OSH 6
Math 104 - Section 107

Question 1 *(2 points)* Find the linear approximation of $x^{1.2}$ near $x = 1$.
Use it to estimate $1.2^{1.2}$.
Use concavity to determine whether this is an overestimation or an under estimation.
Use Taylor's Theorem to show that the error of your approximation in absolute value is less than 0.005.

Question 2 *(2 points)* Find the 3rd Taylor polynomial of $(x+1)e^x$ near $x = 0$.
Use it to estimate $1.5\sqrt{e}$.

Question 3 *(4 points)* Do the following for $f(x) = \frac{1}{2x} + \arctan x$:

- Find increasing and decreasing intervals.
- Find local extremes.
- Find vertical and horizontal asymptotes.
- Draw a graph of the function, indicating all previous information.

Question 4 *(2 points)* Let ABC be a triangle such that $AB = 6_{\text{cm}}$ and $AC = 5_{\text{cm}}$. The edge BC is increased at a rate of $1_{\text{cm/sec}}$. Find the rate of change of the angle $\angle A$ (in radians/second) when $BC = 5_{\text{cm}}$.