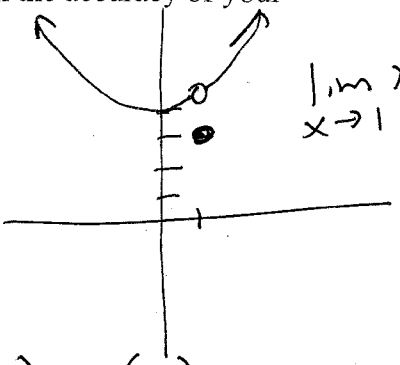
Solutions

Name_____ **9/17/08 AP Calculus AB Chapter 1 Test**

Show all of your work. No Calculators. Indicate clearly the methods you use, because you will be graded on the correctness of your methods as well as on the accuracy of your final answers.

1. Use the graph at the right to find: $\lim_{x\to 1} f(x) = \begin{cases} x^2+4, & x \neq 1 \\ 3, & x = 1 \end{cases}$



$\lim_{x\to 1} x^2+4 = 5$

2. $\lim_{x\to 0} \frac{\sqrt{x+2}-\sqrt{2}}{x}$ $\cdot \frac{\sqrt{x+2}+\sqrt{2}}{\sqrt{x+2}+\sqrt{2}}$ $\frac{(x+2)-(2)}{x\left[\sqrt{x+2}+\sqrt{2}\right]}$

$= \lim_{x\to 0} \frac{1}{\sqrt{x+2}+\sqrt{2}} = \frac{1}{2\sqrt{2}}$

3. $\lim_{x\to 1} \sqrt{1-x}$ $= DNE$

$\lim_{x\to 1^-} f(x) = 0 \neq \lim_{x\to 1^+} f(x)$ DNE

4. Show that the function has exactly one zero in the given interval.

$f(x) = x^4 + 3x + 1$ [-2, -1]

$f(-1) = 1 - 3 + 1 < 0$

$f(-2) = 16 - 6 + 1 > 0$

so by IVT exists a zero

such that $f(c) = 0$ on $[-2, -1]$

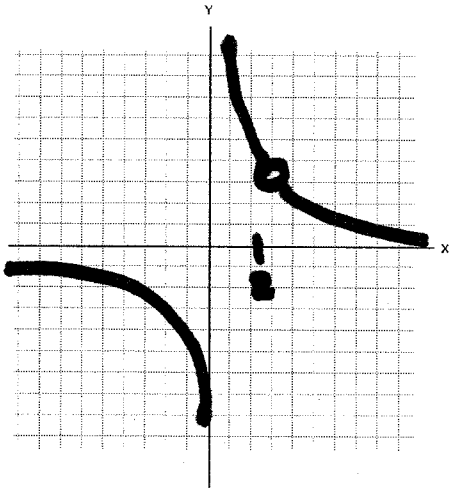
5. For the function $y = \frac{x-2}{x^2-4}$, label the discontinuities as removable or non-removable.

$\frac{x-2}{(x-2)(x+2)}$ removable @ $x=2$

non removable @ $x=-2$

6. Create a function that is continuous everywhere but at 2 values of x and its limit exists everywhere but 1 value of x.

a) Graph your function here:



b) Define your function here: one example

$$f(x) = \begin{cases} \frac{1}{x} & x \neq 2 \\ \text{und} & x = 2 \end{cases}$$