Name:_____

Math 121

Self-Assessment Quiz #2

September 10, 2021

- Please see the course webpage for the answer key.
- 1. Compute $\int_3^{3\sqrt{3}} \frac{1}{\sqrt{36-x^2}} + \frac{1}{9+x^2} dx$.
- **2.** Compute $\int \frac{4}{(1+x^2)(1+(\arctan x)^2)} dx$.
- 3. Compute $\int_0^{\ln \sqrt{2}} \frac{e^x}{\sqrt{4 e^{2x}}} dx.$
- 4. Compute $\int_0^{\ln 3} \sinh(2x) \ dx.$
- **5.** (a) Use implicit differentiation to **PROVE** that $\frac{d}{dx} \arctan x = \frac{1}{1+x^2}$
- (b) From part (a) we now know that $\frac{1}{1+x^2} dx = \arctan x + C$. Use this fact **and integration** to **PROVE** that $\int \frac{1}{3+x^2} dx = \frac{1}{\sqrt{3}} \arctan \left(\frac{x}{\sqrt{3}}\right) + C$
- **6.** Use implicit differentiation to **PROVE** that $\frac{d}{dx}\sin^{-1}(5x) = \frac{5}{\sqrt{1-25x^2}}$