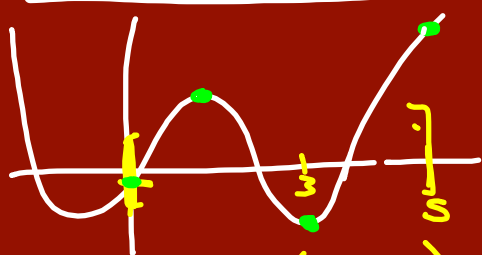
ABSOLUTE EXTREMA



Abs max $(5, \_\_)$
Abs min $(3, \_\_)$

$[\;,\;]$

1) Find crit pts
2) Sub crit pts + end pts into the orig func

$f(x) = x^2 - 3x + 2 \quad [0, 5]$

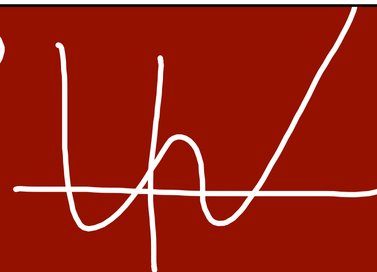
$f'(x) = 2x - 3 = 0$

$x = 3/2$

sub in	$f(x)$
0	2
$3/2$	$-1/4$
5	12

Abs max $(5, 12)$
Abs min $(3/2, -1/4)$

$f(x) = 3 - 4x - 2x^2 \quad (-\infty, \infty)$



$\lim_{x \to -\infty} -2x^2 = -2(-\infty)^2 = -\infty$

$\lim_{x \to \infty} -2x^2 = -2(\infty)^2 = -\infty$

$(\, , \quad)$

$f'(x) = -4 - 4x = 0$

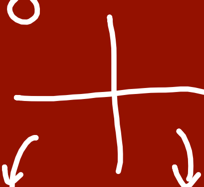
$-4 = 4x$

$-1 = x$

1) Check limits of end points

2) Find critical pts

3) Find y-coord in T-table & compare to limits.



-1	5

Abs max $(-1, 5)$

No Abs min

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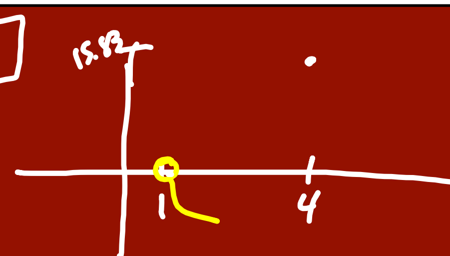
$f(x) = (x^3 - 1)^{2/3}$ $\quad (1, 4]$



1) $\lim_{x \to 1} (x^3 - 1)^{2/3} = 0$

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

$$\frac{2x^2}{(x^3-1)^{1/3}} = 0$$

$x^3 - 1 = 0$

$\sqrt[3]{x^3} = \sqrt[3]{1}$

$\cancel{x = 1}$

$2x^2 = 0$

$\sqrt{x^2} = \sqrt{0}$

$\cancel{x = 0}$ not in interval

3)

4	$63^{2/3} \approx 15.83$

Abs max $(4, 15.83)$

$f(x) = \frac{x}{x^2+1}$ $(0, \infty)$

$\lim_{x \to 0^+} \frac{x}{x^2+1} = \frac{0}{1} = 0$

$\lim_{x \to \infty} \frac{x}{x^2} = \lim_{x \to \infty} \frac{1}{x} = \frac{1}{\infty} = 0$

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

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

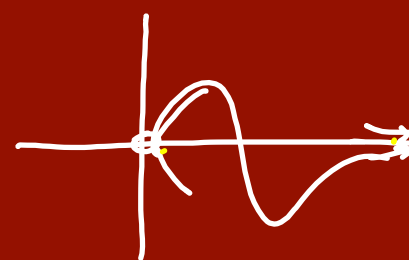
$\frac{-x^2+1}{(x^2+1)^2} = 0$

$-x^2+1=0$

$\sqrt{1} = \sqrt{x^2}$

not in interval

$\overset{+}{\cancel{-}}1 = x^2$



1	$\frac{1}{2}$

Abs max $(1, \frac{1}{2})$

Abs min None

3/ $f(x) = \sin x - \cos x$ $\quad [0, \pi]$

$f'(x) = \cos x + \sin x = 0$

$\cos x = -\sin x$

$x = \frac{3\pi}{4}, \cancel{\frac{7\pi}{4}}$

not in interval.