

LIMITS AND CONTINUITY WORKSHEET
[1.7 & 1.8]

Generate a table of values to find each of these limits.

1. $\lim_{x \rightarrow 0} (1+x)^{1/x} = \boxed{e} \approx 2.71828 \dots$

-0.1	-0.01	-0.001	-0.0001
2.8680	2.732	2.7196	2.718418

0.1	0.01	0.001	0.0001
2.5937	2.7048	2.7169	2.718146

2. $\lim_{\theta \rightarrow 0} \left(\frac{\sin(2\theta)}{\theta} \right) = \boxed{2}$

-0.1	-0.01	-0.001	
1.9867	1.99987	1.9999...	$\rightarrow 2$

0.1	0.01	0.001	
1.9867	1.99987	1.9999...	$\rightarrow 2$

3. $\lim_{t \rightarrow 1} \left(\frac{1-t}{1-t} \right) = \boxed{DNE}$

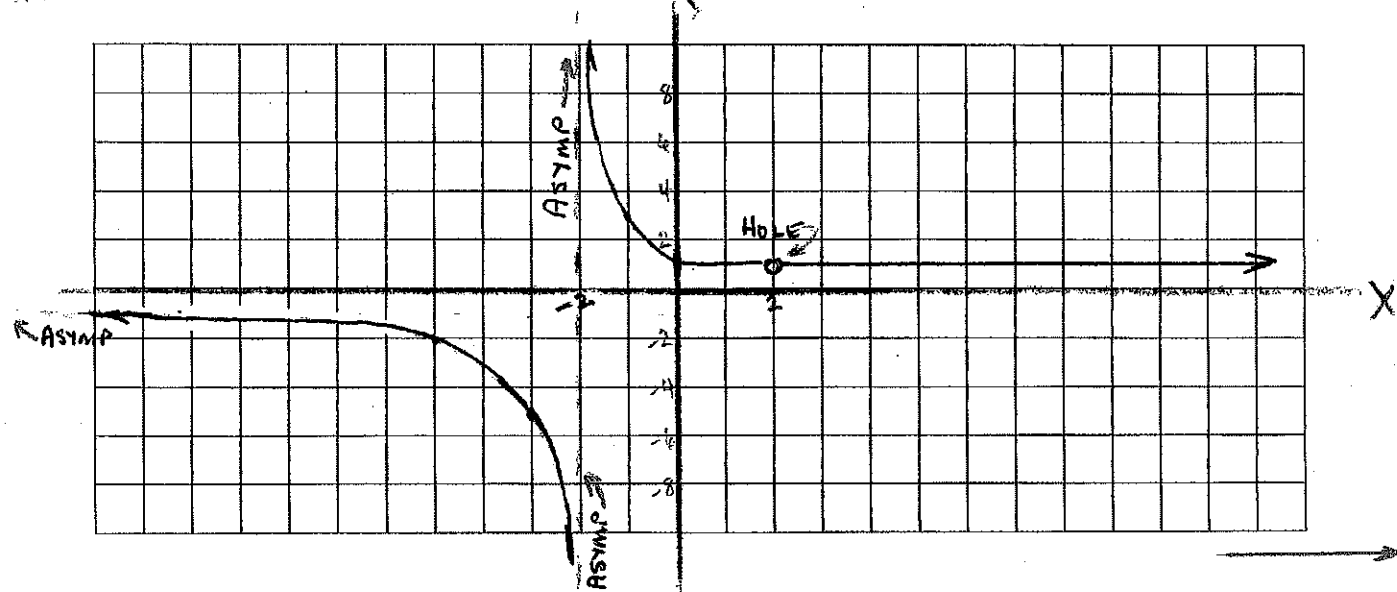
0.9	0.99	0.999	
1	1	1	

1.1	1.01	1.001	
-1	-1	-1	

Neatly and accurately graph $f(x)$. Use the graph to find each of these limits. ^{ON YOUR GRAPH} ~~Be sure to~~ emphasize any asymptotes, holes, or other important characteristics.

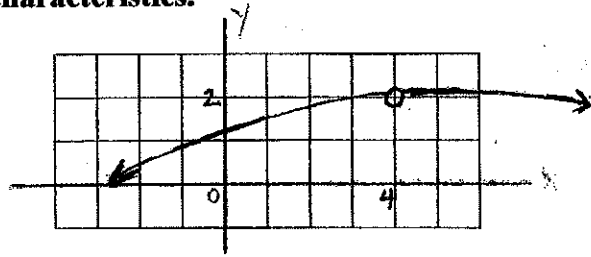
4. $f(x) = \frac{x-2}{|x|-2}$ $\lim_{x \rightarrow 2^+} f(x) = \boxed{1}$ $\lim_{x \rightarrow 2^-} f(x) = \boxed{1}$ $\lim_{x \rightarrow -\infty} f(x) = \boxed{1}$

$\lim_{x \rightarrow \infty} f(x) = \boxed{-1}$ $\lim_{x \rightarrow \infty} f(x) = \boxed{1}$ $\lim_{x \rightarrow -2^-} f(x) = \boxed{-\infty}$ $\lim_{x \rightarrow -2^+} f(x) = \boxed{\infty}$

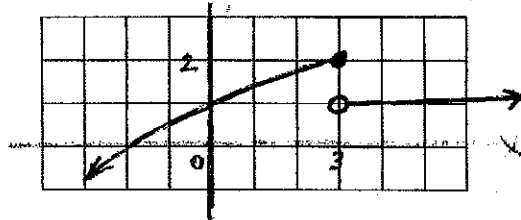


In each case, neatly sketch a graph with the given characteristics.

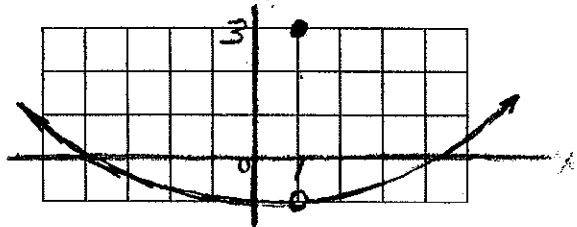
5. $f(4)$ is undefined and $\lim_{x \rightarrow 4} f(x) = 2$.



6. $f(3) = 2$ and $\lim_{x \rightarrow 3} f(x)$ does not exist.



7. $f(1) = 3$ and $\lim_{x \rightarrow 1} f(x) = -1$.



Find the value of k that would make the function continuous in each case. Explain how you found your value.

8.
$$g(x) = \begin{cases} \frac{e^x - 1}{x} & x \neq 0 \\ k & x = 0 \end{cases}$$

At $x=0$, $k = \lim_{x \rightarrow 0} \frac{e^x - 1}{x} = 1$

$\therefore k = 1$

-0.1	-0.01	-0.001	
.9516	.9950	.9995	$\rightarrow 1$
.1	.01	.001	
1.0517	1.00517	1.000500	$\rightarrow 1$

9.
$$h(x) = \begin{cases} \frac{\sin(5\pi x) - 1}{2x - 1} & x \neq \frac{1}{2} \\ 2k + 3 & x = \frac{1}{2} \end{cases}$$

At $x = \frac{1}{2}$, $2k + 3 = \lim_{x \rightarrow \frac{1}{2}} \left(\frac{\sin(5\pi x) - 1}{2x - 1} \right)$

$= 0$

$2k + 3 = 0$

$k = -\frac{3}{2}$

.49	.499	.4999	.49999
.61558	.06168	.0061685	.0006168 $\rightarrow 0$
.51	.501	.5001	.50001
-.61558	-.06168	-.0061685	-.0006168 $\rightarrow 0$