Math 131 - March 30, 2016
Solutions

Warm-up Problems

1. Draw a graph that matches the given data.
   Label all local max and mins and all inflections points.

$f''(x)$	$-$	$+$	$+$	$-$	$+$
$f'(x)$	$+$	$+$	$-$	$-$	$+$
	$x < 3$	$3 < x < 4$	$4 < x < 5$	$5 < x < 6$	$x > 6$

Lecture Problems

2. Suppose you are given:

$$f(x) = \frac{4x}{x^2+1}$$
$$f'(x) = -\frac{4(x-1)(x+1)}{(x^2+1)^2}$$
$$f''(x) = \frac{8x(x^2-3)}{(x^2+1)^3}$$

   (a) Find all critical points of f. **Solution:** $x = 1, -1$. $(-1, -2)$ and $(1, 2)$.

   (b) Find all possible inflection points of f. **Solution:** $x = \pm\sqrt{3}$: $(-\sqrt{3}, -\sqrt{3})$ and $(\sqrt{3}, \sqrt{3})$

   (c) Find all intervals where f is increasing and decreasing.

   (d) Find all intervals where f is concave up and down.

   (e) Find all local max and mins of f.

   (f) Find all inflection points of f.

   (g) Draw a nice graph of f.