EX1 → $f(x) = x^3 - 3x^2 + 3x + 1$

$f'(x) = 3x^2 - 6x + 3 = 0$

$3(x^2 - 2x + 1) = 0$

$3(x-1)(x-1) = 0$

$x = 1$

+	+
$f'(0)$	$f'(2)$

1

$f(x)$ is inc. on $(-\infty, \infty)$

EX2 → $f(x) = x^3 - \frac{3}{2}x^2$

$f'(x) = 3x^2 - 3x = 0$

$3x(x-1) = 0$

$x = 0, 1$

+	−	+
$f'(-1)$	$f'(\frac{1}{2})$	$f'(2)$

0, 1

$f(x)$ is inc. on $(-\infty, 0), (1, \infty)$

dec. on $(0, 1)$

⊛ 1st Derivative Test

→ If $f'(x)$ changes from positive to negative @ $x=c$, then $f(x)$ has a relative maximum @ $x=c$

→ If $f'(x)$ changes from negative to positive @ $x=c$, then $f(x)$ has a relative minimum @ $x=c$

EX1 → $f(x)=\dfrac{x^4+1}{x^2}$

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

$=0$ @ $x=\pm 1$, V.A. @ $x=0$

$-$		$+$		$-$		$+$
$f'(-2)$	-1	$f'(-\frac{1}{2})$	0	$f'(\frac{1}{2})$	1	$f'(2)$

$f(x)$ is inc. on $(-1,0)$, $(1,\infty)$

dec. on $(-\infty,-1)$, $(0,1)$

$f(x)$ has rel. minima @ $x=\pm 1$

HW: p. 186 → 4-46 even, 61-64, 80, 85-88