

1. A cyclist is travelling at 2ms^{-1} as she approaches a short downwards hill. She travels down the hill for 4 s until she is travelling at 10ms^{-1} .

i) State the meaning of *a car has an acceleration of 6ms^{-2}* .

Ans: *The car is gaining 6ms^{-1} of speed every second.*

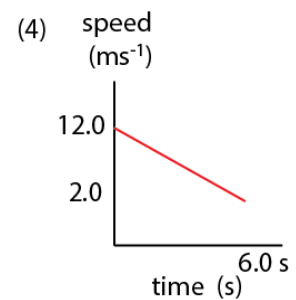
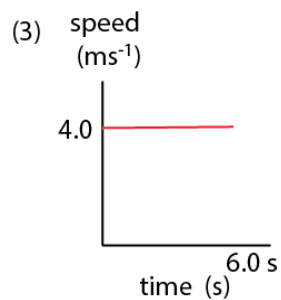
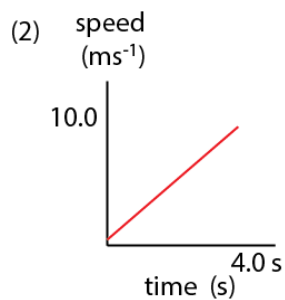
ii) Calculate the acceleration of the cyclist whilst travelling down the hill.

$$a = \frac{v - u}{t} = \frac{10\text{ms}^{-1} - 2\text{ms}^{-1}}{2\text{s}} = \frac{8\text{ms}^{-1}}{2\text{s}} = 4\text{ms}^{-2}$$

2. Draw a speed –time graph for car speeding up uniformly from 0.0ms^{-1} to 10.0ms^{-1} for 4.0 s.

3. Draw a speed –time graph for a cyclist travelling at a steady speed of 4.0ms^{-1} for 6.0 s. (Use a ruler and remember to label the axes)

4. Draw a speed –time graph for a cyclist slowing down up from 12.0ms^{-1} to 2.0ms^{-1} in 6.0s. (Use a ruler and remember to label the axes).



5. Starting from rest, the flea accelerates to 1.2 metres per second in a time of 0.001 seconds. If the flea has a mass of 0.0001 kilograms, calculate its acceleration.

$$a = \frac{v - u}{t} = \frac{1.2\text{ms}^{-1} - 0.0\text{ms}^{-1}}{0.001\text{s}} = 1200.0\text{ms}^{-2}$$