

Math 165
Spring 2008
Exam 2

Show your work. Answers without work will not receive credit.

1. (8 points) Evaluate $\int (x^4 - 5x^3 + 3)dx$

2. (8 points) Evaluate $\int_{-2}^{-1} \frac{4}{x^4} dx$

3. (10 points) Evaluate $\int_0^{\pi/2} \sqrt{1 - \sin x} \cos x dx$

4. (8 points) Evaluate $\frac{d}{dx} \int_0^{x^4} \sec t dt$

5. (12 points) Find the points on the hyperbola $y^2 - x^2 = 4$ that are closest to the point $(2, 0)$.

6. (12 points) Find the local extreme values of $f(x) = x^3 - \frac{15}{2}x^2 + 18x - 7$ and determine if each is a local maximum, minimum or neither.

7. (12 points) Find the solution to the differential equation $\frac{dy}{dx} = \frac{x}{y\sqrt{1+x^2}}$ such that $y = 2$ when $x = 0$.

8. (10 points) Sketch the graph of $f(x) = \frac{x+2}{x-1}$. Indicate where the function is increasing and decreasing and where the asymptotes are.

9. (12 points) Use the definition of the definite integral (i.e. Riemann sums) to calculate:

$$\int_0^3 x^2 dx$$

10. (8 points) Evaluate $\int_{-\pi/4}^{\pi/4} x \sin^2(x) dx$