A ball is projected upwards from the top of a tower with a velocity of 50m/s making an angle of 30 degree with the horizontal. The height of the tower is 70m. After how many seconds from the instant of throwing will the ball reach the ground?

- the height when ball will reach the ground,
The ball reaches the ground if $h = 0$ (the height when ball will reach the ground =0)
h – the height of ball above ground (y-coordinate of the ball),
The ball moves with acceleration g downward (acceleration equals –g), therefore:
$h = h_0 + v_{y0}t - \frac{gt^2}{2}$
$h_0 = 70\ m$ – initial coordinate of the ball
$v_{y0} = 50\frac{m}{s}\sin 30 = 25\frac{m}{s}$ – initial velocity in y-direction
$g = 9.8\frac{m}{s^2} \approx 10\frac{m}{s^2}$ – gravity acceleration
t – time
$70 + 25t - 5t^2 = 0$
$t^2 - 5t + 14 = 0$
$t_1 = 7\ s$
$t_2 = -2\ s$
the time can be only with sign "+", so:
$t = 7\ seconds$
Answer: $t = 7\ seconds$