
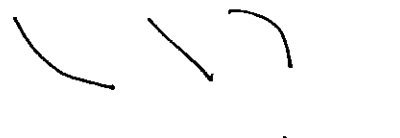


 $f'(x) > 0$



 $f'(x) = 0$


 $f'(x) < 0$


$f(x)$  concave down

$f'(x)$ 

$f''(x) < 0$

$g(x)$ 

concave up

$g'(x)$ 

$g''(x) > 0$

3.8) Ex 1) $f(x) = \ln|x| = \begin{cases} \ln x & x > 0 \\ \ln(-x) & x < 0 \end{cases}$

$$f'(x) = \begin{cases} \frac{1}{x} & x > 0 \\ -\frac{1}{x}(-1) = \frac{1}{x} & x < 0 \end{cases}$$

$$\Rightarrow (\ln|x|)' = \frac{1}{x}$$

$$\begin{aligned} \text{Ex 2) } [\ln(|x| \cdot \cos x)]' &= [\ln|x| + \ln(\cos x)]' \\ &= \frac{1}{x} + \frac{1}{\cos x} \cdot (-\sin x) \end{aligned}$$