

Math 136: Calculus 2

Spring 2017

Professor Levandosky

Written Homework 2

Instructions: Your solutions to the following problems should be written using the following guidelines.

- Use lined paper, and remove any frayed edges. Write your name and assignment number at the top of the first page.
- Copy each problem and write your solution below it. Keep the problems in the correct order.
- Show all your work. A correct answer with insufficient explanation will not receive full credit. On the other hand, incorrect answers may receive partial credit where appropriate.
- Use words and sentences! Imagine that you are trying to explain to someone how to do the problem. Justify each step in your solution.

1. Evaluate the following indefinite integrals.

(a) $\int 2x^7 - 3\sqrt{x} \, dx$

(b) $\int (x - 2)(2x + 3) \, dx$

(c) $\int \frac{x^3 + 3x + 1}{x^2} \, dx$

(d) $\int \sin(3x) + e^{7-4x} \, dx$

2. Find the function y that satisfies $\frac{dy}{dx} = \frac{1}{x^2}$ and $y(1) = 6$.

3. A rock falls off a 20 meter high cliff. Its acceleration due to gravity is $-9.8m/s^2$.

- (a) Find the velocity $v(t)$ of the rock at time t .
- (b) Find the position $s(t)$ of the rock at time t .
- (c) At what time does the rock hit the ground?
- (d) With what velocity does the rock hit the ground?

4. Evaluate the following definite integrals.

(a) $\int_0^3 e^{-x} \, dx$

(b) $\int_1^4 \sqrt{t} dt$

(c) $\int_1^2 \frac{2x^2 + 3}{x} dx$

(d) $\int_0^9 |\sqrt{x} - 2| dx$

5. Find a formula for $f(x) = \int_1^x t^{1/3} dt$. Find $f'(x)$.

6. Evaluate $\frac{d}{dx} \int_1^{5x^2} \sin(t^2) dt$.

7. Which of the following functions satisfies $\frac{dy}{dx} = \sqrt{1+x^3}$ and $y(1) = 3$? Explain.

(a) $y = \frac{1}{2}(1+x^3)^{-1/2}(3x^2)$

(b) $y = \frac{(1+x^3)^{3/2}}{3x^2}$

(c) $y = 3 + \int_1^x \sqrt{1+t^3} dt$

(d) $y = 1 + \int_3^x \sqrt{1+t^3} dt$