5. [12 points] Suppose that a student's rate of exam completion, given in problems per minute, is given by

t	0	15	30	45	60	75	90
$r(t)$	0.30	0.15	0	−0.20	0.25	0.15	0

(a) [6 points of 12] Write an integral that gives the total number of problems that the student completes in the 90 minute exam period. Estimate the number of problems that the student completes. Based on your estimate, does the student complete the exam?

(b) [6 points of 12] The points on $r(t)$ given in (a) are shown in the two graphs below, connected by a smooth curve. On the first graph, illustrate the geometric meaning of (i) $\int_{30}^{45} r(t)\,dt$ and (ii) $\frac{1}{30}\int_0^{30} r(t)\,dt$. On the second graph, illustrate the geometric meaning of your calculation in (a).