Answer on Question #76759, Physics / Mechanics | Relativity | for completion

A train is travelling with a velocity of 40 km/h i) What should be the acceleration on it so that it may reach a point 10 km ahead in 8 minutes ii)What will be its velocity on reaching that point.

We can write the equation of velocity in the next way: $v=v_0+at$, where $v_0=40$ km/h, a – acceleration.

i)

Distance is an integral from velocity with respect to time:

$$\int_0^{8/60}(40+at)dt=\left(40t+\frac{at^2}{2}\right)\Big|_0^{2/15}=\frac{80}{15}+a\frac{2}{225}=10.\,a=525\frac{km}{h^2}.$$

ii)

We can evaluate final velocity: $v_f=40+525*(8/60)=110$ km/h.