INTRODUCTION TO CALCULUS

MATH 1A

UNIT 13: WORKSHEET

Problem 1: We study here the function $f(x) = 2x^3 - 3x^2$ on the interval $[-1, 2]$.

a) Find all the critical points of f. They are all nice integers.

Solution:
The critical points are 0,1

b) Use the second derivative test to find the local maxima and minima on $(-1, 2)$.

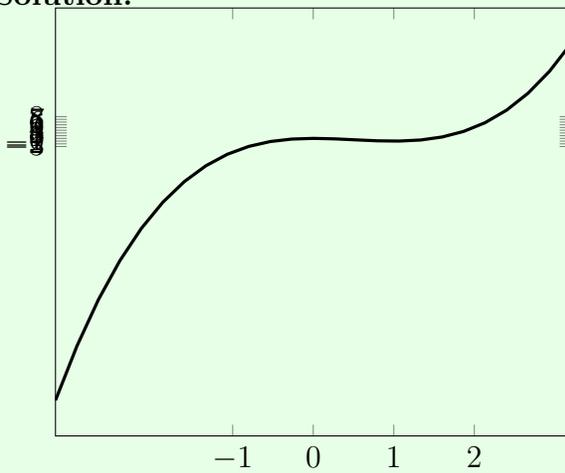**Solution:**
The second derivative is $12x - 6$. This is negative at $x = 0$ and positive at $x = 1$. The point $x = 0$ is a maximum. The point $x = 1$ is a minimum.

c) Use the information you have to sketch a graph of f.

f(x)

−1   0   1   2 x

Solution:

−1   0   1   2
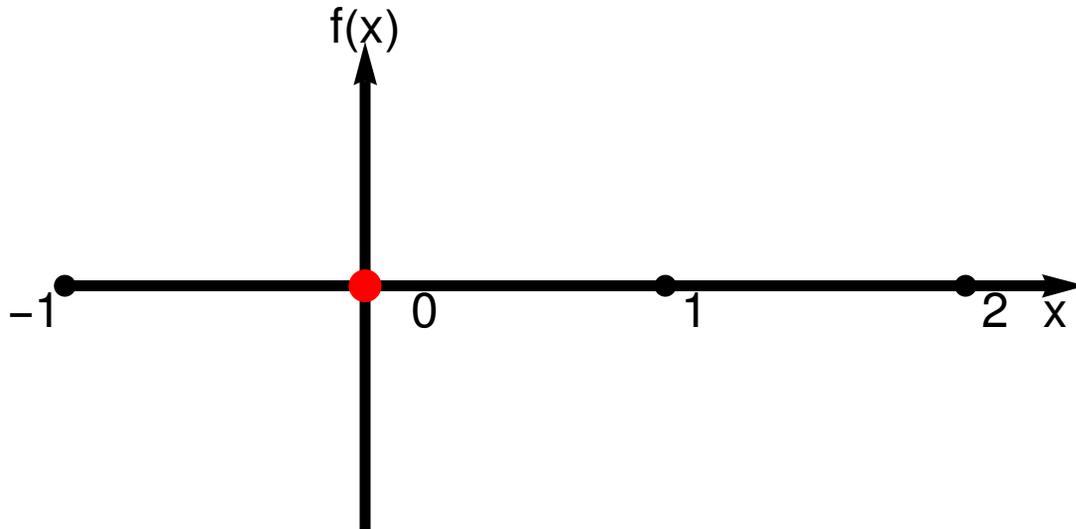
d) Check the first derivative test.

Solution:
The function is increasing from $(-\infty, 0)$ and $(1, \infty$. The function is decreasing on $(0, 1)$.

e) Find the global maxima and minima.

Solution:
We have to check the point $0, 1$ as well as the boundary points $-1, 2$. The function value at $x = 2$ is largest. The function value at $x = -1$ is smallest. 2 is a global maximum. -1 is a global minimum.