

Name: \_\_\_\_\_

## Qualifying Test - 2016

You have 1 hour to complete all ten questions. Only answers written on the answer blank will be graded. Each problem is worth 2 points. The top 16 scores will advance to the next level. If there is a tie for the 16th position then the last question will be graded to break the tie. After you finish, join us outside Leshar 111 for lunch before the Integration Bee. Good Luck!

Find  $I$ .

1.  $I = \int 6 \cos^3(4x) dx$

1. \_\_\_\_\_

2.  $I = \int \frac{x^4}{x^2 - 4} dx$

2. \_\_\_\_\_

3.  $I = \int_0^{\infty} e^{-x} \cos(5x) dx$

3. \_\_\_\_\_

4.  $I = \int \frac{y^2}{(4 - y^2)^{3/2}} dy$

4. \_\_\_\_\_

5.  $I = \int \frac{8x + 27}{x^3 + 6x^2 + 9x} dx$

5. \_\_\_\_\_

6.  $I = \int \frac{1 + \ln x}{5 + x \ln x} dx$

6. \_\_\_\_\_

7.  $I = \int \frac{x + 1}{(\sqrt{x} - 1)^{3/2}} dx$

7. \_\_\_\_\_

8.  $I = \int \frac{\tan x}{\sec^2 x} dx$

8. \_\_\_\_\_

$$9. I = \int \frac{dx}{\sqrt{x} + \sqrt{x+1}}$$

9. \_\_\_\_\_

$$10. I = \int \frac{dx}{x\sqrt{x^2 - 36}}$$

10. \_\_\_\_\_

### Tie Breaking Question

This question will only be graded in event of a tie. Evaluate. Exact answers only.

$$I = \int_0^{\pi} \sqrt{\sin x - \sin^3 x} dx$$