3. The following questions are each meant to have short computation times. Each question is worth 4 points.

(a) If $f(x)$ is even and $\int_{-2}^{2} (f(-x) - 3)\, dx = 8$, find $\int_{0}^{2} f(x)\, dx$.

(b) The average value of the function $g(x) = 10/x^2$ on the interval $[c, 2]$ is equal to 5. Find the value of c.

(c) If people are buying UMAir Flight 123 tickets at a rate of $R(t)$ tickets/hour (where t is measured in hours since noon on December 15, 2008), explain in words what $\int_{3}^{27} R(t)\, dt$ means in this context.

(d) Suppose that the function $N = f(t)$ represents the total number of students who have turned in this exam t minutes after the beginning of the exam. Interpret $(f^{-1})'(325) = 2$.

(e) Find k so that the function $h(x)$ below is continuous for all x.

$$h(x) = \begin{cases} x^2 + 1, & x \leq 1 \\ 6\sin(\pi(x - 0.5)) + k, & x > 1 \end{cases}$$