Regrades
- write a note
- 12/1 week from Wed

- high
median
2.7 - 3.1 ☺
2.9

Ex 1 + Ex 2

hi 98
med 78

4.0	97
3.5	87
3.0	78
2.5	70
2.0	57

Optimization

$f(x) = x^3 - 3x^2 - 5x + 7$

$[-2, 1]$ ✓

global max / min

abs

① crit nums

local min / max ?

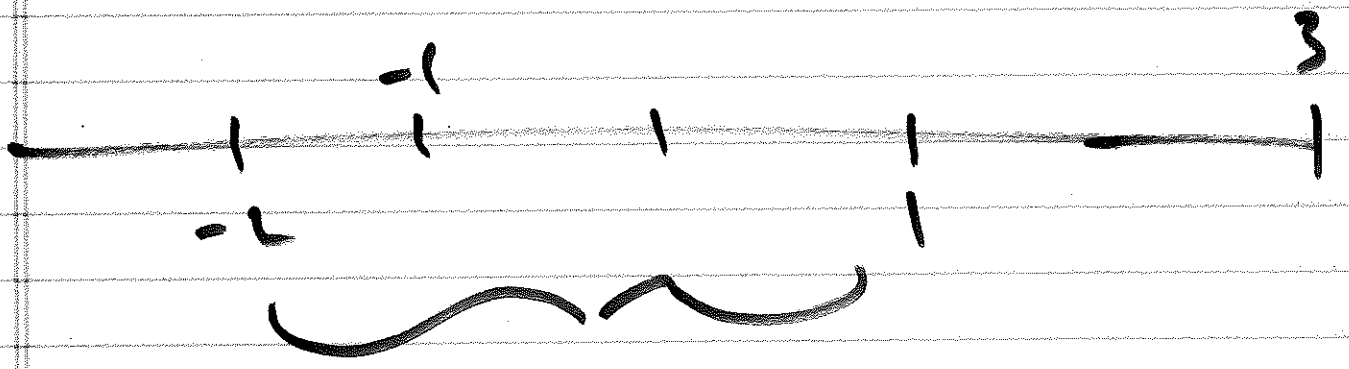
$f'(x) = 0$ or undef

$f'(x) = 3x^2 - 6x - 9 = 0$

$x^2 - 2x - 3 = 0$

