

YOUR NAME: _____

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Read each problem **very carefully** before starting to solve it and do only what is asked. Each problem is worth around 5 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. [8 points] Consider $f(x) = -x^3 + 3x^2 + 3$.

(a) Find $f'(x)$ and its critical points.

(b) Find $f''(x)$ and its critical points.

(c) Create the combined sign table for f' and f'' showing your conclusions about f in the last line.

- (d) Sketch the graph of $y = f(x)$ labeling all important points. Please, be neat and do the best you can.

2. [4 points] Use the second derivative test to find the relative min/max of

$$f(x) = 3x^4 + 16x^3 - 30x^2 + 100.$$