Written HW12 – MATH 2502 Fall 2021

Due by 27 September for timely completion credit

Recall trig substitutions:

$$\sqrt{a^2 - x^2} \to x = a\sin(\theta)$$

$$\sqrt{a^2 + x^2} \to x = a\tan(\theta)$$

$$\sqrt{x^2 - a^2} \to x = a\sec(\theta)$$

You may use the following integrals in your calculation:

$$\int \tan^2(\theta)\mathrm{d}\theta = \tan(\theta) - \theta + C$$

$$\int \tan^3(\theta)\sec(\theta)\mathrm{d}\theta = \frac{1}{3}\sec(\theta)\left(\sec^2(\theta) - 3\right) + C$$

1. $\displaystyle\int \frac{x^3}{\sqrt{16 - x^2}}\mathrm{d}x$
2. $\displaystyle\int \frac{\sqrt{x^2 - 25}}{x}\mathrm{d}x$
3. $\displaystyle\int \frac{9x^3}{\sqrt{1 + x^2}}\mathrm{d}x$