

I. EVALUATE EACH INTEGRAL. BE SURE TO SHOW YOUR WORK.

$$1. \int \sin^2 x \, dx \qquad 2. \int \sec^5(x) \, dx = \qquad 3. \int 4x^2 e^{(2x)} \, dx$$

$$4. \int \cos^3 x \sin^4 x \, dx \qquad 5. \int \tan^3 x \sec x \, dx \qquad 6. \int \frac{x}{2\sqrt{4-x^2}} \, dx$$

$$7. \int \frac{x^3}{\sqrt{x^2-4}} \, dx \qquad 8. \int \frac{x-17}{x^2+x-6} \, dx$$

$$9. \int \frac{4x^2-2x+9}{x^3+3x} \, dx \qquad 10. \int 2x \ln(x) \, dx$$

II. EVALUATE EACH LIMIT.

$$11. \lim_{x \rightarrow 1^+} \frac{1-x+\ln(x)}{x^3-3x+2} \qquad 12. \lim_{x \rightarrow 0} x^{(x^3)} \qquad 13. \lim_{x \rightarrow 0} \frac{x^2-x}{\tan(x)}$$

III. EVALUATE EACH INTEGRAL.

$$14. \int_{-1}^{\infty} e^{(-x)} \, dx \qquad 15. \int_1^2 \frac{1}{(x-2)^2} \, dx$$

III. VERIFY EACH INTEGRAL FORM:

YOU MIGHT LOOK OVER THE PROOF OF THE AREA OF A CIRCLE.

$$16. \int \frac{u^2 du}{\sqrt{a^2+u^2}} = \frac{u}{2} \sqrt{a^2+u^2} - \frac{a^2}{2} \ln(u + \sqrt{a^2+u^2}) + C$$

$$17. \int \frac{du}{u \sqrt{a^2+u^2}} = -\frac{1}{a} \ln \left| \frac{\sqrt{a^2+u^2} + a}{u} \right| + C$$