

Mathematics Questions by Topic

Motion and Force

Answer 9

Source: K19SM2Q14

Question 9

A particle of mass 3 kg travels in a straight line with velocity $v \text{ ms}^{-1}$ when its displacement is x metres, where $v = \sqrt{4x^2 + 9}$. The force in newtons acting on the particle when $x = 2$ is

A.24

B.12

C.8

D.4

E. $\frac{24}{5}$ **ANSWER A**

$$v = \sqrt{4x^2 + 9}, \quad \frac{dv}{dx} = \frac{4x}{\sqrt{4x^2 + 9}}, \quad m = 3$$

$$F = ma = m \frac{dv}{dx} = 3 \times 4x = 12x$$

$$\text{when } x = 2, \quad F = 24$$