

Answer on Question #46688 – Math – Algorithms | Quantitative Methods

The position $f(x)$ of a particle moving in a line at various times x

is given in the following table. Estimate the velocity and acceleration of the particle at $x = 2.1$.

x	1.0	1.2	1.4	1.6	1.8	2.0	2.2
$f(x)$	2.72	3.32	4.06	4.96	6.05	7.39	9.02

Solution.

$$\text{Velocity at } x = 2.1: v(2.1) = \frac{f(2.2) - f(2.0)}{2.2 - 2.0} = \frac{9.02 - 7.39}{0.2} = 8.15.$$

$$\text{Velocity at } x = 2.2: v(2.2) = \frac{f(2.2) - f(2.0)}{2.2 - 2.0} = \frac{9.02 - 7.39}{0.2} = 8.15.$$

$$\text{Velocity at } x = 2.0: v(2.0) = \frac{f(2.0) - f(1.8)}{2.0 - 1.8} = \frac{7.39 - 6.05}{0.2} = 6.70.$$

$$\text{Acceleration at } x = 2.1: a(2.1) = \frac{v(2.2) - v(2.0)}{2.2 - 2.0} = \frac{8.15 - 6.70}{0.2} = 9.00.$$