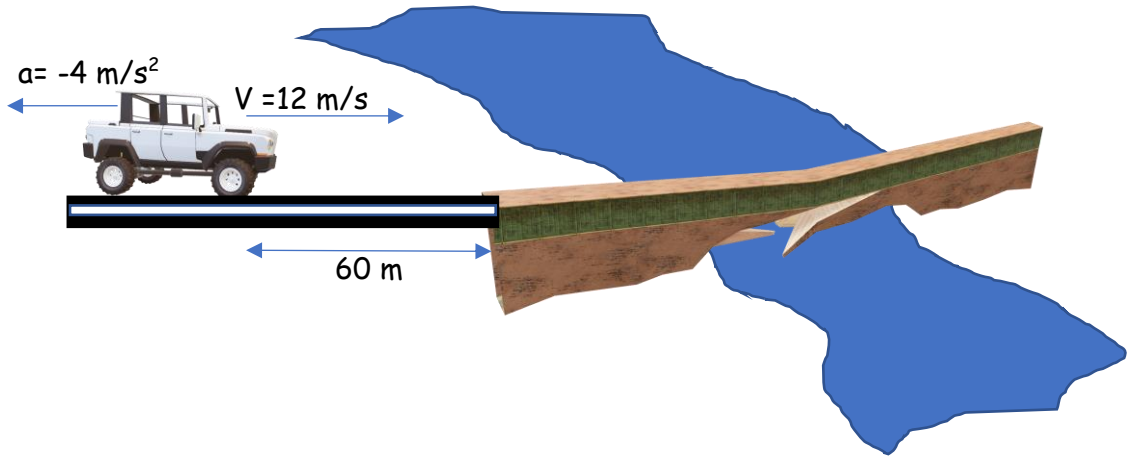
1. A car drives along a road at 12 m/s toward a bridge. Suddenly, in 60 metres away from the bridge the driver saw the warning sign that the bridge is unfunctional. The car can decelerate at maximum 4 m/s^2. What is the maximum reaction time that the driver can have to make sure he will stop the car before the bridge?



Stopping Distance = **Thinking Distance** + **Braking Distance**

Thinking Distance – the distance before the driver reacts and press the brake.

The car's velocity v = 12 m/s

Thinking Distance = Velocity x Time = 12 x $t_{reaction}$

Braking Distance – the distance covered after the driver pressed the brake and before the car stops.

Braking Distance: $v^2 = u^2 + 2as$

v-final velocity = 0 m/s, as the car stopped at the end.

$0 = 12^2 + 2 \times (-4) \times S$

$0 = 144 - 8S$

$S = \frac{-144}{-8} = 18$ m – Braking Distance

Stopping Distance = 60 m

Stopping Distance = Thinking Distance + Braking Distance

Thinking Distance = Stopping Distance - Braking Distance

Thinking Distance = 60 m -18 m = 42 m

$t_{reaction} = \frac{Thinking\ Distance}{Speed} = \frac{42}{12} = 3.5\ s$