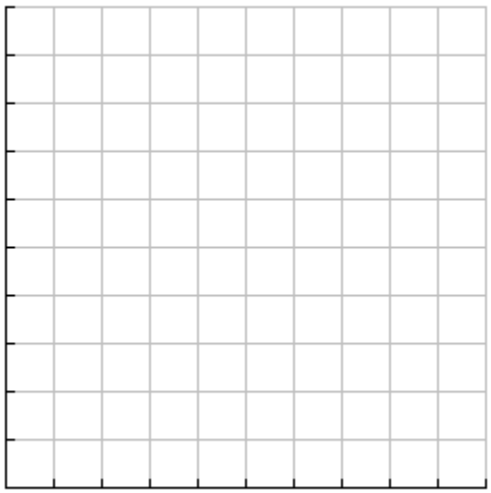
Name_____ Period_____ Limit Lab AP Calculus 8/25

In this lab, we will study the behavior of a function near a specified point.

Consider the following function $f(x) = \dfrac{x^4 - 1}{x - 1}$.

1. Use the TABLE on your calculator to fill in the table below. Change your window to match the table and sketch the graph.

x	*f(x)*
1.9	
1.99	
1.999	
2	
2.001	
2.01	
2.1	



2. What do you notice (*or what appears to be happening to the values of f(x)*) as *x* approaches 2 from both sides?

_____

3. What is $\lim\limits_{x \to 2} \dfrac{x^4 - 1}{x - 1}$? _____

4. What is *f*(2)? _____

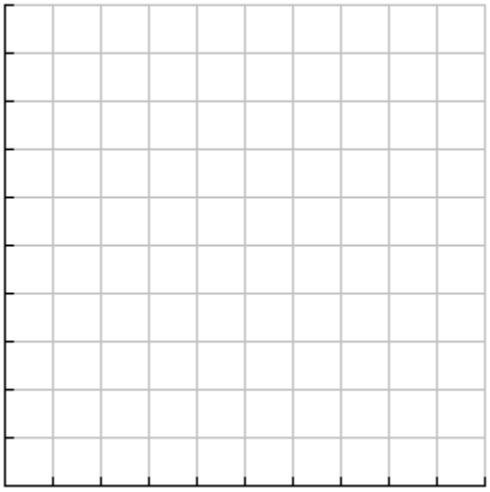
5. Graph *f*(*x*) on your calculator using a friendly window for *x* (ZOOM decimal) and [-20,20] for *y*. What happens at *x* = 2?

_____

Use the same function *f* as above, but this time, look at what happens as *x* approaches 1.

6. Use the TABLE on your calculator to fill in the table below.

x	*f(x)*
.9	
.99	
.999	
1	
1.001	
1.01	
1.1	



7. What is $\lim\limits_{x \to 1} \dfrac{x^4 - 1}{x - 1}$? _____

8. What is *f*(1)? _____

9. Graph it on the calculator using the same window as above. What happens at *x* = 1?

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