

$$f(x) = x^3 + 2x^2 - 8x + 5$$

(a) Find $f''(x)$

(b) (i) Solve $f''(x) = 0$

(ii) Hence find the range of values of x for which $f(x)$ is concave.

$$\begin{aligned} \underline{\text{(a)}} \quad f'(x) &= 3x^{3-1} + 2(2)x^{2-1} - 8x^{1-1} + 0 \\ &= 3x^2 + 4x - 8 \end{aligned}$$

$$f''(x) = 6x + 4$$

$$\underline{\text{(b)}} \quad \underline{\text{(i)}} \quad f''(x) = 6x + 4 = 0$$

$$x = -\frac{4}{6} = -\frac{2}{3}$$

(ii) $f(x)$ concave $\left(\cap\right)$ when $f''(x) < 0$

$$\Rightarrow 6x + 4 < 0 \Rightarrow x < -\frac{2}{3}$$

(2)

(2)