Exercise 1. Find the critical points and all the extrema of $f(x) = |x^3 - 9x|$. 
Exercise 2. Let $f(x)$ be a differentiable function on $\mathbb{R}$ such that $0 < f'(x) < \frac{1}{2}$. Show that

$$f(-1) < f(1) < 1 + f(-1).$$
Exercise 3. Let $f(x) = \frac{x^2}{x + 1}$.

- Find all the asymptotes of the curve $y = f(x)$.
- Find the critical points of $f(x)$ and all the extrema.
- Sketch the graph of $f(x)$. 
Exercise 4. Find the value of $c$ that makes the function

$$f(x) = \begin{cases} 
\frac{9x - 3\sin(3x)}{5x^3} & \text{for } x \neq 0 \\
\quad c & \text{if } x = 0
\end{cases}$$

continuous.
Exercise 5. Let $L$ be the line $y = x + 1$. Find the closest point of $L$ to the point $P(2, 4)$ and evaluate the distance between $P$ and $L$. 