

### Answer on Question #60231-Physics-Mechanics-Relativity

A baseball is hit toward center field; it will travel 72 m before it reaches the ground. At the first moment the ball is hit, the center fielder is 98 m away from home plate. He uses 0.5 s to judge the flight of the ball, then races to catch it. The ball's speed when it leaves the bat is 35 m/s at home plate. Can the center fielder catch the ball before it hits the ground?

#### Solution

$$T = \frac{D}{V} = \frac{72}{35} = 2.057 \text{ s.}$$

Distance between the center fielder and final position of the ball is

$$S = 98 - 72 = 26 \text{ m.}$$

The speed of the center fielder to catch the ball:

$$u = \frac{S}{T - 0.5} = \frac{26}{2.057 - 0.5} = 16.7 \frac{\text{m}}{\text{s}}.$$

But the fastest human footspeed on record is 44.64 km/h (12.4 m/s or 27.8 mph).

So, the center fielder cannot catch the ball before it hits the ground.