1. (a) Find the linearization of \( f(x) = x^7 \) at centered at base point \( x_0 = 1 \).
(b) Use part (a) to find an approximation to \((0.99)^7\).

2. The surface area of a cube is \( S = 6x^2 \), where \( x \) is the length of a side. Use differentials to approximate the following.
(a) What is the change in surface area if the side length changes from 10 to 10.01?
(b) If there is a 1\% change in the side length, what is the percentage change in the surface area?
(c) If the side length is measured to be 10 cm with a possible error of \( \pm 0.05 \) cm, what is the maximum possible error in calculating the surface area using this measurement?
3. Given the following graphs, identify all absolute and local extrema (if any).

Give the $x$-coordinates.

Absolute maxima:
Local maxima:
Absolute minima:
Local minima:

4. (a) Find the critical points of the function $f(x) = x^3 - 3x^2$.
(b) Then find the absolute maximum and minimum values of $f(x)$ on the interval $[-1, 4]$. 