MATH 1A– Midterm #1

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Name: _____
Student ID: _____

This exam contains 8 pages (including this cover page) and 6 questions. Total of points is 20.

Distribution of Points

Question	Points	Score
1	4	
2	3	
3	3	
4	3	
5	4	
6	3	
Total:	20	

1. (4 points) For the following function, find a formula for the inverse, as well as the *domain* and *range* of f^{-1}.

$$f(x) = \sqrt{x+5}$$

2. (3 points) Find horizontal asymptotes of

$$y = \frac{x^2 + 3x + 3}{8x^2 + 5}.$$

3. (3 points) Let

$$f(x) = \begin{cases} ax + 2, & \text{if } x < -1 \\ ax^2 + bx + 3, & \text{if } -1 \leq x < 1 \\ \sqrt{x} + 2a + b, & \text{if } x \geq 1 \end{cases}$$

Find the values of a and b that make the function $f(x)$ continuous everywhere.

4. (3 points) Show that the equation

$$2^x + x = 0$$

has a solution in the interval $[-4, 4]$.

5. (4 points)

   (a) Use the definition of derivative as a limit to find $f'(x)$ for $f(x) = x^2 + 3x$.

   (b) Find the equation of the tangent to $y = f(x)$ at $x = 2$.

6. (3 points) Find the following limit.

$$\lim_{x \to 3} \frac{2 - \sqrt{x+1}}{x^2 - 2x - 3}$$