

* Particular Solutions :

Ex 1) Find a particular solution for $f'(x) = 3x^2 - 1$ given $f(2) = 4$.

$$f(x) = \frac{3x^3}{3} - x + C$$

$$f(x) = x^3 - x + C$$

$$f(2) = 2^3 - 2 + C$$

$$f(2) = 6 + C = 4$$

$$C = -2$$

$$\text{so } f(x) = x^3 - x - 2$$

2) $f'(s) = 6s - 8s^3$, $f(2) = 3$

$$f(s) = \frac{6s^2}{2} - \frac{8s^4}{4} + C$$

$$C = 23$$

$$f(s) = 3s^2 - 2s^4 + 23$$

$$f(s) = 3s^2 - 2s^4 + C$$

$$f(2) = 3(2)^2 - 2(2)^4 + C$$

$$= 12 - 32 + C$$

$$= -20 + C = 3$$

3) $f''(x) = \sin x$, $f'(0) = 1$, $f(0) = 6$

$$f'(x) = -\cos x + C$$

$$f'(0) = -\cos 0 + C$$

$$= -1 + C = 1$$

$$C = 2$$

$$f'(x) = -\cos x + 2$$

$$f(x) = -\sin x + 2x + C$$

$$f(0) = -\sin 0 + 2(0) + C$$

$$0 + 0 + C = 6$$

$$C = 6$$

$$f(x) = -\sin x + 2x + 6$$