1. Let $A$ be the rectangular region bounded above by the line $y = 1$, below by $y = 0$, on the left by $x = 1$, and on the right by $x = 10$. Let $B$ be the region in the first quadrant between the curve $y = 2x - x^2$ and the $x$-axis. Let $C$ be the region bounded on the left by the curve $x = 1 - \sqrt{1-y}$, on the right by $x = 10$, above by $y = 1$, and below by the $x$-axis. Finally, let $D$ be the region in the first quadrant bounded by the $x$-axis, the line $x = 1$, and the curve $x = 1 + \sqrt{1-y}$.

We know that $\int \int f(x,y) \, dA_A = -4$, $\int \int f(x,y) \, dA_B = 17$, and $\int \int f(x,y) \, dA_C = 3$.

Find $\int \int f(x,y) \, dA_D$

2. A swimming pool surface has the shape of a rectangle 100 meters by 15 meters. The pool contains 9000 meters$^3$ of water. What is the average depth of the pool?

3. The average depth of a circular pond is 4 meters. If the pond contains 3000 meters$^3$ of water, what is the radius of the pond?