Homework for Math 352  
Spring 2020  

Hwk Set 1. Due Friday, January 17. Do the following review problems from Calculus I & II (150/250), Linear Algebra (221) and Intro. to Proofs (302). Show all work.

1. \[ \lim_{t \to 2} \frac{t^2 - 4}{t - 2} \]
2. \[ \lim_{\theta \to 0} \frac{\sin 2\theta}{3\theta} \]
3. \( (\sec(e^x))' \)
4. \[ \int x \sin x \, dx \]
5. \[ \int x \sin^2 x \, dx \]
6. \[ \int_{-1}^{1} \tan(x^3) \, dx \]
7. Find the Taylor series centered about \( x = 0 \) of \( \cos x^2 \).
8. Find the interval of convergence of \( \sum_{n=1}^{\infty} \frac{(2 - x)^n}{n} \).
9. Prove that \( A \cup (B \cap C) = (A \cup B) \cap (A \cup C) \), where \( A \), \( B \) and \( C \) are sets.
10. Find the eigenvalues of \[
\begin{bmatrix}
5 & 8 & 16 \\
4 & 1 & 8 \\
-4 & -4 & -11
\end{bmatrix}
\]