

MATH 1080, SPRING 2006, PRACTICE FINAL

1. Go over Exam 1, Exam 2, and Exam 3 problems as well as HW 1-HW 10 for the old materials.

2. For the recent materials (Volume and integration by substitution), study the following problems and related HW problems on HW 10 and HW 11.

3. More problems to practice on the recent materials are:

(1) Let $f(x) = x^2(x - 1)(x - 2)$.

(a) Find the average rate of change of f between $x = 0$ and $x = 1$.

(b) Find the tangent line of f at $x = 1$.

(c) Find the critical points of f .

(d) Find inflection points of f if any. Justify your answer.

(e) Find the local max/min of f .

(f) Find the area of the region surrounded by f and the x -axis.

(g) Find the volume of the solid obtained by rotating the region surrounded by f and the x -axis by x -axis.

(h) Find the volume of the solid obtained by rotating the region surrounded by f and the x -axis by y -axis.

(2) Evaluate the following:

(a) $\int_0^{\frac{\pi}{2}} \cos^3 x dx =$

(b) $\int_1^2 (x^2 - 1)^{20} x dx =$

(c) $\int_0^1 (x + 1)e^{3x^2 + 6x - 1} dx =$

(d) $\int_e^{e^2} \frac{\ln(x^2)}{x} dx =$

Good-luck!