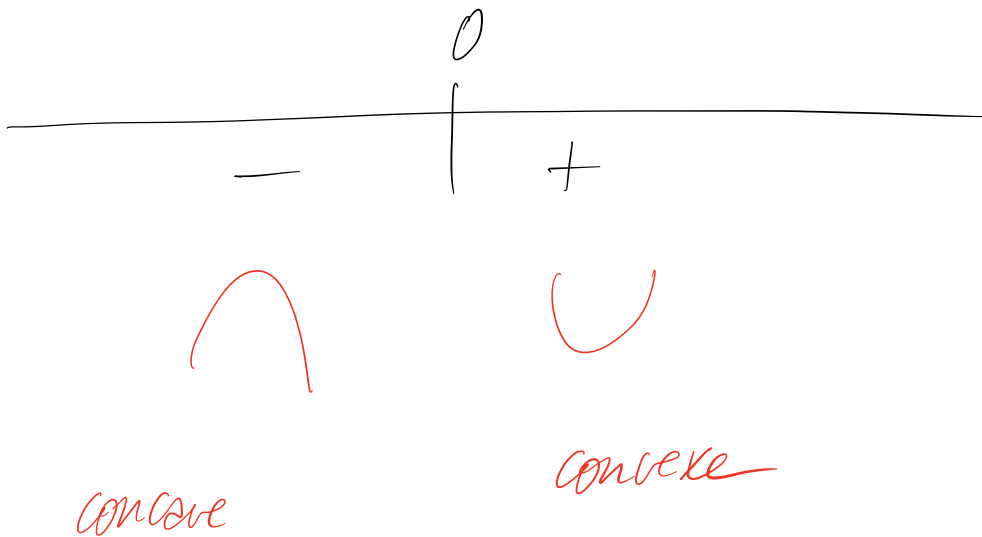


$$b) \mathcal{D}_f = \mathbb{R}$$

$$f'(x) = 3x^2 + 3 \quad f''(x) = 6x$$

Tableau donnant la courbure:



$$e) \mathcal{D}_f = \mathbb{R} - \{1\}$$

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

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

Tableau donnant la courbure:

	1	
+		+
∪		∪
<i>concave</i>		<i>concave</i>

$$d) D_f = \mathbb{R}$$

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

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

$$= -\frac{(x^2+1)(2x^2+2 - 8x^2)}{(x^2+1)^4}$$

$$= - \frac{(-6x^2 + 2)}{(x^2 + 1)^3} = \frac{6(x^2 - \frac{1}{3})}{(x^2 + 1)^3}$$

$$x^2 - \frac{1}{3} = 0 \Leftrightarrow x = \pm \frac{1}{\sqrt{3}} \approx \pm 0,58$$

Tableau donnant la courbure:

	-0,58		0,58	
+		-		+
U	PI	∩	PI	U
convexe	↑	concave	↑	convexe
	(-0,58; 0,75)		(0,58; 0,75)	