EXAM 3 - MATH 112

DATE: Friday, March 19
INSTRUCTOR: George Voutsadakis

Read each problem very carefully before starting to solve it. Each question is worth 3 points. It is necessary to show your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

1. Find the domain, the x- and y-intercepts, the intervals of monotonicity, the relative extrema, the intervals of concavity, the inflection points and then roughly sketch the graph of the function $f(x) = x^5 - 5x^4$.

2. Find the derivatives

   (a) $f(x) = 4xe^{-x^2}$

   (b) $f(x = 5^{3x+2}(x^2 + 6x)$

   (c) $f(x) = x(e^x + e^{-x})$

3. Find the domain, the x- and y-intercepts, the intervals of monotonicity, the relative extrema, the intervals of concavity, the inflection points and then roughly sketch the graph of the function $f(x) = x^2e^{-x}$

4. Find the derivatives

   (a) $f(x) = \ln \frac{x-1}{x-2}$

   (b) $f(x) = \log_3 (x\sqrt{x-1})$

   (c) $f(x) = \ln (e^{x+2} - 1)$

5. Find the domain, the x- and y-intercepts, the horizontal and vertical asymptotes, the intervals of monotonicity, the relative extrema, the intervals of concavity, the inflection points and then roughly sketch the graph of the function $f(x) = x - 2\ln (x^2)$.

6. Compute the indefinite integrals

   (a) $\int \frac{5}{\sqrt{x}} dx$

   (b) $\int x(\sqrt{x} - \frac{2}{\sqrt{x^3}})dx$

   (c) $\int \frac{5x-3}{x^{1/7}} dx$