Column	Points	Score
1	13	
2	12	
3	15	
4	10	
Total	50	

Instructions:
1. Do all of your work in this booklet.
2. **Show all of your steps** in problems for full credit.
3. **Be clear and neat** in your work. Any illegible work, or scribbling in the margins, will not be graded.
4. Place your **answers in a box**.
5. If you need more space, you may **use the back of the page** and write **On back Page #** in the problem space.

1. Definitions (6 pts)
a. Define pressure as $P = ?$.

b. Give the Integration by Parts Formula.

c. What is the P-Test?

2. Problems (7 pts)
a. Find the arc length of the curve $f(x) = \cosh x$ for $0 \le x \le 1$.

b. Let $f(x) = \dfrac{1}{2}x$ for $x = 0$ to $x = 2$.

i. Sketch the surface of revolution of this function about the x-axis.

ii. What is the surface area?

4. Trigonometric Integrals (12 pts) Evaluate the following:

a. $\displaystyle\int_0^{\frac{P}{2}} \cos^5 x \, dx$.

b. $\displaystyle\int \sin^2 3x \, dx$

c. $\displaystyle\int \sec^4 x \, dx$

d. $\displaystyle\int x \sin 2x \, dx$

4. More Integrals (15 pts) Compute the following integrals using whatever methods and rules we know.

a. $\int \tan 2x \, dx$.

b. $\int \dfrac{x}{\sqrt{25+9x^2}} \, dx$.

c. $\int \ln(x^2 - x - 2) \, dx$.

d. $\int \dfrac{1}{(x+5)(x-1)} \, dx$.

e. $\int_0^2 \sqrt{4 - x^2} \, dx$

5. Assorted Problems (10 pts)

a. Determine if the integral $\displaystyle\int_1^\infty x^{-1} \, dx$ converges or diverges.

b. Determine of the integral $\displaystyle\int_1^\infty 6e^{-x} \, dx$ converges or diverges.

c. Write out the partial fraction decomposition form without finding the coefficients: $\dfrac{x^4}{x^4 - 1}$

d. Convert the integral $\displaystyle\int \dfrac{1}{x - \sqrt{x+2}} \, dx$ to one without any radicals. Do not evaluate.