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

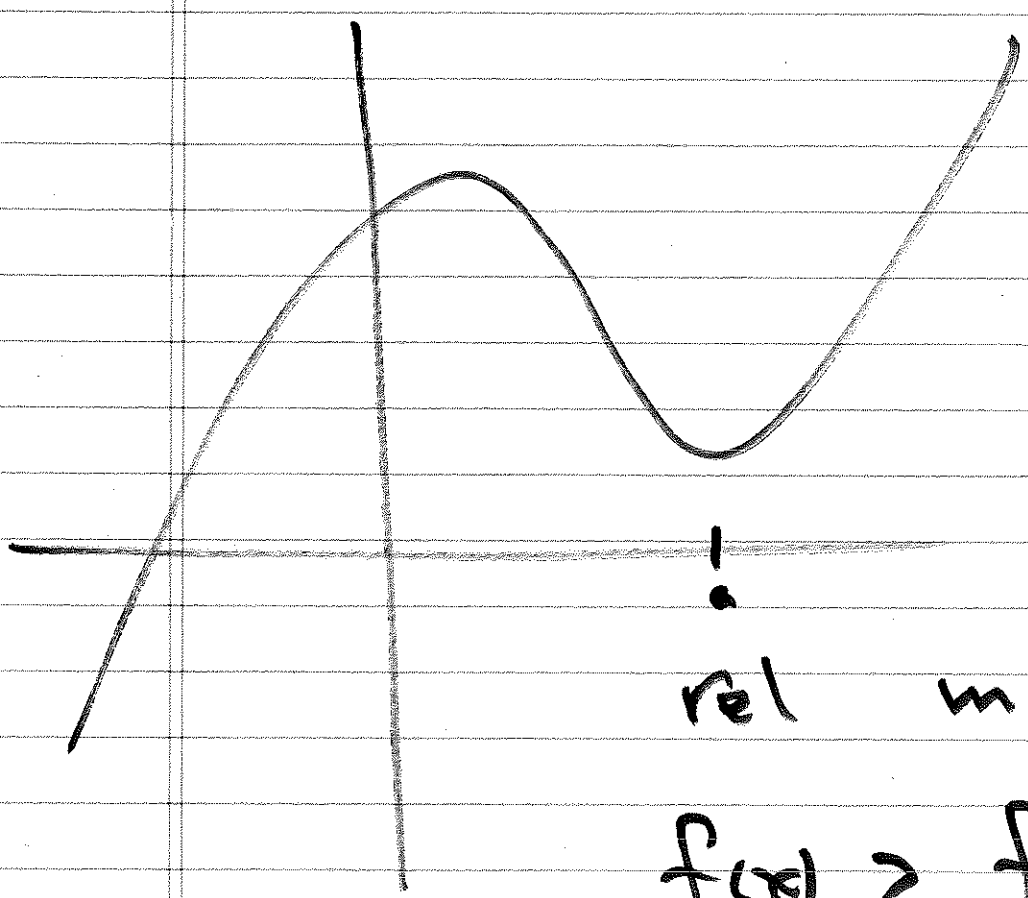
$x = -1, 3$



$x = 3$ not in $[-2, 1]$

(2) Check

	x	f	
end points →	-2	$-8 - 12 + 18 + 7 = 5$	
	-1	$-1 - 3 + 9 + 7 = 12$	global max
end points →	1	-4	global min



rel min

$f(x) > f(a)$

if $x < a$
or $x > a$

Eg: $g(t) = 4\cos t - \sin 2t$

crit nums

$g'(t) = -4\sin t - \cos 2t$

$= -4\sin t - 2\cos 2t = 0$

?

