

Math 244 Final Exam

Monday, December 10

Name: _____

This is the final exam. There are 12 questions, worth a total of 100 points. **No electronic devices are permitted.** Carefully read each question and understand what is being asked before you start to solve the problem. Please show all your work and circle or mark in some way your final answers.

$$\oint_C \vec{F} \cdot \vec{T} \, ds = \iint_D \text{curl } \vec{F} \cdot \vec{k} \, dA$$

$$\oint_C \vec{F} \cdot \vec{n} \, ds = \iint_D \text{div } \vec{F} \, dA$$

$$\oint_C \vec{F} \cdot d\vec{r} = \iint_S \text{curl } \vec{F} \cdot \vec{n} \, d\sigma$$

$$\iint_S \vec{F} \cdot \vec{n} \, d\sigma = \iiint_R \text{div } \vec{F} \, dV$$

$$ds = |\vec{r}'(t)| \, dt$$

$$d\sigma = |\vec{r}_u(u, v) \times \vec{r}_v(u, v)| \, du \, dv$$