Exam 3 Review **November, 2024**
Calculus III **Prof. Nollet**

13.7 Critical points for function $f(x, y)$, second partials test to determine if they are local max/min or saddle points (ex. 1-30). Absolute max/min on closed bounded region R (ex. 31-38), geometric max/min problems (ex. 49-62). Most likely a problem of the middle type.

14.1-2 Iterated integrals, endpoints and plane regions. Double integrals (signed volume under graph), computation by iterated integrals, changing order of integration.

14.4 Polar coordinates and polar integrals. $x = r\cos\theta, y = r\sin\theta$ useful. Remember the conversion factor is r.

14.5 Triple integrals, correspondence of endpoints with solid region B in $\mathbb{R}^3$, computation by iterated integrals.

14.7 Conversion of triple integrals to cylindrical coordinates: x, y, z similar to polar coordinates, conversion factor is r. Conversion to spherical coordinates. $x = \rho\sin\phi\cos\theta, y = \rho\sin\phi\sin\theta, z = \rho\cos\phi$, conversion factor is $\rho^2\sin\phi$.

15.1 Line integrals $\int_C f\, ds = \int f(r(t))|r'(t)|dt$.

15.2 Vector fields $F : \mathbb{R}^3 \to \mathbb{R}^3$ or $F : \mathbb{R}^2 \to \mathbb{R}^2$. Setting up and calculating line integrals $\int_C F \cdot dr = \int_C Mdx + Ndy + Pdz$.

Suggestions: Look over homework, quizzes, and examples from class. Book review problems may help, though I'm more likely to invent problems similar to examples from class.