

81. B

$$\textcircled{81} \quad y = \frac{(2x-3)^2}{x^4} = \frac{(4x^2 - 12x + 9)}{x^4}$$

$$y = 4x^{-2} - 12x^{-3} + 9x^{-4}$$

$$\frac{dy}{dx} = -8x^{-3} + 36x^{-4} - 36x^{-5}$$

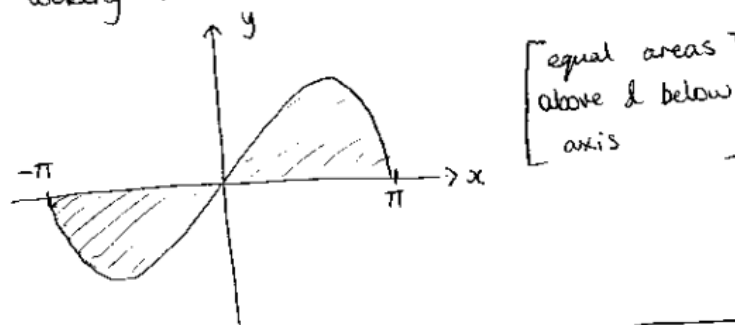
$$\text{so at } x=1, \quad \frac{dy}{dx} = -8 + 36 - 36 \\ = \boxed{-8} \quad \textcircled{B}$$

82. E

$\textcircled{82}$ Using the formula, the average (call it μ) is:

$$\mu = \frac{1}{2\pi} \int_{-\pi}^{\pi} x^2 \sin x \, dx$$

However looking at what this function looks like:



We spot that the integral must be zero so $\mu = 0$ \textcircled{E}

Remember: You would never have to calculate an integral as difficult as this so there must be a 'trick'