

Σερώβη Αναστέλλου

Elect/Elect

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$$3 \quad x = 4t^3 - t^2$$

$$y = t^4 + 2t^2$$

$$dy = 4t^3 + 4t$$

$$dx = 12t^2 - 2t$$

$$\frac{dy}{dx} = \frac{dy}{dt} \div \frac{dx}{dt}$$

$$= \frac{4t^3 + 4t}{12t^2 - 2t}$$

$$\frac{dy}{dx} = \frac{4t^3 + 4t}{12t^2 - 2t}$$

$$1 \quad y = \sin\left(\frac{6}{x^2}\right)$$

$$y + \Delta y = \sin\left(\frac{6}{(x + \Delta x)^2}\right)$$

$$\Delta y = \sin\left(\frac{6}{(x + \Delta x)^2}\right) - y$$

$$\sin A - \sin B = 2 \cos\left(\frac{A+B}{2}\right) \cdot \sin\left(\frac{A-B}{2}\right)$$

$$\Delta y = 2 \cos \left( \frac{A+B}{2} \right) \cdot \sin \left( \frac{A-B}{2} \right)$$

$$\Delta y = 2 \cos \left[ \frac{12x^2 + 12x\Delta x + 6\Delta x^2}{2x^2(x+\Delta x)^2} \right] \cdot \sin \left[ \frac{-12x\Delta x - 6\Delta x^2}{2x^2(x+\Delta x)^2} \right]$$

$$\frac{\Delta y}{\Delta x} = 2 \cos \left[ \frac{12x^2 + 12x\Delta x + 6\Delta x^2}{2x^2(x+\Delta x)^2} \right] \cdot \sin \left[ \frac{-12x\Delta x - 6\Delta x^2}{2x^2(x+\Delta x)^2} \right]$$

$$\frac{\Delta y}{\Delta x} = \frac{-12 \cos}{x^3} \left[ \frac{12x^2 + 12x\Delta x + 6\Delta x^2}{2x^2(x+\Delta x)^2} \right] \cdot \sin \left[ \frac{-12x\Delta x - 6\Delta x^2}{2x^2(x+\Delta x)^2} \right]$$

$$\frac{dy}{dx} = -12 \cos \left[ \frac{12x^2}{2x^2(x)^2} \right] \cdot 1 \quad \Delta x \rightarrow 0$$

$$\begin{aligned} \frac{dy}{dx} &= \frac{-12 \cos}{x^3} \left[ \frac{12x^2}{2x^4} \right] \\ &= \frac{-12 \cos}{x^3} \left( \frac{6}{x^2} \right) \end{aligned}$$

2  $\int_a^b y dx = A$        $x = 4t^3 - t^2$        $y = t^4 + 2t^2$   
 $a=1$     $b=3$

$$\frac{dx}{dt} = 12t^2 - 2t$$

$$dx = (12t^2 - 2t) dt$$

$$\int_1^5 (t+2t^2)(12t^2-2t) dt$$

$$\int_1^5 (12t^3 - 2t^5 + 24t^4 - 4t^3) dt$$

$$\left| \frac{12t^4}{4} - \frac{2t^6}{6} + \frac{24t^5}{5} - \frac{4t^4}{4} \right|_1^5$$

$$\left( \frac{12(5)^4}{4} - \frac{2(5)^6}{6} + \frac{24(5)^5}{5} - \frac{4(5)^4}{4} \right) - \left( \frac{12}{4} - \frac{2}{6} + \frac{24}{5} - \frac{4}{4} \right)$$

$$= \frac{481568}{105}$$

$$= 4586.361$$