MATH 155A FALL 13
EXAMPLES CHAPTER 3 (MAX AND MIN).

Question. Identify the local and absolute maxima and minima of $f(x) = 2x^3 + 3x^2 - 12x + 6$ on $[-3, 3]$.

Solution.

Compute

$$f'(x) = 6x^2 + 6x - 12 = 0 \Rightarrow x = -2,\ x = 1.$$

Hence

$$f'(x) = 6(x + 2)(x - 1).$$

It follows that $f'(x) > 0$ for $-3 < x < -2$, $f'(x) < 0$ for $-2 < x < 1$, and $f'(x) > 0$ for $1 < x < 3$. Hence f has a local maximum at -2 and a local minimum at 1.

Next we compute

$$f(-3) = 15,$$
$$f(-2) = 26,$$
$$f(1) = -1,$$
$$f(3) = 51.$$

Hence the absolute minimum is -1 and it occurs at $x = 1$, and the absolute maximum is 51 and it occurs at 3. Since $f'(x) > 0$ for $-3 < x < -2$, we see that $f(-3) = 15$ is a local minimum, and we already knew that $f(-2) = 26$ is a local maximum.

URL: `http://www.disconzi.net/Teaching/MAT155A-Fall-13/MAT155A-Fall-13.html`