A monkey in a perch 20 m high in a tree drops a coconut above the head of a zoo keeper as he runs with a speed 1.5 m/s beneath the tree actually intending to hit the toes of the zoo keeper, how early in seconds should the coconut be dropped by the monkey.

Solution:

The time needed for coconut to fall from the perch is

$$t = \sqrt{\frac{2h}{g}},$$

where $h = 20\text{m}$ – is the height of the perch, $g = 10\frac{\text{m}}{\text{s}^2}$ – is the acceleration of free fall. So

$$t = \sqrt{\frac{2h}{g}} = \sqrt{\frac{2 \cdot 20\text{m}}{10\frac{\text{m}}{\text{s}^2}}} = 2\text{s}$$

Answer: 2s.