

Practice Problems 9 - Math 141, Frank Thorne (thornef@mailbox.sc.edu)

Any of these problems that might appear on a quiz, assessment, or the final exam. You will be expected to show your work, write in complete sentences, and explain your reasoning clearly.

- (a) Thomas, 5.1, 1-10, 19-20.
- (b) What is an indefinite integral? Explain thoroughly.
- (c) What is a definite integral? Explain thoroughly. Draw a picture and give a definition in terms of an equation, and explain the relationship between the picture and the equation.
- (d) Evaluate $\int_0^4 \sqrt{4 - (x - 2)^2} dx$ using geometry.
- (e) Evaluate $\int_0^4 \sqrt{4x - x^2} dx$ using geometry.
- (f) Evaluate $\int_0^3 4x dx$ using geometry.
- (g) Evaluate $\int_{-2}^0 3x dx$ using geometry.
- (h) Evaluate $\int_{-4}^4 \frac{x}{2} dx$ using geometry.
- (i) Evaluate $\int_{-2}^5 (x + 3) dx$ using geometry.
- (j) What does the Fundamental Theorem of Calculus say, and why is it true? Explain carefully and thoroughly.
- (k) What is the Net Change Theorem? Explain its relationship to the Fundamental Theorem of Calculus.
 - (l) Is the integral $\int_{-1}^4 \frac{1}{x^2} dx$ defined? Why or why not?
 - (m) Is the integral $\int_{-1}^4 x^2 dx$ defined? Why or why not?
 - (n) Is the integral $\int_{-1}^4 0 dx$ defined? Why or why not?
- (o) Thomas, Ch. 5.3, 51-62. (*Even though the Fundamental Theorem of Calculus isn't covered until Chapter 5.4, you are encouraged to use it here.*)