Name: [1 pt]

Problem 1. For the function $f(x) = x^3 - 3x$,

1. Find all the relative extremal and inflection points. [5 pts]
2. Sketch the graph of f. [5 pts]

$f'(x) = 3x^2 - 3 = 3(x^2-1)$

$f''(x) = 6x$

$f'(x) = 0 \Rightarrow 3(x^2-1) = 0 \Rightarrow x^2 - 1 = 0 \Rightarrow x^2 = 1$

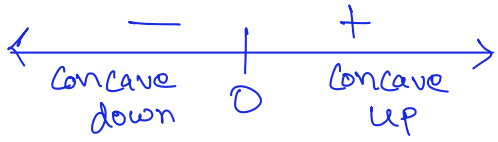
$\Rightarrow x = \pm 1$

$f''(1) = 6 > 0 \Rightarrow x = 1$ is min pt., $f(1) = -2$

$f''(-1) = -6 < 0 \Rightarrow x = -1$ is max pt., $f(-1) = 2$

3 Pts.

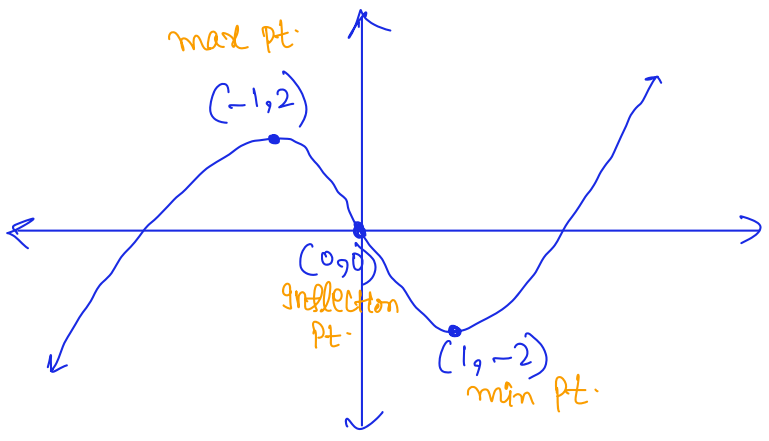
$f''(x) = 0 \Rightarrow 6x = 0 \Rightarrow x = 0$



$\Rightarrow x = 0$ is an inflection pt.

2 Pts

$f(0) = 0^3 - 3(0) = 0 \Rightarrow (0,0)$ is y-int.



5 Pts.