Answer on Question #38573, Physics, Mechanics

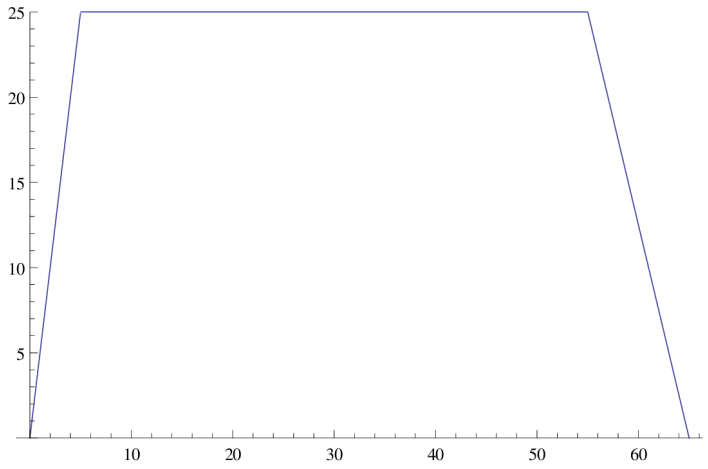
Let us examine motion on each of three parts of the distance.

I. Motion with acceleration $5\frac{m}{s^2}$ for 5 seconds. Here, velocity is $v=v_0+at=5t$. For $t=5s$, $v=5\cdot5=25\frac{m}{s}$.

II. Motion with constant velocity $v=25\frac{m}{s}$ for 50 seconds.

III. Motion with retardation for 10 seconds. Using formula $v=v_0+at$ find the retardation, $0=25+10\cdot a\Rightarrow a=-2.5\frac{m}{s^2}$. Hence, velocity as a function of time is $v=25-2.5t$ (If time starts from zero at third part of the track).

Velocity graph is



The distance covered is sum of distances covered on each part of the road:

$S=\int_0^5 5\,t\,dt+50\cdot50+\int_0^{10}(25-2.5\,t)dt=5\,\frac{t^2}{2}\Big|_0^5+2500+\left(25\,t-2.5\,\frac{t^2}{2}\right)\Big|_0^{10}=2690\ m$ (area under the velocity curve).