3) $x = 4t^3 + t^2 \qquad y = t^4 + 2t^2$

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

$$\frac{dy}{dt} = 4t^3 + 4t$$

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

$$\frac{dy}{dx} = \frac{4t^3 + 4t}{12t^2 - 2t} = \frac{2t(2t^2 + 2)}{2t(6t - 1)}$$

$$\frac{dy}{dx} = \frac{2t^2 + 2}{6t - 1}$$

$$\Delta y/\Delta x = 6/x^2 \cdot \cos\left(\frac{12}{x^2} + 0\right)$$

$$\Delta y/\Delta x = 6/x^2 \cos 6/x^2$$

2.) $x = 4t^3 - t^2 \quad y = t^4 + 2t^3$ at $t = 2$ and $t = 1$

$$A = \int_a^b y\,dx$$

$$A = \int_1^3 t^4 + 2t^2\,dx \qquad dx/dt = 12t^2 - 2t$$

$$dx = (12t - 2t)\,dt$$

$$A = \int_1^3 t^4 + 2t^2 \cdot 12t^2 - 2t \text{ at}$$

$$A = \int_1^3 12t^6 - 2t^5 + 24t^4 - 4t^3\,dt$$

$$A = \left[\frac{12t^7}{7} = \frac{2t^6}{6} + \frac{24t^5}{5} - \frac{4t^4}{4}\right]_1^3$$

$$A = \left[\frac{12t^7}{7} - \frac{t^6}{3} + \frac{24t^5}{5} - t^4\right]_1^3$$

$$B = \left[\frac{12(3)^7}{7} - \frac{(3)^6}{3} + \frac{24(3)^5}{5} - (3)^4\right] - \left[\frac{12(1)^7}{7} - \frac{(1)^6}{3} + \frac{24(1)^5}{5} - (1)^4\right]$$

$$A = \left[\frac{26244}{7} = 243 + \frac{5832}{5} - 81\right] - \left[\frac{12}{7} - \frac{1}{3} + \frac{24}{5} - 1\right]$$

$$A = \frac{160704}{35} - \frac{544}{105} = \frac{482112}{105} - 544 = \frac{481568}{105}$$

$$A = 4586.36a$$

MAT 104 14/05/2020

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SERIAL NO: 04

1.) $y = \sin(6/x^2)$

$y + \Delta y = \sin 6/x^2 (x + \Delta x)$

$y + \Delta y = \sin 6/x = + 6/x = \Delta x$

$\Delta y = \sin 6/x^2 + 6/x^2 \Delta x, - y$

$\Delta y = \sin 6/x^2 + 6/x^2 \Delta x - \sin 6/x^2$

$\Delta y = \sin(6/x^2 + 6/x^2 \Delta x) = A$ and $\sin 6/x^2 = B$

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

$A - B = 6/x^2 \Delta x$

$A + B = 12/x^2 + 6/x^2 \Delta x$

$\frac{2\sin\left(\frac{6}{x^2}\Delta x\right)}{2} \cos\frac{(12/x^2 + 6/x^2 \Delta x)}{2}$

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

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

Lim $6/x^2 \sin\frac{(6/x^2 \Delta x)}{(6/x^2 \Delta x)}$ $6/x^2 (1) = 6/x^2$