

Equations of Motion

$$v = a t + u \quad S = u t + \frac{1}{2} a t^2 \quad v^2 = u^2 + 2 a s \quad S = \frac{(u+v)t}{2}$$

1. A car starts from **rest** and accelerates uniformly for **8.0 s**.



It reaches a final speed of **24 m/ s**.

- What is the acceleration of the car?
- Calculate the distance travelled by the car.
- What is the average velocity of the car?

2. A racing car can start from rest and travel **600 m** in **14 s**.

- What is its **average acceleration** during this time?
- Calculate the **final speed of the car**.
- How fast is this final speed in **km/ h**?



3. A space-rocket is launched and accelerates uniformly from **rest** to **180 m/ s** in **5.5**



- What is its **average acceleration** during this time?
- How fast is this **final speed** in **km/ h**?

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6. A cyclist is travelling at a constant speed of 15 m/s when he passes a stationary bus. The bus starts moving just as the cyclist passes, and accelerates at 1.5 m/s^2 .
- When does the bus reach the same speed as the cyclist?
 - What distance has the cyclist travelled before the bus catches up?

