

Runner passed 8100 m in 25 min = 1500 s. Hence, his speed was $v_0 = 8100/1500 = 5.4$ m/s Now, he have to pass $S=1900$ m in $T=5$ min = 300s. Let us suppose, he will be accelerating t seconds. Then, equation will look like:

$$v_0 \cdot t_1 + a \cdot t_1^2/2 + (v_0 + a \cdot t_1) \cdot t_2 = S$$

with condition $t_1 + t_2 = T$, where t_1 is time when he moves with acceleration and t_2 is time when he moves at reached speed. We can solve this system for t_1 :

$$t_2 = T - t_1$$

$$v_0 \cdot t_1 + a \cdot t_1^2/2 + (v_0 + a \cdot t_1) \cdot (T - t_1) = S$$

$$v_0 \cdot t_1 + a \cdot t_1^2/2 + T \cdot v_0 + a \cdot t_1 \cdot T - v_0 \cdot t_1 - a \cdot t_1^2 = S$$

$$-t_1^2 \cdot a/2 + a \cdot t_1 \cdot T + T \cdot v_0 - S = 0$$

$$t_1 = 3.76 \text{ s}$$

Runner has to accelerate for 3.76 seconds.