Print your name here:______________________________

Please circle your section:

(1) T 1:30   Gilman 17   Ariturk, Sina
(2) T 3:00   Hodson 210   Tran, Timothy
(3) Th 1:30  Maryland 309  Ravit, Jason
(4) Th 3:00  Hodson 316   Tran, Timothy

Write out and SIGN the pledge:
I attest that I have completed this exam without unauthorized assistance from any person, materials, or device.

Signature: ___________________________ Date: ___________________________

This is a 50 minutes in-class closed book exam. No notes, books, or calculators are allowed.

This examination booklet contains 4 problems, on 6 sheets of paper including the front cover. Please detach the last page, which is intended for use as scrap paper.

Show all work. Don’t use any techniques that haven’t been covered in class yet. The correct answer is worth no points without any argumentation.
1 (40 pts.) Evaluate the following limits (if there is no limit, state "no limit" together with a reason).

a) \( \lim_{x \to 0} (\cos x - (x + 2)^3) \)

b) \( \lim_{x \to \infty} \frac{x^3 + 100x^2 + x}{5x^5 + 2x^2 + 2} \)

c) \( \lim_{x \to 1} \arcsin(\frac{\sqrt{x - 1}}{x - 1}) \)

d) \( \lim_{x \to \infty} (\sqrt{x^2 - 1} - x) \)
2 (20 pts.) Find asymptotes (horizontal and vertical) for the function

\[
f(x) = \begin{cases} 
1 - \frac{1}{1+x} & x < -1 \\
\tan \frac{\pi x}{2} & -1 < x < 2 \\
\frac{1}{x^2} & x > 2 
\end{cases}
\]
3 (20 pts.)

For the following functions $y = f(x)$, determine if it is invertible. If not, explain the reason, if yes, find the inverse function $y = f^{-1}(x)$.

a) $f(x) = \frac{1}{\sqrt{x^2-1}}$

b) $f(x) = \frac{1}{\sqrt{x-1}}$
4 (20 pts.) Determine (the equation of) the tangent line to the curve $y = x^\sqrt{x}$, that parallel to the line $2y = 3x + 10$. At which point does this tangent line touch the curve? Write out the equation of the normal line through this point.
This page is intended for use as scrap paper.