

Name: _____

Quiz 13, section 4.3

1. (5 pts) Let $f(x) = \frac{1}{3}x^3 - 4x^2 + 2$. Find the intervals where f is increasing/decreasing and the intervals where it is concave up and concave down (CUP/CAP).

$$f' = x^2 - 8x = x(x-8)$$

$$CP: x = 0, 8$$

$$f'' = 2x - 8 = 2(x-4)$$

$$PIP: x = 4$$

| | | | | |
|-------|---|---|---|---|
| | 0 | 4 | 8 | |
| x | - | + | + | + |
| x-8 | - | - | - | + |
| f'(x) | + | - | - | + |
| f'' | - | - | + | + |

$$\text{inc: } (-\infty, 0) \cup (8, \infty)$$

$$\text{dec: } (0, 8)$$

$$\text{CUP: } (4, \infty)$$

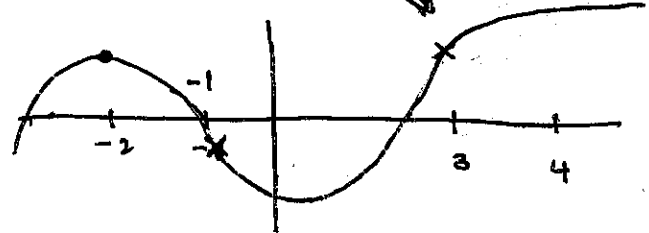
$$\text{CAP: } (-\infty, 4)$$

2. (5 pts) Sketch the graph of a function for which: $f'(x) < 0$ on $(-2, 3)$, $f'(x) > 0$ on $(-\infty, -2) \cup (3, \infty)$, $f''(x) < 0$ on $(-\infty, -1) \cup (4, \infty)$ and $f''(x) > 0$ on $(-1, 4)$.

| | | | | | |
|-----|----|----|---|---|---|
| | -2 | -1 | 3 | 4 | |
| f' | + | - | - | + | + |
| f'' | - | - | + | + | - |

①

NO, the IP is at $x=4$



②

draw the sketch first, then label the points

