

Worksheet 11

Math 251, Summer 2017

Name: _____

I have given you the answers on the bottom of the last page. You must figure out how to solve the problem to get the correct answer.

1. Find all of the critical points and inflection points of $f(x)$, and classify the critical points as local maxima, local minima, or neither.

(a) $f(x) = x^4 - x^3 - 2x^2$

(b) $f(x) = x^5$

(c) $f(x) = \frac{x^2 - x}{e^x}$

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(d) $f(x) = e^{-x^2}$

- Find the intervals where $f(x) = 2x^4 - x^2$ is concave down.
- Optimize the function $f(x) = \ln(x)x^2$ on the interval $[0.2, \infty)$.
- Optimize the function $g(x) = \frac{x^2-1}{x+4}$ on the interval $[-1, 2]$.

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5. The following functions all have $f'(0) = 0$ and $f''(0) = 0$, which means the second derivative test will fail for $x = 0$. Decide if 0 is a local max, local min, or neither.

(a) $f(x) = x^4$

(b) $f(x) = x^3$

(c) $f(x) = \tan(x) - x$