Math 106, Spring 2018

Worksheet 6, Tuesday, February 28, 2018

1. Compute $\int_2^5 x^2 \, dx$ using each of the following two methods:
   (a) The Fundamental Theorem of Calculus.
   (b) The *Limit Definition* of the Definite Integral
2. Compute $f'(x)$ where $f(x) = \int_5^x \frac{1}{t+7} \, dt$.
3. Compute $f'(x)$ where $f(x) = \int_x^9 \sqrt{t^2+3} \, dt$.
4. Compute $g''(x)$ where $g(x) = \int_x^9 \sqrt{1+\cos t} \, dt$.

NOTE: Unless instructions specify to use the Limit Definition of the Definite Integral, you may use the Fundamental Theorem of Calculus, Part II.

5. Compute $\int_0^{\frac{\pi}{3}} \sec^2 \theta \, d\theta$.
6. Compute $\int_{-\pi}^{\frac{\pi}{3}} \cos x \, dx$.
7. Compute $\int_{-2}^{-1} x - \frac{5}{x^3} \, dx$.
8. Compute $\int_0^{\frac{\pi}{6}} (\tan x + \sec x) \sec x \, dx$.
9. Compute $\int_1^2 \left(x^2 - \frac{1}{x^2}\right)^2 \, dx$.
10. Compute $\int_0^1 x^{\frac{3}{4}} - 2x^{\frac{1}{2}} \, dx$.
11. Compute $\int_1^4 \frac{x - x^3}{\sqrt{x}} \, dx$.
12. Compute $\int_{-2}^1 |x| \, dx$. Recall how the absolute value is defined. Then draw the bounded region and use *area interpretation* to confirm your answer.
13. Compute $\int_4^7 |x-5| \, dx$. Again, draw the bounded region and use *area interpretation* to confirm your answer.

Turn in your own solutions.