

**Mat 115 Worksheet 3**  
**Tuesday, Oct 10 2017**

Name:

**Important info:** Welcome to the mat 115 workshops! My name is **Diego Avalos** (avalosgalvez@cpp.edu), and I will be your workshop facilitator. We meet on Tuesdays and Thursdays from 4 to 5:50 pm. My office hour is on Mondays from 11:30 am to 12:30 pm in room 3-2117. All worksheets and solutions may be found at the website [www.diegoavalos.net/teaching/mat115workshop2017](http://www.diegoavalos.net/teaching/mat115workshop2017). I want to thank the SIAM president **Camille Michaluk** for covering my workshop today. Thank you **pres!**

Compute the definite integrals in problems 1 to 9.

1.  $\int_{-\pi}^{\pi} \sin^3(x^5) dx$

4.  $\int_{-1/2}^{1/2} \frac{1}{\sqrt{1-x^2}} dx$

7.  $\int_{\pi/4}^{\pi/3} \sec^2 x dx$

2.  $\int_{\pi/12}^{\pi/6} \sin(2x) \cos(2x) dx$

5.  $\int_{-1}^1 x^{4/3} + 4x^{1/3} dx$

8.  $\int_0^{\pi/2} \cos^2 x dx - \int_0^{\pi/2} \sin^2 x dx$

3.  $\int_{-\sqrt{3}}^1 \frac{1}{1+x^2} dx$

6.  $\int_{e^{-3}}^{e^3} x^2 + x^{-1} dx$

9.  $\int_{\pi/6}^{\pi/3} x + \frac{2}{\sin^2 x} - \csc x \cot x dx$

Compute the derivatives in problems 10 to 15.

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

12.  $\frac{d}{dx} \int_x^0 t \sec t dt$

14.  $\frac{d}{dx} \int_1^{x^3} \sqrt[3]{t} dt$

11.  $\frac{d}{dx} \int_1^x \sqrt{1 - \cos t} dt$

13.  $\frac{d}{dx} \int_{-1}^x |t| dt$

15.  $\frac{d}{dx} \int_{x^3}^{x^2} \frac{t^6}{1+t^4} dt$

16. Let  $F(x) = \int_4^x \sqrt{t^2 + 9} dt$ . Find

a.  $F(4)$

b.  $F'(4)$

c.  $F''(4)$

Find the average value of the functions in 17 to 20 in the respective interval.

17.  $f(x) = 3x; [1, 3]$

19.  $f(x) = \sec x \tan x; [0, \pi/3]$

18.  $f(x) = \sin x; [0, \pi]$

20.  $f(x) = \sec^2 x; [-\pi/4, \pi/4]$