The exam will cover from Chapter 13 to 14. 
There will be a review at next Tuesday November 18.

The MIDTERM II EXAM WILL BE at the regular classroom of the Thursday Nov 20.

1. Find the tangent plane of $x^2 + y^2 + 2z^2 = 4$ at $(1, 1, 1)$.
2. Find the direction in which the function $z = 2x + \sin(2y - x)$ increases and decreases the most from the point $(0, 0)$.
3. Find the directional derivative of $z = f(x, y) = 4x^2 + y^2$ in the direction of $i+j$ at the point $(1, 1)$. What is physical meaning of this derivative? 4. Compute: $(x^y)_{xy}$.
5. Compute the integral $\int \int x^2 + y^2 \leq 4 (x + y^2)dxdy$.

6. Approximate $\sqrt{99}$ and $\sin(46^\circ)$. You have to show the formula. An answer from calculate will yield 0 point.

7. Find the maximum of $xyz$ if $x + y + z = 1$ and positive.

8. Find maxima and maximal value of the function $2x - y$ inside the unit circle.

9. Find the integral $\int \int \int_D x^2 dvol$, where $D$ is the upper half unit ball $x^2 + y^2 + z^2 \leq 1, z \geq 0$.

10. Find maxima and maximal value of the function $x^2 + 2y$ in the triangle $x + 3y = 1, y = 0$ and $x = 0$.

11. Find the integral $\int \int \int_D x dvol$, where $D$ is the part of the unit ball $x^2 + y^2 + z^2 \leq 1$ and $x \geq 0, y \geq 0, z \geq 0$.

12. Find the extrema of the function $x^2y$ in the triangle bounded by the $x-axis$
    and $y-axis$ and the line $x + y = 1$.

13. Compute $\int \int_D x^2ydx dy$, where $D$ is the upper half disk.

14. Write down the change of variable formulae for spherical and cylindrical coordinates.