trig ident

$\sin 2A = 2\sin A \cos A$

$\cos 2A = 1 - 2\sin^2 A$ ✓

half angle formulas

$$-4\sin t - 2\cos 2t = 0$$

$$2\sin t + \cos 2t = 0$$

$$1 - 2\sin^2 t$$

$$-2\sin^2 t + 2\sin t + 1 = 0$$

let $x = \sin t$

$$-2x^2 + 2x + 1 = 0$$

$$2x^2 - 2x - 1 = 0$$

$$x = \frac{2 \pm \sqrt{4+8}}{4}$$

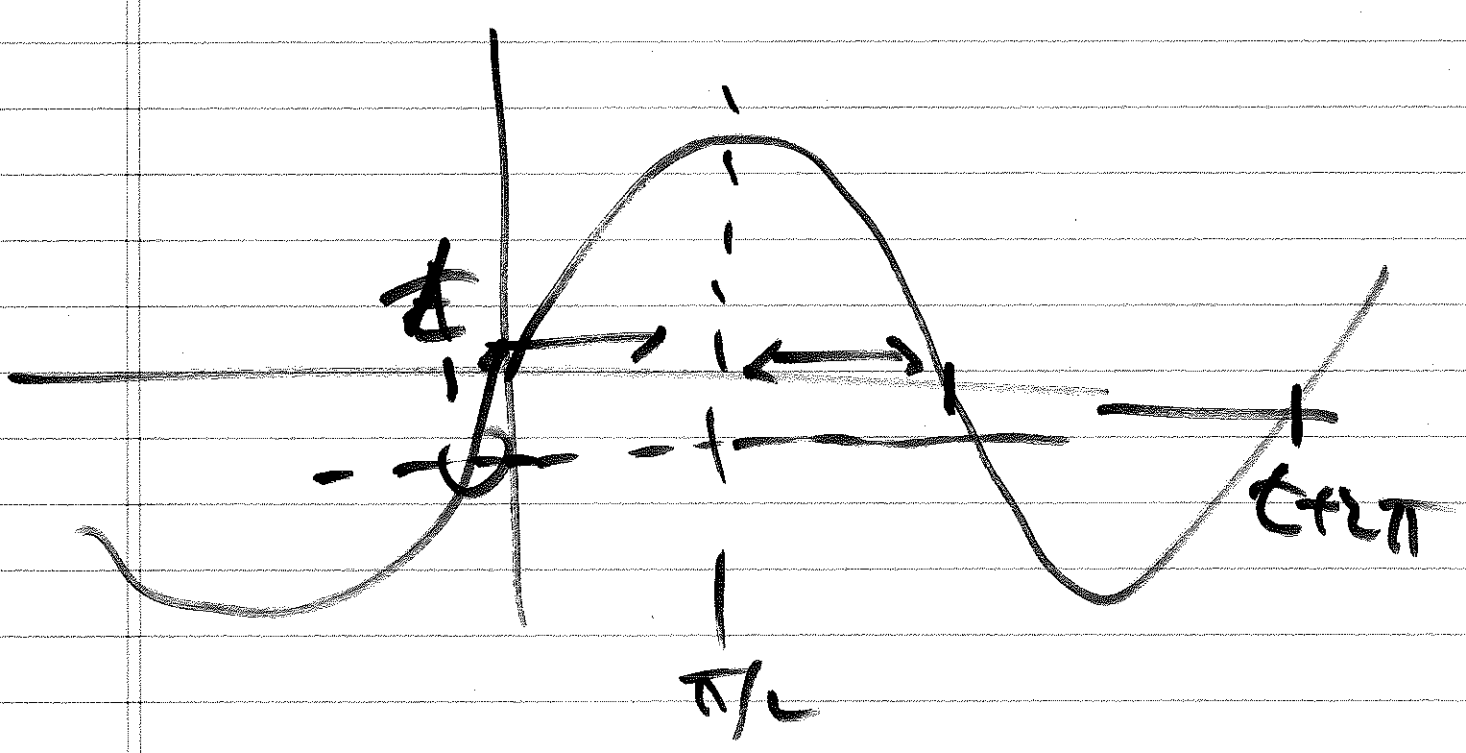
$$= \frac{2 \pm 2\sqrt{3}}{4} = \frac{1 \pm \sqrt{3}}{2}$$

$$\sin t = \frac{1 \pm \sqrt{3}}{2}$$

$$\sin t = \frac{1+\sqrt{3}}{2} \quad \text{no rel}$$

$$\sin t = \frac{1-\sqrt{3}}{2}$$

$$t = \sin \frac{1-\sqrt{3}}{2}$$



Ex: $f(x) = x^{4/3} \cdot (x^2 - 8x - 24)$

$$f'(x) = \frac{4}{3}x^{1/3}(x^2 - 8x - 24) + x^{4/3}(2x - 8)$$

$$= \frac{2}{3\sqrt[3]{x}}(x^2 - 8x - 24) + \frac{x^{4/3}(2x - 8)}{3\sqrt[3]{x}} \cdot \frac{3\sqrt[3]{x}}{3\sqrt[3]{x}}$$

