Name:
ID:
Important instructions:
- Use an HB pencil or a pen (do not use red color)
- Solve the problems completely
- Write down your answers in a clear manner
- Justify all your steps
- Use the back of the page (verso) only for scratching

Prob. 1
Find the limit
\[
\lim_{t \to \infty} \frac{2 - t}{\sqrt{4 + 3t^2}}
\]

Prob. 2
Find
\[
\lim_{z \to +\infty} \left( \sqrt{z^2 + cz} - \sqrt{z^2 + dz} \right)
\]
where \(c\) and \(d\) are two real numbers.

Prob. 3
Use the definition to prove that
\[
\lim_{x \to 6} \sqrt{x + 3} = 3
\]

Prob. 4
Find the points of discontinuity. Are they removable or not?

\[ f(x) = \frac{5x + 2}{5|x| + 2} \]

**Prob. 5**
Use the intermediate value theorem to show that there is a square with a diagonal length that is between \( r \) and \( 2r \) and an area that is half the area of a circle of radius \( r \).

**Prob. 6**
Find the following limit

\[ \lim_{v \to \pi/4} \frac{v - \pi/4}{\tan v - 1} \]

**Prob. 7**
Find \( \lim_{x \to a} f(x) \) for \( f(x) = \begin{cases} 
\frac{x-4}{|x-4|}, & x \neq 4 \\
0, & x = 4 
\end{cases} \) when \( a = 0, a = 4^+, a = -4^-, a = -4^+, a = +\infty, a = -\infty \).