Homework 1 (due January 16)

1. Compute the exact value of $\displaystyle\int_1^3 \frac{f'(x)}{f(x)}\,dx$ given that

x	0	1	$\frac{\pi}{2}$	e	3
$f(x)$	5	7	8	10	11
$f'(x)$	2	4	6	9	12

2. Suppose $\displaystyle\int_0^1 g(t)\,dt = 3$. Compute each of the following.

(a) $\displaystyle\int_0^{0.5} g(2t)\,dt$

(b) $\displaystyle\int_0^1 \big(t + g(1-t)\,\big)\,dt$

(c) $\displaystyle\int_1^{1.5} g(3-2t)\,dt$

3. Compute $\displaystyle\int_0^1 \frac{t}{\sqrt{t+1}}\,dt$ exactly (Hint: Let $u = \sqrt{t+1}$).

4. Find the derivative of $f(x) = x\sin^5(x^2)$.