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

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

from chain rule

$$\frac{d}{dx}\left(f(g)\right) = \frac{d}{dg}\left(f(g)\right) \times \frac{d}{dx}(g)$$

where $g = \frac{6}{x^2}$

$$y' = \frac{d}{dg}\left(\sin(g)\right) \times \frac{d}{dx}\left(\frac{6}{x^2}\right)$$

Calc the derivative

$$y' = \cos g \times \frac{d}{dx}\left(\frac{6}{x^2}\right)$$

$$y' = \cos(g) \times \left(-6 \times \frac{2x}{(x^2)^2}\right)$$

$$\cos\left(\frac{6}{x^2}\right) \times \left(-6 \times \frac{2x}{(x^2)^2}\right)$$

To simplify

$$y = -\frac{12\cos\left(6/x^2\right)}{x^3}$$

$t^4(12t^2-2t)+2t^2(12t^2-2t)$

$12t^6-2t^5+24t^4-4t^3$

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

and $t = 3$

$$A = \int_1^3 y \, dx$$

10098 − 30

10068 square unit

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

$$A = \int_1^3 t^4 + 2t^2 \, dx$$

Given $x = 4t^3 - t^2$

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

$$dx = 12t^2 - 2t \, dt$$

$$A = \int_1^3 t^4 + 2t^2 (12t^2 - 2t \, dt)$$

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

$$\left[12t^6 - 2t^5 + 24t^4 - 4t^3 \right]_1^3$$

$$\left[12(3)^6 - 2(3)^5 + 24(3)^4 - 4(3)^3 \right] - \left[12 - 2 + 24 - 4 \right]$$