

Worked example

Using equation 1

A cyclist starting from rest with uniform acceleration can reach a velocity of 20 m/s in 25 seconds. Calculate her acceleration.

Given

Initial velocity $u = 0\text{ m/s}$

Final velocity $v = 20\text{ m/s}$

Time taken $t = 25\text{ s}$

$$a = \frac{v - u}{t} = \frac{20 - 0}{25} = 0.8\text{ m/s}^2$$

using equation 5

A train accelerates uniformly from rest at 0.2 m/s^2 over a distance of 1 km .

Calculate the final velocity it reaches.

$u = 0$ (starts from rest)

$a = 0.2\text{ m/s}^2$

$s = 1\text{ km} = 1000\text{ m}$

Note: use equation 5 for v when know s but not t .

$$v^2 = u^2 + 2as$$

$$= 0 + 2(0.2\text{ m/s}^2) \times 1000\text{ m}$$

$$= 400\text{ m}^2\text{ s}^{-2}$$

Final velocity, $v = 20\text{ m/s}$