$$= \frac{2(x^2 - 8x - 24) + 3x(2x - 8)}{3\sqrt[3]{x}}$$

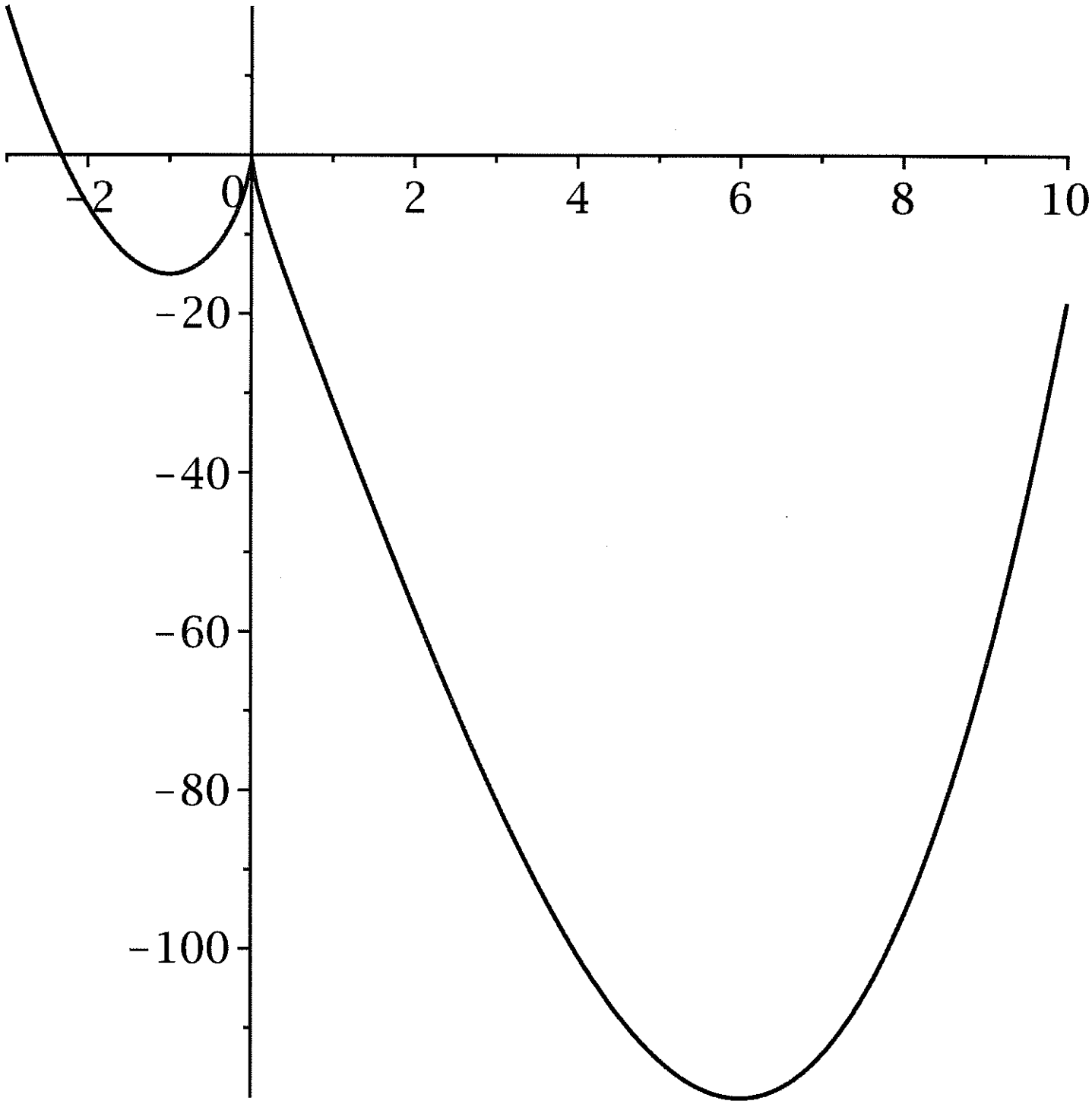
$$x^{4/3} \cdot x^{4/3} = x^1$$

$$= \frac{8x^2 - 40x - 48}{3\sqrt[3]{x}}$$

$$= \frac{8(x^2 - 5x - 6)}{3\sqrt[3]{x}}$$

$$= \frac{8(x-6)(x+1)}{3\sqrt[3]{x}}$$

crit vals $x = -1, 6, 0$



$g(x) = x^{2/3} \cdot \left(x^2 - 8x - 24\right)$ on $[-3, 10]$