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. $\dfrac{24}{5}$

ANSWER A

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

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

when $x = 2$, $F = 24$