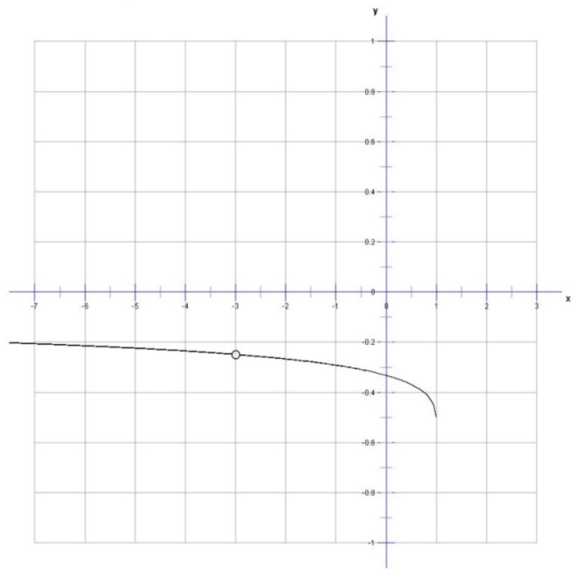
Calculus – Homework #2 - Answer Key

1)

x	-3.1	-3.01	-3.001	-2.999	-2.99	-2.9
f(x)	-.2485	-.2498	-.2500	-.2500	-.2502	-.2516

$$\lim_{x\to -3}\frac{\sqrt{1-x}-2}{x+3} = -.25 \text{ or } \frac{-1}{4}$$

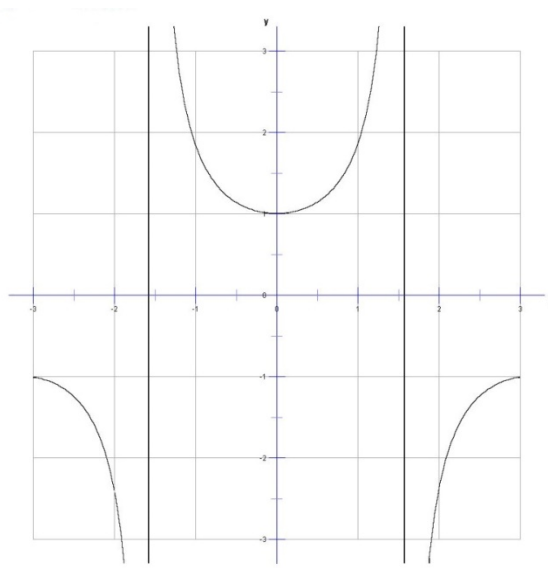


2) $L=0$ Proof: Find a relationship between ε and δ by stating that $0<|x-a|<\delta$ where $a=3$ which gives you $|x-3|<\delta$ by substitution. Now state that $|f(x)-L|<\varepsilon$. Substitution yields $|(6x-18)-(0)|<\varepsilon$. Simplify to get $|6x-18|<\varepsilon$ you must now manipulate this inequality to get $|6(x-3)|<\varepsilon$ which is equivalent to $6|(x-3)|<\varepsilon$ and finally $|x-3|<\frac{\varepsilon}{6}$. This means that the relationship between δ and ε is $\delta=\frac{\varepsilon}{6}$. Therefore, if $0<|x-3|<\delta$, then $0<|x-3|<\frac{\varepsilon}{6}$ then $6|x-3|<\varepsilon$ then $|6(x-3)|<\varepsilon$ which can then be written as $|6x-18|<\varepsilon$ or $|6x-18-0|<\varepsilon$ and finally as $|(6x-18)-(0)|<\varepsilon$

3)

x	0.1	0.01	0.001	-0.001	-0.01	-0.1
f(x)	1.0050	1.0001	1.0000	1.0000	1.0001	1.0050

$$\lim_{x\to 0}\sec x = 1$$

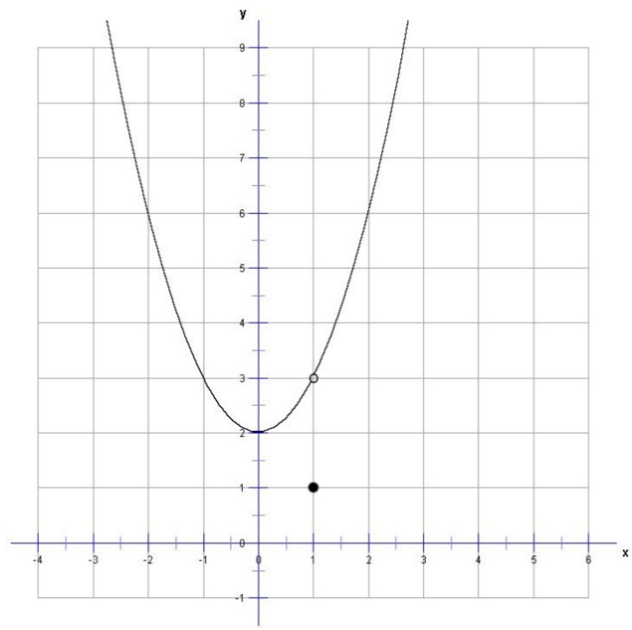


4) $L = 29$ $\delta = .00\overline{09}$ or $\dfrac{1}{1100}$

5)

x	1.1	1.01	1.001	0.999	0.99	0.9
f(x)	3.2100	3.0201	3.0020	2.9980	2.9801	2.8100

$$\lim_{x\to 1} f(x) = 3$$



6) 16
7) –1
8) –4
9) 2
10) 1
11) $\frac{1}{2}$
12) –2
13) A. 15 B. 5 C. 6 D. $\frac{2}{3}$
14) –2
15) 1
16) –1
17) $\frac{1}{2}$
18) 1
19) –1
20) A. 64 B. 2 C. 12 D. 8