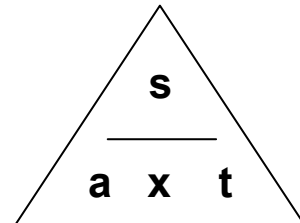




The acceleration of an object can be calculated using the equation:

$$\text{acceleration (m/s}^2\text{)} = \frac{\text{change in speed (m)}}{\text{time taken for change (s)}}$$



Copy and answer these questions. Remember to include your working out and units.

1. Calculate the acceleration of a bike, if its speed changes from 0m/s to 30m/s in 6 seconds?
2. A boy carries out an experiment by dropping a marble from a window. His friend uses a datalogger to measure the speed of the ball as it hits the ground, and find it to be 30m/s. Calculate the acceleration due to gravity.
3. A boat increases its speed from 15m/s to 25m/s in 12 seconds. Calculate the boat's acceleration?
4. A cyclist freewheels down a hill. Her speed increases from 12 km/hr to 23 km/hr in 6 seconds. Calculate her acceleration in m/s².
5. A vehicle is moving at 10m/s. If it accelerates at 3m/s², how long is it before it is moving at 31m/s?
6. The speed of a car between two sets of traffic lights changes as shown:

| | | | | | | | |
|--------------------|-----|-----|-----|-----|------|-----|-----|
| Time (s) | 0 | 20 | 40 | 60 | 80 | 100 | 120 |
| Speed (m/s) | 0.0 | 2.5 | 5.0 | 7.5 | 10.0 | 5.0 | 0.0 |

- a. Plot a graph of speed versus time for the car's motion.
- b. Calculate the acceleration and distance travelled in:
 - i) the first 80 seconds.
 - ii) the last 40 seconds.
- c. Work out the average speed of the car between the 2 sets of lights.