MAT270 Final Exam Review

Fall 2013

This is in no way a complete list of topics covered in class, but merely a compilation of the types of exercises commonly encountered.

1. See Exam 1 review sheet.

2. See Exam 2 review sheet.

3. See Exam 3 review sheet.

4. Suppose that $\int_1^4 f(x)\,dx = 6$, $\int_1^4 g(x)\,dx = 4$, and $\int_3^4 f(x)\,dx = 2$. Evaluate the following integrals, or state that there is not enough information.

   a. $\int_1^4 (3f(x) - 2g(x))\,dx$

   b. $\int_3^1 (f(x) - g(x))\,dx$

   c. $\int_1^4 f(x)g(x)\,dx$

5. State the Fundamental Theorem of Calculus

6. Evaluate the following with the the Fundamental Theorem of Calculus.

   a. $\dfrac{d}{dt}\displaystyle\int_x^{x^2} (\sin(\theta) + \cos(\theta))\,d\theta$

   b. $\dfrac{d}{dx}\displaystyle\int_{x^3}^b \dfrac{\arctan(z) + \ln(2^z)}{z^{4/21}}\,dz$

7. Evaluate the following integrals. Some of them may require a u-substitution to solve.

   a. $\displaystyle\int_{-4}^2 (8x^5 - 2 + \frac{1}{x})\,dx$

   b. $\displaystyle\int_0^1 \dfrac{1}{\sqrt{81 - 9x^2}}\,dx$

   c. $\displaystyle\int_0^{\pi/2} \cos(\theta)\,d\theta$

   d. $\displaystyle\int \eta^9 (3\eta^{1/3} + 27)\,d\eta$

e. $\displaystyle\int \sec(3x)\tan(3x)\,dx$

f. $\displaystyle\int \left(\cos(3\mu) - \cos^3(3\mu)\right)\,d\mu$

g. $\displaystyle\int_1^2 37x - 18y\,dz$