DIRECTIONS:

- Use a pencil (NOT a pen) only.

- Use complete mathematical sentences and when appropriate, circle your answers.

- Print this quiz out as single sided and staple the pages together in the upper left-hand corner.

- Show all work, clearly and in order. **You will lose points if any of these instructions are not followed.**

Questions	Points	Score
1	0.5	
2	2	
3	0.25	
4	0.25	
5	1.5	
Extra Credit	0.25	
Total	5	

Problem 1: (0.5 points) If $\int_3^6 g(x)dx = 3$, $\int_{-2}^3 g(x)dx = 2$, $\int_{-2}^3 f(x)dx = 4$, and $\int_{-2}^6 f(x)dx = 9$, determine the values of the following definite integrals.

(a) (0.25 points) $\int_{-2}^6 3\left(2g(x) - x^2\right) dx$

(b) (0.25 points) $\int_3^6 \left(\pi f(x) - \cos\left(2.71\right) g(x)\right) dx$

Problem 2: (2 points) Integrate the following indefinite integrals

(a) (0.25 points) $\int \frac{z^{2/3}+1}{z^2}dz$

(b) (0.25 points) $\int 4e^{-2s+3}ds$

(c) (0.25 points) $\int \tan x\, dx$

(d) (0.25 points) $\int 3\pi \tan^2 w\, dw$

(e) (0.25 points) $\int \frac{3^{2x}-4(3^x)}{27^x}dx$

(f) (0.25 points) $\int \frac{1}{\sqrt{n}}2^{\sqrt{n}}dn$

(g) (0.25 points) $\int \frac{4}{|u|\sqrt{36u^2-1}}du$

(h) (0.25 points) $\int \sec^2\left(\sec x\right)\sec x \tan x\, dx$

Problem 3: (0.25 points) State the Mean Value Theorem.

Problem 4: (0.5 points) Prove the Fundamental Theorem of Calculus.

Problem 4: (0.25 points) Solve the integral $\int \frac{a}{|x|\sqrt{b^2 x^2 - 1}} dx$ where $a, b \in \mathbb{R}$.

Problem 5: (1.5 points) Integrate the following definite integrals.

(a) (0.25 points) $\int_0^3 \left(r^2 - 4\right)^2 dr$

(b) (0.25 points) $\int_0^{\frac{1}{2}} \frac{1}{1+4u^2} du$

(c) (0.25 points) $\int_1^e 2\left(\ln p\right)\left(\frac{1}{p}\right) dp$

(d) (0.25 points) $\int_0^\pi \left(\sin^2 z + \cos^2 z\right) dz$

(e) (0.25 points) $\int_{-\frac{\pi}{4}}^{\frac{\pi}{4}} y^2 \sec^2\left(y^3\right) dy$

(f) (0.25 points) $\int_{-1}^3 |4 - x^2| dx$

Extra Credit (0.25 points) Find the derivative of $h(x) = \sec^{-1}\left[\ln\left(\sec x \tan x\right)\right]$.