

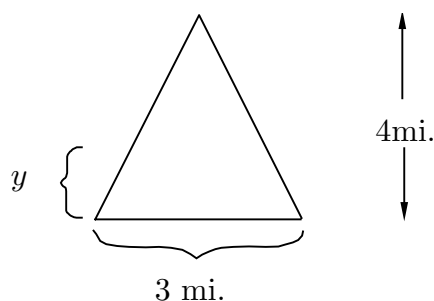
Find the antiderivatives without using the calculator. Show all work. If you use the tables say which formula you used and when you used it in your calculation.

1. $\int_{\pi/6}^{8\pi} \cos(3x + 5) dx$

2. $\int \frac{-x^2}{\sqrt{4 + x^2}} dx$

3. $\int \cos^{11} x \sin^3 x dx$

4. A triangular shaped city has a population density equal to $(2000 - 300y)$ people per square mile at distance y from the base



What is the total population of the city?

5. Suppose a friend runs a numerical integration experiment and ultimately finds

n	Value	Error
10	1.09861550486	6.5×10^{-2}
100	1.098612288997	6.4×10^{-11}
1000	1.098612288668142	6.4×10^{-15}

Here n is the grid size, the first column is the value of the integral. The friend does not tell you if this is a Riemann sum, midpoint, trapezoid, or Simpson calculation.

- Which method is it? Say why you think so. Can you be absolutely sure?
- State carefully what facts about numerical integration you are using.