



Calculus I Test 1

Limits

Number of questions—10

Directions: Solve each of the following problems, using the available space to show all relevant work. Irrelevant work will detract from your score, while answers without work shown will be awarded no credit. Answers with partially correct work will receive partial credit. Each problem is worth 10 points. You must work alone, but you may use a graphing calculator as a supplement to your own work if you indicate the steps used. You may not use computational intelligence or AI.

In this exam:

- (1) Unless otherwise specified, the domain of a function f is assumed to be the set of all real numbers x for which $f(x)$ is a real number.
- (2) The inverse of a trigonometric function f may be indicated using the inverse function notation f^{-1} or with the prefix “arc” (e.g., $\sin^{-1} x = \arcsin x$).

(for teacher use only)

Exam Score			
Question	Points	Question	Points
1		6	
2		7	
3		8	
4		9	
5		10	
Overall Score:			

1. Find $\lim_{k \rightarrow 0} \frac{(x - k)^2 - 2kx^3}{x(x + k)}$.

2. Find $\lim_{x \rightarrow 0} \frac{4x^4 + 8x^3}{3x^5 - 9x^3}$.

3. Find $\lim_{x \rightarrow \infty} \frac{x^2 + 1}{3x^2 + 2x - 1}$.

4. Find $\lim_{x \rightarrow 0} \frac{5x^5 + 8x^3}{x^5}$.

5. For what value of c is $f(x) = \begin{cases} cx^2 + 2x, & \text{for } x < 2, \\ x^3 - cx, & \text{for } x \geq 2, \end{cases}$ continuous?

6. Find $\lim_{x \rightarrow 0} x^4 \cos \frac{2}{x}$.

7. Find $\lim_{h \rightarrow 0} \frac{\sqrt{9+h} - 3}{h}$.

8. Find $\lim_{x \rightarrow 0} \frac{5 \sin 2x}{3 \sin x}$.

9. Show that there is a root of the equation $\sin x = x^2 - x$ in the interval $(1, 2)$.

10. Find a formula for a function that has vertical asymptotes $x = -3$ and $x = 6$ and horizontal asymptote $y = 0$.