Final Exam: Some problems for review

You will take your Final exam at the regular classroom SCB 303 on Thursday, June 27, from 10 AM to 12:50 PM. You will do it on paper (not on a computer). The material covered is Section 15.1-15.3, 15.6-15.9, and 16.1-16.7. There will be some questions for extra credit. They can help you earn up to 5% of the total course score.

It is a closed book exam. No notes are allowed. You are allowed to use a scientific calculator. Phones are not allowed. You should review the homework problems, quizzes, and examples given in the lectures. It is always a good idea to study for the exam with someone. Some additional problems to practice:

1) Evaluate the surface integral $\iint_S (x+y+z)dS$ where S is the surface parametrized by $x = u+v$, $y = u - v$, $z = 1 + 2u + v$, $0 \le u \le 2$, $0 \le v \le 3$.

2) Evaluate the surface integral $\iint_S xz\,dS$ where S is the intersection of the plane $x + y = 7$ and the solid cylinder $y^2 + z^2 \le 9$.

3) Use Green's theorem to evaluate $\int_C (y + e^{\sqrt{x}})dx + (2x + \cos(y^2))dy$ where C is the boundary of the region enclosed by the parabolas $y = x^2$ and $x = y^2$ and is negatively oriented.

4) Find the work done by the force field $F(x,y) = (2x + y, x)$ in moving an object from $P(1,1)$ to $Q(4,3)$.

5) Evaluate the line integral $\int_C \sin y\,dx + (x\cos y - \sin y)dy$ where C is the part of the graph of the function $y = 2 + \cos x$ from $(\pi, 1)$ to $(0, 3)$.

6) Use a suitable change of variables to evaluate the double integral $\iint_D (x+y)e^{x^2 - y^2}dA$ where D is the region enclosed by the lines $x - y = 0$, $x - y = 2$, $x + y = 0$, and $x + y = 3$.

7) Evaluate the volume of the solid that lies between the cylinders $x^2 + y^2 = 1$ and $x^2 + y^2 = 16$, above the xy-plane, and below the plane $z = y + 4$.