Math 241 Worksheet 8 (two-sided)

Name: _____   Section (circle one):   **3** **4**

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 $\pm.05$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).
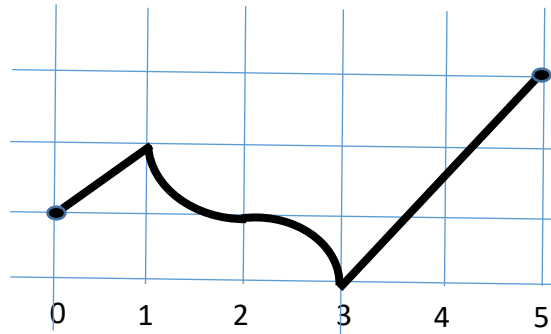
Give the x-coordinates.

Absolute maxima:

Local maxima:
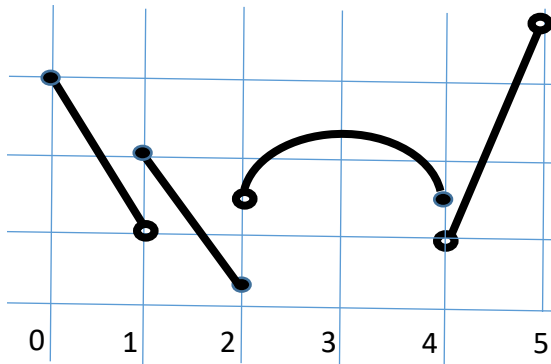
Absolute minima:

Local minima:

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 $[-1, 4]$.