

1. (5 pts.) Find the following limit.

$$\lim_{t \rightarrow 0^+} \left( \frac{1}{x} - \frac{1}{\sin x} \right)$$

2. (3 pts.) Which of the following functions grow faster?

(a)  $x^2 e^x$

(b)  $x e^x$

3. (2 pts.)  $\sin^{-1} \left( -\frac{\sqrt{2}}{2} \right) =$

4. (2 pts.)  $\tan^{-1} (-1) =$

5. (3 pts.)  $\sec (\tan^{-1} 2x) =$

6. (5 pts.) Find the derivative of  $f(x) = \tan^{-1} e^{x^2}$