Math 16A (Spring 2008)
Schlichter
Midterm 1 Review

Be sure to understand ALL problems from the homework. These are just some selected practice problems.

1. $\lim_{x\to 3^+} \dfrac{5}{x^2-5x+6} =$

2. $\lim_{x\to 5} \dfrac{x+5}{x^2+10x+35} =$

3. $\lim_{x\to 64} \dfrac{\sqrt{x}-8}{x-64} =$

4. $\lim_{x\to 1} \dfrac{3x^3+3}{2x-5} =$

5. $\lim_{x\to \infty} \dfrac{2x^2+3}{x^5-2x^2+1} =$

6. $\lim_{x\to 0} \dfrac{\dfrac{1}{x+5}-\dfrac{1}{5}}{x} =$

7. $\lim_{x\to 0} x^3 =$

8. $\lim_{x\to 3} \dfrac{x^2+9x+18}{x-3} =$

9. $\lim_{x\to 1^+} \dfrac{\sqrt{2x+1}-\sqrt{3}}{x-1} =$

10. Explain the continuity of $f(x) = \dfrac{x^2+1}{x-1}$

11. Is the following function continuous at $x = 0$? Explain your reasoning.

$$f(x) = \begin{cases} 2+x^3 \text{ if } x < 0, \\ 3 \text{ if } x = 0, \\ 3\cos x \text{ if } x > 0 \end{cases}$$

12. Determine constant A and B so that the following function is continuous for all x-values.

$$g(x) = \begin{cases} Ax^2 + Bx - 2 \text{ if } x > -1, \\ 2 \text{ if } x = -1, \\ Bx - A + 8 \text{ if } x < -1 \end{cases}$$

13. Use the limit definition to find the derivative of the following functions

    a) $f(x) = 8 - 5x$

    b) $f(x) = 4 - x^2$

    c) $f(x) = \dfrac{2}{x} - 1$

14. Find the slope of the above three functions at the points

    $x = 0$

    $x = 2$

15. Solve $2(\sin x)^2 - \sin x - 1 = 0$ for $0 \leq x \leq 2\pi$

16. Find the center and radius of the circle: $x^2 - 6x + y^2 + 8y + 9 = 0$

17. Given that $f(x) = x^3 + 4$ find f^{-1}.