For Monday review triple integrals in section 15.4, and read about cylindrical and spherical coordinates in section 15.6.

1) Find the area inside the ellipse
$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$
by integrating $f(x,y) = 1$ over that region. Use the substitution $x = a\,u$, $y = b\,v$ to simplify the integral first.

2) Find the Jacobian of the transformation $x = u$, $y = uv$ and sketch the region $1 \leq x, y \leq 2$ in the (u,v)-plane. Use this to evaluate the integral:
$$\int_1^2 \int_1^2 \frac{y}{x}\, dy\, dx$$
by making a substitution.

3) Evaluate the integral
$$\int \int_{\mathcal{R}} (2x^2 - xy - y^2)\, dx\, dy$$
where $\mathcal{R}$ is the region in the first quadrant bounded by $y = -2x + 4$, $y = -2x + 7$, $y = x - 2$, and $y = x + 1$. (Hint: try factoring the quadratic you are integrating and then using a substition $u = a\,x + b\,y$, $v = c\,x + d\,y$).