Midterm 20A Version 1

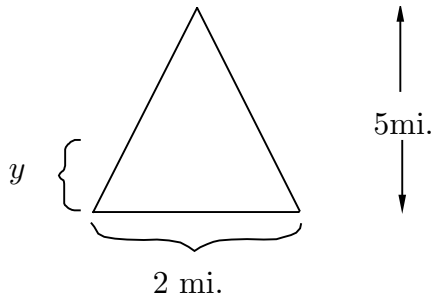
Find the antiderivatives without using the calculator. Show all work. If you use the tables say which formula you used and when you used it in your calculation.

1. $\displaystyle\int_1^7 e^{(5t-4)}\, dt$

2. $\displaystyle\int \frac{x^2}{\sqrt{9-x^2}}\, dx$

3. $\displaystyle\int \sin^{10} x\ \cos^3 x\ dx$

4. A triangular shaped city has a population density equal to (1500 - 200y) 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	3.2×10^{-1}
100	1.098612288997	3.3×10^{-10}
1000	1.098612288668142	3.2×10^{-14}

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.

(a) Which method is it? Say why you think so. Can you be absolutely sure?

(b) State carefully what facts about numerical integration you are using.