

M 408C - Differential and Integral Calculus

Week 12 - 5.2-5.4

Quest HW 12 - Due Monday at 11:30p.

Gradescope HW 12 - Due Wednesday at 11:30p on Gradescope.

§5.2, #62

§5.3, #63, 83

§5.4, #74

Additional Question :

#1) If $x \sin(\pi x) = \int_0^{x^2} f(t) dt$, where f is a continuous function, find $f'(4)$.

#2) If $f(x) = \int_0^{g(x)} \frac{1}{\sqrt{1+t^3}} dt$, where $\int_0^{\cos(x)} [1 + \sin(t^2)] dt$, find $f'(\pi/2)$.

#3) Find $\frac{d^2}{dx^2} \int_0^x \left(\int_0^{\sin(t)} \sqrt{1+u^4} du \right) dt$.

Hint: This means find the second derivative. It might help to think of this complicated expression as:

$$\int_0^x \left(\int_0^{\sin(t)} \sqrt{1+u^4} du \right) dt = \int_0^x (f(t)) dt, \text{ where } f(t) = \int_0^{\sin(t)} \sqrt{1+u^4} du.$$

62. If $F(x) = \int_2^x f(t) dt$, where f is the function whose graph is given, which of the following values is largest?

(A) $F(0)$

(B) $F(1)$

(C) $F(2)$

(D) $F(3)$

(E) $F(4)$

