EXAM 4 - MATH 251 Friday, April 18

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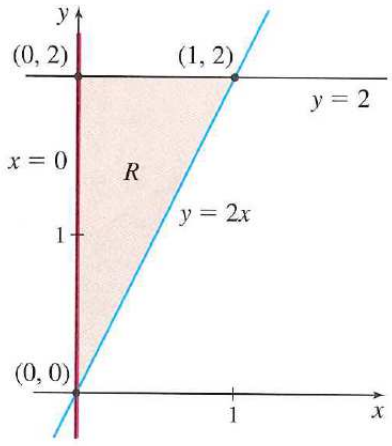
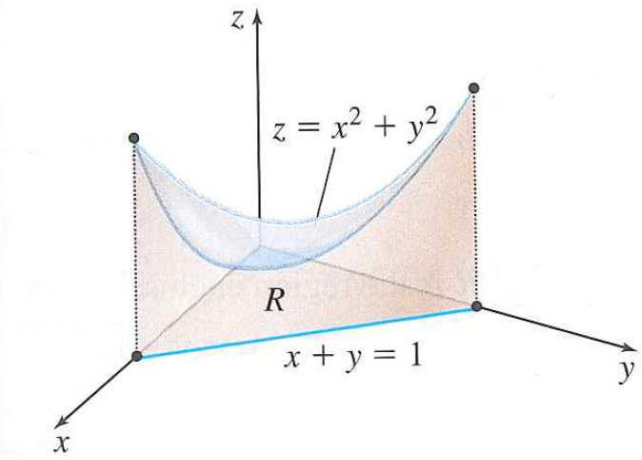
Read each problem **very carefully** before starting to solve it. Each problem is worth 10 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. A rectangular open-top box has fixed volume of 12 m^3. The material used to make the bottom costs \$3 per square meter whereas the material used for the sides costs \$1 per square meter. What dimensions will minimize the cost of the material?

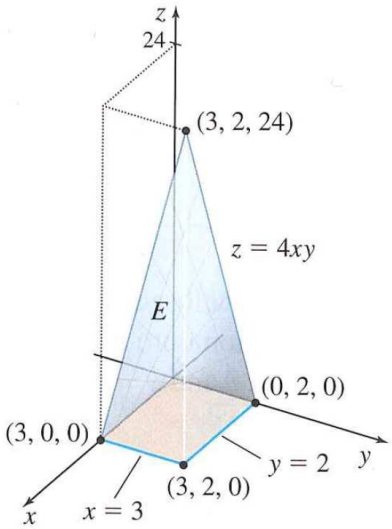
2. Find $\iint_R e^{y^2} dA$, where R is the region shown in the figure.



3. Find the volume of the solid below the paraboloid $z = x^2 + y^2$ and above the triangular region R formed by the x- and y-axes and the line $x + y = 1$.



4. Compute the triple integral $\iiint_E (x^2 + y^2)dV$, where E is the solid in the first octant enclosed by the surface $z = 4xy$ and the planes $z = 0$, $x = 3$ and $y = 2$.



5. Find the volume of the solid E that is enclosed by the cylinder $y^2 + z^2 = 4$ and the planes $x = 0$, $z = 0$ and $x + z = 5$.