starts from rest and accelerates at 10 m/s² for 1.5. the train then travels at a constant velocity for 3 minutes. What total distance is covered by the train in the 4.5 minutes?

Distance that train covers with acceleration:

$$S_1 = \frac{at_1^2}{2}$$

Distance that train covers with constant velocity:

$$S_2 = vt_2 = at_1 t_2$$

Total distance is:

$$S = S_1 + S_2 = \frac{at_1^2}{2} + at_1 t_2 = at_1 \left(\frac{t_1}{2} + t_2 \right)$$

$$S = 10m/s^2 * 90s * \left(\frac{90s}{2} + 180s \right) = 202500m = 202.5km$$

Answer: $S = 202.5km$