Name:
Table:

No electronic devices (phones, calculators, computers, etc.) are allowed during the exam.

You may only use techniques on this quiz which we have discussed in class. In particular, you may not use L'Hôpital's rule in evaluating any of the limits below. You must have provide clear, logical solutions to each of the problems below to receive full credit.

Problem 1 (1 point)

Use the precise definition of the limit at infinity to show $\lim_{x\to\infty} \frac{1}{x^2} = 0$.

Problem 2 (1 points)

Calculate the following limit:

$$\lim_{x\to 0} \sqrt{\frac{2\sin(x)}{x}}.$$

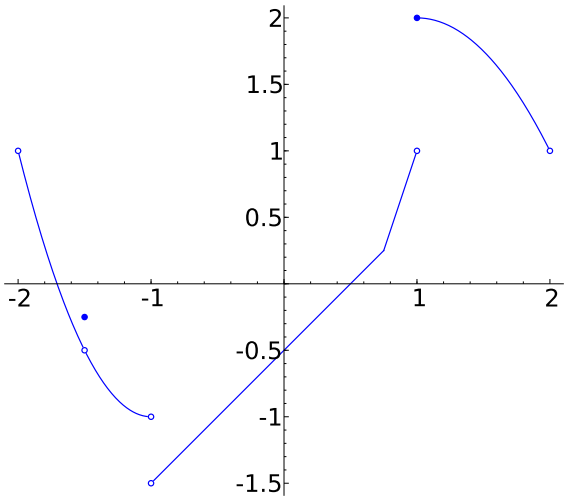
Problem 3 (2 points)

Calculate the following limit:

$$\lim_{x \to 3} \log_2 \left(\frac{2x^3 - 18x}{9x - 27} \right).$$

Problem 4 (1 point)

Where is the following function not continuous?



Problem 5 (1 point)

What are the horizontal asymptotes of the following function?

$$f(x) = \frac{6x^3 - 5x^2 + 7}{2x^3 + x - 5}$$

(To receive credit you must justify your answer mathematically.)

Problem 6 (1 point)

What are the horizontal asymptotes of the following function?

$$f(x) = \frac{3x + 1}{\sqrt{5x^2 + 2x - 3}}.$$

(To receive credit you must justify your answer mathematically.)

Problem 7 (2 points)

Suppose $f(x)$ is a continuous function defined for all real numbers, and that $f(x)$ satisfies the following equation:

$$\lim_{x\to 2} \frac{f(x)^2 - 16}{2x^2 - 8} = 5.$$

What is $f(2)$?

Problem 8 (1 point)

Use the ϵ-δ definition of limit to show that $\lim_{x\to -1} (4x - 7) = -11$.