

MATH 184 Assignment 5, Due Monday Nov 5

Note: Many questions were stolen from my test 4 from last year. You will indeed have to work on them and hand them in before seeing the solutions! I will post the solutions to all of test 4 after this assignment is handed in. Please remember the long list of problems given in the course syllabus for you to work on. You will soon be ready to work on problems from sections 4.1, 4.2, 4.3 and 4.5

1. Compute the derivative $f'(x)$ for

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

2. Given $x^2 + y^2 = \ln(xy) + 2$, compute $\frac{dy}{dx}$ as a function of x and y .
3. The function $f(x) = xe^{2x}$ has one inflection point. Find the x coordinate of this point.
4. Find the maximum and minimum of $g(x) = x^3 - 3x$ on the interval $[0, 2]$
5. We are not given an expression for the function $f(x)$ but we are given that $f(1) = 2$ and

$$f'(x) = \frac{x}{\sqrt{x^3 + 3}}.$$

Estimate the value of $f(1.1)$ using this information.

6. The function $f(x) = (\ln(x))^2$ is defined for $x > 0$. On what interval or intervals is the function $f(x)$ concave up?
7. You are planning on building balloons and selling their surface area for advertising. Apparently there is sufficient air travel to sell even the top surface of your balloons. You estimate the net value of a square meter of balloon surface is worth \$100 (you have computed expected revenue minus cost of balloon fabric). The cost of helium to fill your balloon is \$5 per cubic meter. What is the optimal radius for your balloon? A complete answer will justify that the given radius yields the maximum profit.
8. Section 4.4 questions 5,9,21,29