1. Sketch the graph of a function with domain $[-3, 3]$ that has an absolute maximum of 5 at $x = -2$, an absolute minimum of 0 at $x = 2$ and a local minimum of 2 at $x = 0$.

2. Give an example of a function with domain $(-1, 1)$ that does not attain either an absolute minimum or an absolute maximum value. Why doesn't your example violate the Extreme Value Theorem?

3. Sketch a discontinuous function with domain $[-1, 1]$ that attains a minimum but does not attain a maximum value. Why doesn't your example violate the Extreme Value Theorem?

4. Give an example of a continuous function with domain $[0, \infty)$ that attains a minimum but does not attain a maximum value. Why doesn't your example violate the Extreme Value Theorem?

5. Consider the function $\sec(x)$. Sketch this function. From the sketch answer the following. Does this function have any absolute maximums? Absolute minimums? Local maximums? Local minimums?

6. Find all critical points of the function $f(x) = \sin(x)^{1/3}$.

7. Find the absolute maximum and minimum values of $f(x) = e^{-x^2}$ on the interval $[-2, 3]$, and the locations where those values are attained.

8. Find the maximum and minimum values of $f(x) = x + \frac{1}{x}$ on the interval [1/5,4]. Determine where those maximum and minimum values occur.

9. Find the maximum and minimum values of $f(x) = x^{2/3}$ on the interval [-8,8]. Determine where those maximum and minimum values occur.

10. A ball thrown in the air at time $t = 0$ has a height given by

$$h(t) = h_0 + v_0 t - \frac{1}{2} g_0 t^2$$

meters where t is measured in seconds, h_0 is the height at time 0, v_0 is the velocity (in meters per second) at time 0 and g_0 is the constant acceleration due to gravity (in $\mathrm{m/s^2}$). Assuming $v_0 > 0$, find the time that the ball attains its maximum height. Then find the maximum hight.