1. What is the relationship between the Riemann sum and $\int_{a}^{b} f(x) \, dx$?

2. How do ideas of Riemann sums from Calculus I correspond to ideas in Calculus II like the disc method, washer method and shell method?
3. Where do the functions \( f(x) = x^2 + 2 \) and \( g(x) = -(x - 2)^2 + 6 \) intersect (Use these functions for the remaining problems)?

4. On which intervals is \( f(x) > g(x) \)?

5. On which intervals is \( g(x) > f(x) \)?

6. Consider the region bounded by \( f(x) \) and \( g(x) \). If we take a vertical strip of this region and revolve it around the \( x \)-axis what is the volume of the solid that is produced?

7. Find the volume of the solid of revolution whose plane region is bounded by \( f(x) = x^2 + 2 \) and \( g(x) = -(x - 2)^2 + 6 \) that is revolved about the \( x \)-axis.