Name ____________________________________________

- No calculators allowed.
- Show sufficient work to justify each answer.
- You have 15 minutes for this quiz.

1. (2 pts) Evaluate the integral \( \int x^7 \sqrt{x^4 + 1} \, dx \). [Hint: Consider \( u = x^4 + 1 \).]

2. (3 pts) Evaluate the integral \( \int_{\pi^2/9}^{\pi^2/4} \frac{\cos \sqrt{x}}{\sqrt{x}} \, dx \) and simplify your answer.
3. (4 pts) Consider the region bounded by $y = \frac{1}{x^2}$, $y = x$, and $y = \frac{1}{3}$. In the following manner set up, but do not evaluate, integrals which represent the area of this region.

(a) Integrate with respect to $y$.

(b) Integrate with respect to $x$. (Note that the integrands in parts (a) and (b) should be different.)

4. (1 pt) Determine the area of the region in the previous problem by completing any necessary integration.
1. (3 pts) Evaluate the integral \( \int_{\pi^2/36}^{\pi^2/16} \frac{\sin \sqrt{x}}{\sqrt{x}} \, dx \) and simplify your answer.

2. (2 pts) Evaluate the integral \( \int x^5 \sqrt{x^3 - 1} \, dx \). [Hint: Consider \( u = x^3 - 1 \).]
3. (4 pts) Consider the region in the first quadrant bounded by $y = \frac{1}{x^2}$, $y = x^2$, and $y = \frac{1}{2}$. In the following manner set up, but do not evaluate, integrals which represent the area of this region.

(a) Integrate with respect to $x$.

(b) Integrate with respect to $y$. (Note that the integrands in parts (a) and (b) should be different.)

4. (1 pt) Determine the area of the region in the previous problem by completing any necessary integration.