NAME:_____

1. If $[[x]]$ denotes the greatest integer less than or equal to x, let $f(x) = [[x]]$ and $g(x) = [[\frac{1}{2}x]]$

(a) Graph each of the functions $f(x)$ and $g(x)$, over the interval $[0, 3]$.

(b) Using the graphs of part (a) evaluate each of the following integrals.

(i) $\int_0^3 f(x)dx$.

(ii) $\int_0^3 (f(x) + g(x))dx$.

(iii) $\int_0^3 f(x)g(x)dx$.

2. Four calculus students disagree on the value of the integral $\int_0^\pi \sin^8(x)dx$. Jack says that it is equal to π. Joan says it is equal to $\frac{35\pi}{128}$. Ed claims it is equal to $\frac{3\pi}{90} - 1$ while Lesley says it is equal to $\frac{\pi}{2}$. One of them is right. Which one is it?

Hint: Do not try to evaluate the integral; try instead to eliminate the three wrong answers. (Note: If you simply use your calculator to evaluate the integral you will not be able to do the problem like this on the Final Exam; try to think it out.)