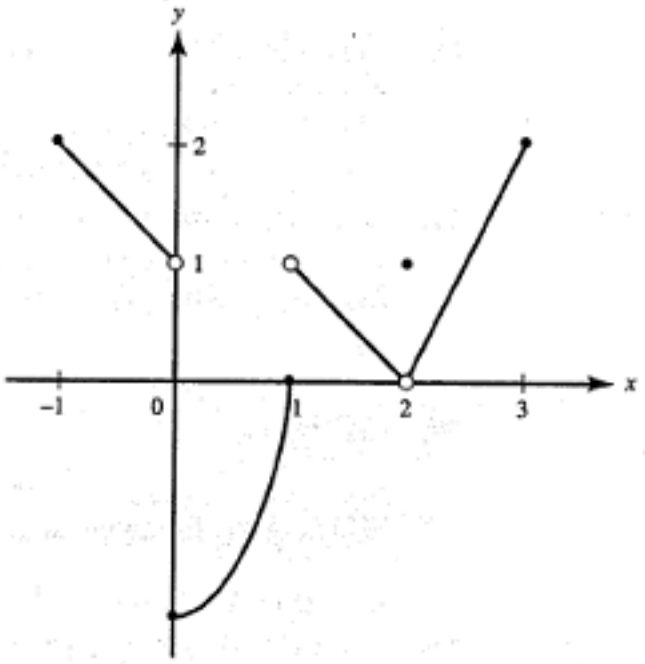
Math 1431 Test 1 Review
Fall 2018
Recitation Review

Use the following information to answer questions 1, 2 and 3.

$$f(x)=\begin{cases}1-x & -1\leq x<0\\ 2x^2-2 & 0\leq x\leq 1\\ -x+2 & 1<x<2\\ 1 & x=2\\ 2x-4 & 2<x\leq 3\end{cases}$$



1. Find $\lim_{x\to 2} f(x)$

2. Find $\lim_{x\to 1+} f(x)$

3. Find $\lim_{x\to 0-} f(x)$

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4. Determine the limit: $\lim_{x\to 2} \dfrac{x-2}{x^2-4}$

5. Determine the limit: $\lim_{x\to 4} \dfrac{x-4}{\sqrt{x}-2}$

6. Find $\lim_{x\to 6+} f(x)$ if

$$f(x)=\begin{cases}x^2+x+1 & x<-1\\ x^2-x & -1\leq x\leq 6\\ x-7 & x>6\end{cases}$$

7. Given $\lim_{x\to 2} f(x)=5$ and $\lim_{x\to 2} g(x)=-1$ find $\lim_{x\to 2}[2f(x)-g(x)]$

8. Determine if $f(x)$ is continuous at $x=-1$ and at $x=6$

$$f(x)=\begin{cases}1-x & x<-1\\ x^2-x & -1\leq x\leq 6\\ x-7 & x>6\end{cases}$$

9. Determine the limit: $\lim_{x\to 0} \dfrac{\sin(5x)}{2x}$

10. Determine the limit: $\lim_{x\to 0} \dfrac{\tan^2(5x)}{2x^2}$

11. Determine the limit: $\lim_{x\to 0} \dfrac{x}{\tan(2x)}$

12. Determine the value of A that makes $f(x)$ continuous at $x = -1$.

$$f(x) = \begin{cases} x^2 & x < -1 \\ Ax + 3 & -1 \leq x \end{cases}$$

13. Determine the value of B and C that makes $f(x)$ continuous everywhere.

$$f(x) = \begin{cases} Bx - C & x \leq 1 \\ 4x & 1 < x < 2 \\ Cx^2 - B & x \geq 2 \end{cases}$$

14. Can the intermediate-value theorem be used to show there is a solution to the equation $2x^3 + x^2 + 3x - 1 = 0$ on the interval [0,2]? Give an explanation why or why not.

15. Can the intermediate-value theorem be used to show there is a solution to the equation $\dfrac{x^2+4}{x-2} = 0$ on the interval [0,4]? Give an explanation why or why not.

16. Use the definition of derivative to find $f'(2)$ for $f(x) = \dfrac{1}{x-1}$.

17. Use the definition of derivative to find $f'(x)$ for $f(x) = \sqrt{x+3}$.

18. Find the equation for the normal line to the graph of $f(x) = 5 - x^2$ at the point where $x = 2$.

19. Find $f'(1)$ if it exists.

$$f(x) = \begin{cases} 3x^2 & x \leq 1 \\ 2x^3 + 1 & x > 1 \end{cases}$$

20. Determine the values of A and B that make $f'(x)$ continuous everywhere.

$$f(x) = \begin{cases} 4x & x \leq 1 \\ Ax + B & x > 1 \end{cases}$$

21. Find the inverse of $f(x) = (x^3 + 4)^{1/3}$, if possible.

22. Use the $\epsilon - \delta$ definition of a limit to prove that $\lim_{x\to 3} 2x + 7 = 13$.

23. Know how to find domain, vertical asymptotes, horizontal asymptotes, and holes for a rational function.

24. Know your unit circle to find values of inverse trig functions and be able to solve trig equations over an interval.