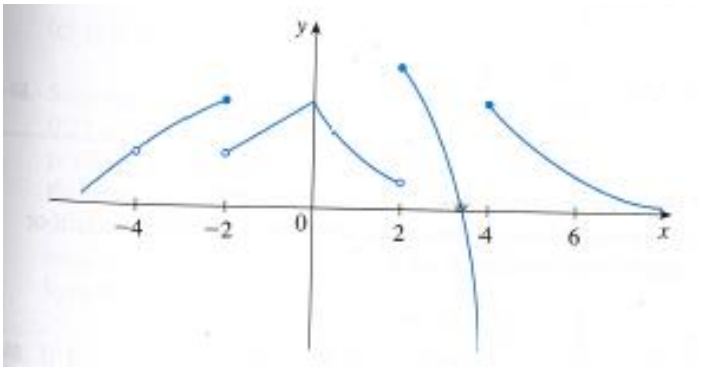
AP Calculus AB
Continuity

Name_____
Limits, Cont., & R.O.C Day 5

1.



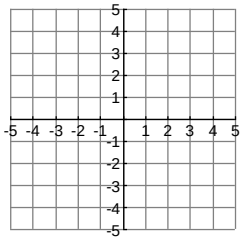
A.) From the graph of f,state the numbers at which f is discontinuous and explain why.

B.) For each of the numbers stated in part (A), determine whether f is continuous from the right, or from the left, or neither.

2-4: Explain why the function is discontinuous at the given number a. Sketch the graph of the function.

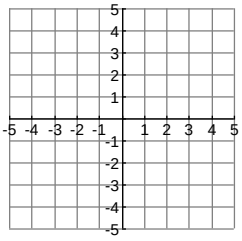
2. $f(x) = \begin{cases} \frac{1}{x+2} & if \ x \neq 2 \\ 1 & if \ x = 2 \end{cases}$

At $a = 2$.



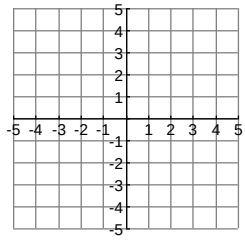
3. $f(x) = \begin{cases} \frac{x^2-x}{x^2+1} & if \ x \neq 1 \\ 1 & if \ x = 1 \end{cases}$

At $a = 1$.



4. $f(x) = \begin{cases} cosx & if \ x < 0 \\ 0 & if \ x = 0 \\ 1 - x^2 & if \ x > 0 \end{cases}$

At $a = 0$.



5-6: How would you "remove the discontinuity" of f? In other words, how would you define $f(2)$ in order to make f continuous at 2?

5. $f(x) = \frac{x^2-x-2}{x-2}$

6. $f(x) = \frac{x^3-8}{x^2-4}$

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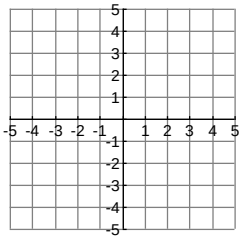
Continuity Limits, Cont., & R.O.C Day 7

7-8: Find the numbers at which f is discontinuous. At which of these numbers is f continuous from the right, from the left, or neither? Sketch the graph of f.

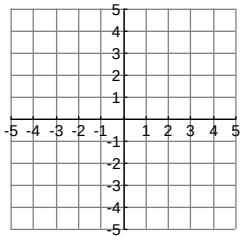
7.

$$f(x)=\begin{cases}1+x^2 & if \quad x\le 0\\ 2-x & if \quad 0<x\le 2\\ (x-2)^2 & if \quad x>2\end{cases}$$



8.

$$f(x)=\begin{cases}x+2 & if \quad x<0\\ e^x & if \quad 0\le x\le 1\\ 2-x & if \quad x>1\end{cases}$$



9. For what value of the constant c is the function f continuous on $(-\infty,\infty)$?

$$f(x)=\begin{cases}cx^2+2x & if \quad x<2\\ x^3-cx & if \quad x\ge 2\end{cases}$$

10. Find the values of a and b that make f continuous everywhere.

$$f(x)=\begin{cases}\dfrac{x^2-4}{x-2} & if \quad x<2\\ ax^2-bx+3 & if \quad 2\le x<3\\ 2x-a+b & if \quad x\ge 3\end{cases}$$

1a. $x=-2$ *b.c* $\lim_{x\to -2} f(x)=$ *d.n.e* and $x=2$ *b.c* $\lim_{x\to 2} f(x)=$ *d.n.e* and $x=4$ *b.c* $\lim_{x\to 4} f(x)=$ *d.n.e* b. omit

2. Discontinuous at $a=2$ *b.c* $\lim_{x\to 2} f(x)=$ *d.n.e* 3. Discontinuous at $a=1$ *b.c* $\lim_{x\to 1} f(x)\neq f(1)$ 4. Discontinuous at $a=0$ *b.c* $\lim_{x\to 0} f(x)\neq f(0)$

5. Let $f(2)=3$ 6. Let $f(2)=3$ 7. Discontinuous at $x=0$ *b.c* $\lim_{x\to 0} f(x)=$ *d.n.e*

8. Discontinuous at $x=0$ *b.c* $\lim_{x\to 0} f(x)=$ *d.n.e* and $x=1$ *b.c* $\lim_{x\to 1} f(x)=$ *d.n.e*

9. $c=\dfrac{2}{3}$ 10. $a=\dfrac{1}{2}$ *and* $b=\dfrac{1}{2}$ (Please do not lose your mind over #10!!!! It is HARD!!)