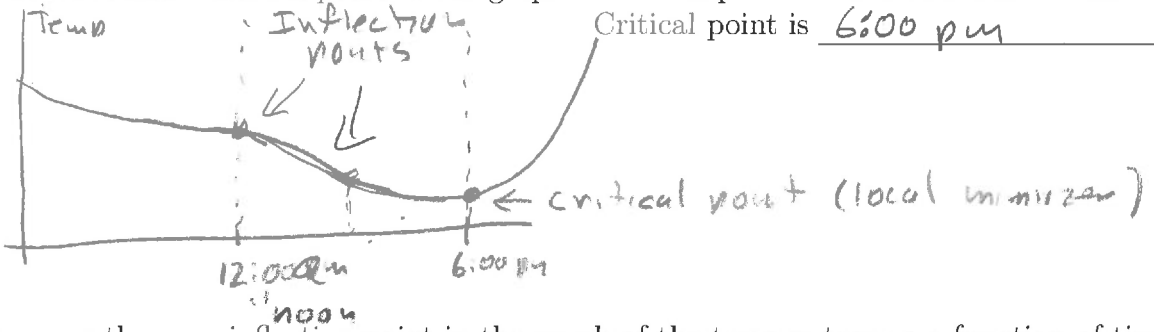
Mathematics 122

Quiz 20 Name: Key

You must show your work to get full credit.

1. As I left home this morning, I put on a light jacket because, although the temperature was dropping, it seemed that the temperature would not go much lower. But I was wrong. Around noon a northerly wind blew up and the temperature begin to drop faster and fasten The worst was around 6 pm when fortunately, the temperature started going back up.

(a) When was there a critical point in the graph of the temperature as a function of time?

Graph: 

Critical point is 6:00 pm

(b) When was there an inflection point in the graph of the temperature as a function of time?

There is an inflection point at noon with change from concave up to concave down.

The concavity has to change again sometime between noon and 6:00pm as it is concave up at a minimizer.

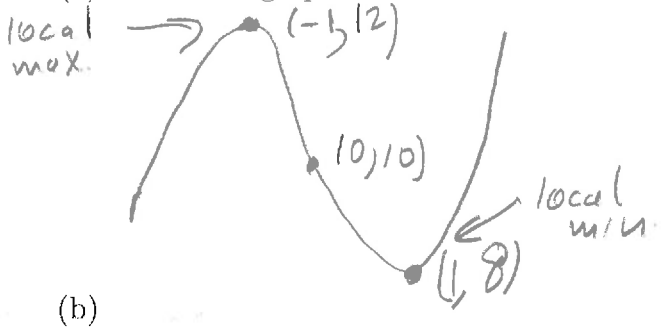
Inflection points 12:am, sometime between noon and 6:00pm

2. Use the first derivative to find all the critical points and the second derivative to find all the inflection points of

$$f(x) = x^3 - 3x + 10$$

Use a graph to identify each critical point as a local maximizer, a local minimizer, or neither.

(a) Sketch the graph with Xmin=-2 and Xmax=2



$f'(x) = 3x^2 - 3 = 3(x^2 - 1) = 0$
so $x = 1, -1$ are critical points
$f''(x) = 6x = 0$ so $x = 0$ is inflection point

(b)

Critical points: 1, -1

Inflection points: 0

Local maximizers: -1

Local minimizers: 1