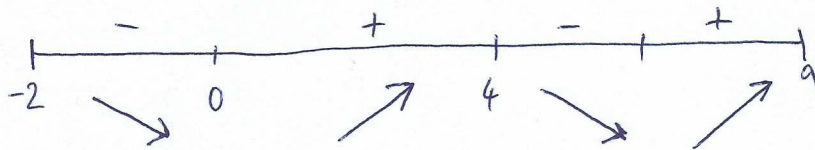


$$1.) \quad f(x) = \sqrt[3]{6x^2 - x^3} = (6x^2 - x^3)^{\frac{1}{3}}$$

$$f'(x) = \frac{1}{3} (6x^2 - x^3)^{-\frac{2}{3}} \cdot (12x - 3x^2) = \frac{12x - 3x^2}{3\sqrt[3]{(6x^2 - x^3)^2}}$$



$$f_{\max} = f(4) = \sqrt[3]{32}$$

$$f_{\min} = f(0) = f(6) = 0$$

$$4.) \int_2^{\infty} R(x) dx, \quad R(x) = \frac{6x^4 - 5x^3 + 34x^2 - 35x + 34}{x^5 - x^4 + 8x^3 - 8x^2 - 9x + 9}$$

$$\int_2^{\infty} \frac{1}{x-1} dx + \int_2^{\infty} \frac{2}{(x-1)^2} dx + \int_2^{\infty} \frac{3}{x+1} dx + \int_2^{\infty} \frac{2x-1}{x^2+9} dx =$$

~~$$\int_2^{\infty} \frac{1}{x-1} dx + \int_2^{\infty} \frac{2}{(x-1)^2} dx + \int_2^{\infty} \frac{3}{x+1} dx + \int_2^{\infty} \frac{2x-1}{x^2+9} dx =$$~~

$$= \left[\ln|x-1| \right]_2^{\infty} + \left[-\frac{2}{x-1} \right]_2^{\infty} + \left[3\ln|x+1| \right]_2^{\infty} + \left[\ln|x^2+9| - \frac{1}{3} \arctg \frac{x}{3} \right]_2^{\infty} =$$

$$= \left[\infty - 0 \right] + \left[0 + 2 \right] + \left[\infty - 3\ln 3 \right] + \left[\infty - \ln 13 - \frac{1}{3} \arctg \frac{2}{3} \right] =$$

$$= \underline{\underline{\infty}}$$

$$\int_2^{\infty} \frac{2}{(x-1)^2} dx = \left| \begin{array}{l} (x-1)^2 = t \\ 2(x-1)dx = dt \\ (x-1) = \sqrt{t} \\ x = \sqrt{t} + 1 \end{array} \right| = \int_2^{\infty} \frac{2}{t} \cdot \frac{1}{\sqrt{t}} dt = \int_2^{\infty} t^{-1} \cdot t^{-\frac{1}{2}} dt = \int_2^{\infty} t^{-\frac{3}{2}} dt = *$$

$$* = \left[\frac{t^{-\frac{1}{2}}}{-\frac{1}{2}} \right]_2^{\infty} = \left[-\frac{2}{\sqrt{t}} \right]_2^{\infty} = \left[-\frac{2}{x-1} \right]_2^{\infty}$$

$$\int \frac{2x-1}{x^2+9} dx = \int \frac{2x}{x^2+9} dx - \int \frac{1}{x^2+9} dx = \ln|x^2+9| - \frac{1}{3} \arctg \frac{x}{3}$$

$$\int \frac{1}{x^2+9} dx = \int \frac{1}{x^2+3^2} dx = \frac{1}{3} \arctg \frac{x}{3}$$