Worksheet #2 - Integrating Over Non-rectangles

In this worksheet, you will calculate double integrals for which the domain is not a rectangle.

1. Let $R$ be the triangular region in the $xy$-plane with vertices $(0, 0)$, $(2, 3)$ and $(2, 6)$. Calculate $\int \int_R \cos(x^2) \, dA$.

2. Calculate $\int_0^1 \int_{\sqrt{x}}^1 \sqrt{x^3 + 1} \, dx \, dy$ by reversing the order of integration. (Hint: Sketch the domain of integration first.)
3 Let $D$ be the region in the $xy$-plane bounded by the parabolas $y = 2x^2 - x$ and $y = 2 + x^2$. Find the volume above $D$ and below the surface $z = x + y$.

4 Let $D$ be the same region as in question 3. Calculate area of the part of the surface $z = x + y$ that is above $D$. 