

**Task.** The position of a particle moving along a coordinate line is  $s = \sqrt{4 + 12t}$ , with  $s$  in meters and  $t$  in seconds. Find the particle's velocity at  $t = 1$  sec.

**Solution.** By definition, the velocity of a particle whose disposition at time  $t$  is given by some function  $s(t)$  is equal to  $s'(t)$ :

$$v(t) = s'(t).$$

In our case

$$s = \sqrt{4 + 12t},$$

so

$$v(t) = s'(t) \left( \sqrt{4 + 12t} \right) = \frac{(4 + 12t)'}{2\sqrt{4 + 12t}} = \frac{12}{2 * 2\sqrt{1 + 3t}} = \frac{3}{\sqrt{1 + 3t}}.$$

For  $t = 1$ ,

$$v(1) = \frac{3}{\sqrt{1 + 3 * 1}} = \frac{3}{\sqrt{4}} = \frac{3}{2} = 1.5 \text{ m/s}.$$

**Answer.**  $v(1) = 1.5$  m/s.