

MAT 202
Assignment 8
Wednesday, August 7, 2013

For full credit on these problems, each must be submitted with a complete and clear solution, showing all of your work. You may work with other classmates on these problems, but please indicate on your assignment if you received help. Partial answers and incomplete solutions may be eligible for some partial credit, depending on the level of completeness and demonstrated understanding.

1. Evaluate the following anti-derivatives.

- (a) $\int \cos^2 x \sin^2 x \, dx$
- (b) $\int \cos^5 x \sin^2 x \, dx$
- (c) $\int \sec^5(2x) \tan^3(2x) \, dx$
- (d) $\int \sec^4(3x) \tan^4(3x) \, dx$
- (e) $\int x^2 \sin x \, dx$
- (f) $\int \frac{x^2}{\sqrt{16-x^2}} \, dx$
- (g) $\int \frac{1}{(1+x^2)^2} \, dx$
- (h) $\int \frac{x}{\sqrt{36-x^2}} \, dx$

2. The equation of an ellipse is given by

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1.$$

- (a) Set up an integral to find the area enclosed by the ellipse. Use symmetry to make your integral easier!
- (b) Evaluate the integral you found in part (a).
- (c) If $a = b$, what shape do we get? How does the formula for the area of this shape correspond to the formula you found in part (b)?