

1. [7 points] At a wildlife sanctuary, Diego fills the giraffes' water bowl at a constant rate of 0.5 gallons per minute. The rate in gallons per minute at which the giraffes drink from the bowl, t **minutes** after 8am, is given by $r(t)$. Suppose there are 12 gallons of water in the bowl at 10am.

a. [3 points] Write an expression possibly involving one or more integrals for the amount of water, in gallons, the giraffes drink between 9am and noon.

b. [4 points] Write an expression possibly involving one or more integrals for the amount of water, in gallons, in the bowl at 8am.