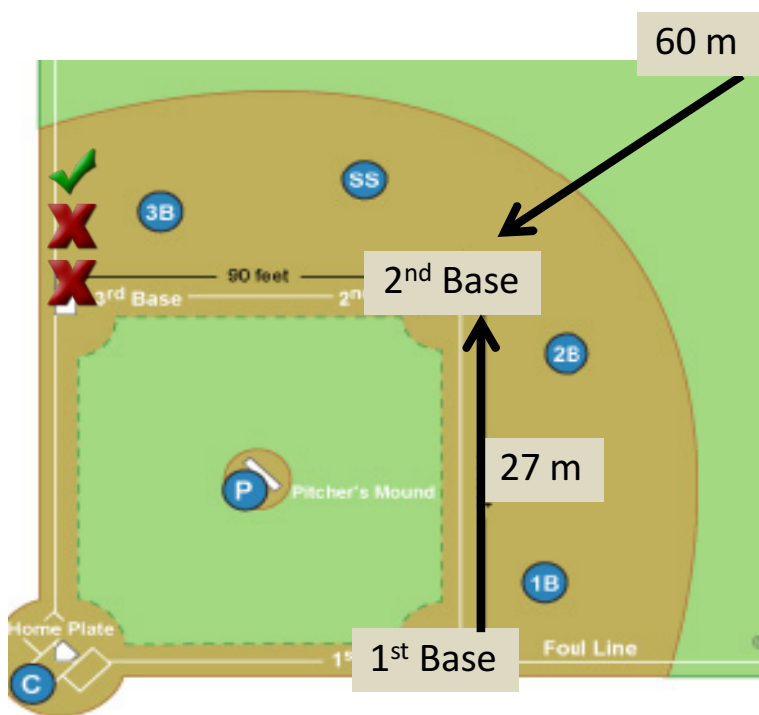


# Mathletics Senior Level

# S1. Physics

In a baseball game a player is running from 1st to 2<sup>nd</sup> base (27m) at a speed of 9m/sec. The ball is being thrown to second base from the field a distance of 60m at 26m/s. Which will reach 2<sup>nd</sup> base first, the ball or the player?

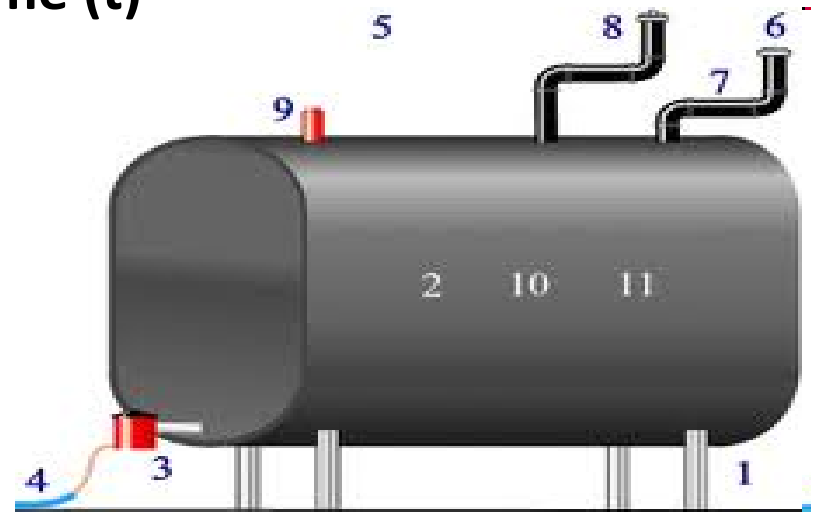
$$\text{Speed} = \text{Distance} \div \text{Time}$$



## S2. Flow Rate

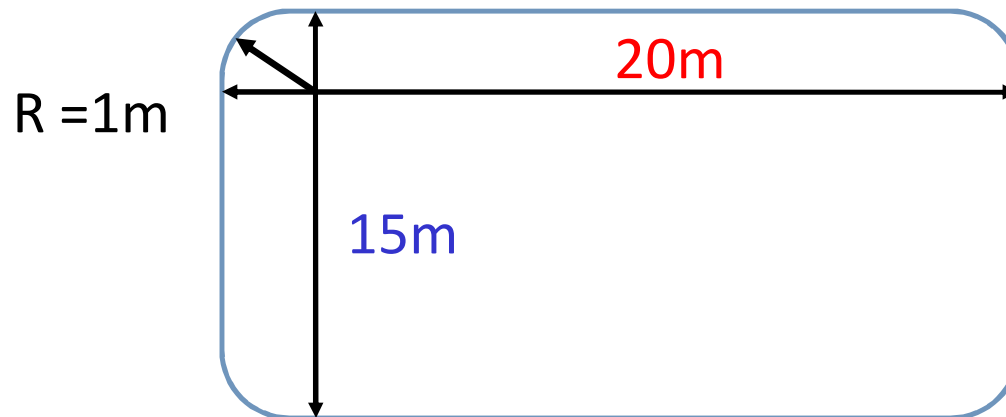
An oil tanker with a capacity of 24 cubic meters receives oil at a flow rate of 10 litres per second. What is the time taken to fill the tank in minutes?

$$\text{Flow Rate (Q)} = \text{Volume (V)} \div \text{Time (t)}$$



### S3. Geometry

A swimming pool has its greatest length of 20 m, its greatest width of 15 m and a constant depth of 3 m. Each corner has a quarter circle of radius 1 meter as shown. How much water (to the nearest thousand liters) does this swimming pool hold?



## S4. Conservation of Energy

A grain elevator is designed to lift 2 Kgs of grain through a height 12 m. Find the potential energy needed in horsepower.

Potential Energy =  $m g h$  in J/S

Where

$m$  = mass (kg);

$g$  = gravity ( $m/s^2$ ),

$h$  = height (m)

$g$  = gravity =  $9.81 m/s^2$

1 horse power = 746 J/s

