

-Sec 9.8 : Higher-Order Derivatives:-

6 find the second derivative:-

$$y = 3x^2 - \sqrt[3]{x^2}$$

$$= 3x^2 - x^{\frac{2}{3}}$$

$$\rightarrow y' = 6x - \frac{2}{3}x^{-\frac{1}{3}}$$

$$\rightarrow y'' = 6 - \frac{2}{3}\left(-\frac{1}{3}\right)x^{-\frac{4}{3}}$$

$$= 6 + \frac{2}{9x^{\frac{4}{3}}}$$

15 If  $f(x) = \sqrt{x+1}$  ; find  $f'''(x)$   
 $= (x+1)^{\frac{1}{2}}$

$$\rightarrow f'(x) = \frac{1}{2}(x+1)^{-\frac{1}{2}}(1) = \frac{1}{2}(x+1)^{-\frac{1}{2}}$$

$$f''(x) = \frac{1}{2}\left(-\frac{1}{2}\right)(x+1)^{-\frac{3}{2}} = -\frac{1}{4}(x+1)^{-\frac{3}{2}}$$

$$f'''(x) = -\frac{1}{4}\left(-\frac{3}{2}\right)(x+1)^{-\frac{5}{2}} = \frac{3}{8}(x+1)^{-\frac{5}{2}}$$

$$= \frac{3}{8\sqrt{(x+1)^5}}$$

19 Find  $f^{(4)}(x)$  if  $f(x) = \sqrt{x} = x^{\frac{1}{2}}$

$$f'(x) = \frac{1}{2}x^{-\frac{1}{2}}$$

$$f''(x) = \frac{1}{2}\left(-\frac{1}{2}\right)x^{-\frac{3}{2}} = -\frac{1}{4}x^{-\frac{3}{2}}$$

