1 | **Limit Laws**

see pdf

2 | **Openstax Calculus Vol1 2.3 Exercises**

- **Link**

2.1 | **84**

$$\lim_{x\to 1}\frac{x^3+3x^2+5}{4-7x}=\frac{1+3+5}{4-7}=\frac{9}{-3}=\boxed{-3}$$

2.2 | **85**

$$\lim_{x\to -2}\sqrt{x^2-6x+3}=\sqrt{4-(-12)+3}=\boxed{\sqrt{19}}$$

2.3 | **86**

$$\lim_{x\to_1}(9x+1)^2=(-9+1)^2=\boxed{64}$$

2.4 | **94**

$$\lim_{x\to 4}\frac{x^2-16}{x-4}=\frac{0}{4-4}=\frac{0}{0}$$
$$\Rightarrow \lim_{x\to 2}\frac{\cancel{x-2}}{x\cancel{(x-2)}}=\lim_{x\to 2}\frac{1}{x}=\boxed{\frac{1}{2}}$$

2.5 | **98**

$$\lim_{h\to 0}\frac{\frac{1}{a+h}-\frac{1}{a}}{h}\Rightarrow\frac{\lim_{h\to 0}\frac{1}{a+h}-\lim_{h\to 0}\frac{1}{a}}{\lim_{h\to 0}h}$$

now what..?

This is just the derivative of $\frac{1}{a}$ where a is a real valued, non zero constant. So, it should just be $\boxed{\frac{-1}{a^2}}$.

2.5.1 | **In class review**

$$\lim_{h\to 0} \frac{\frac{a-a-h}{(a+h)a}}{h} \Rightarrow \lim_{h\to 0} \frac{-1}{a(a+h)}$$

2.6 | **100**

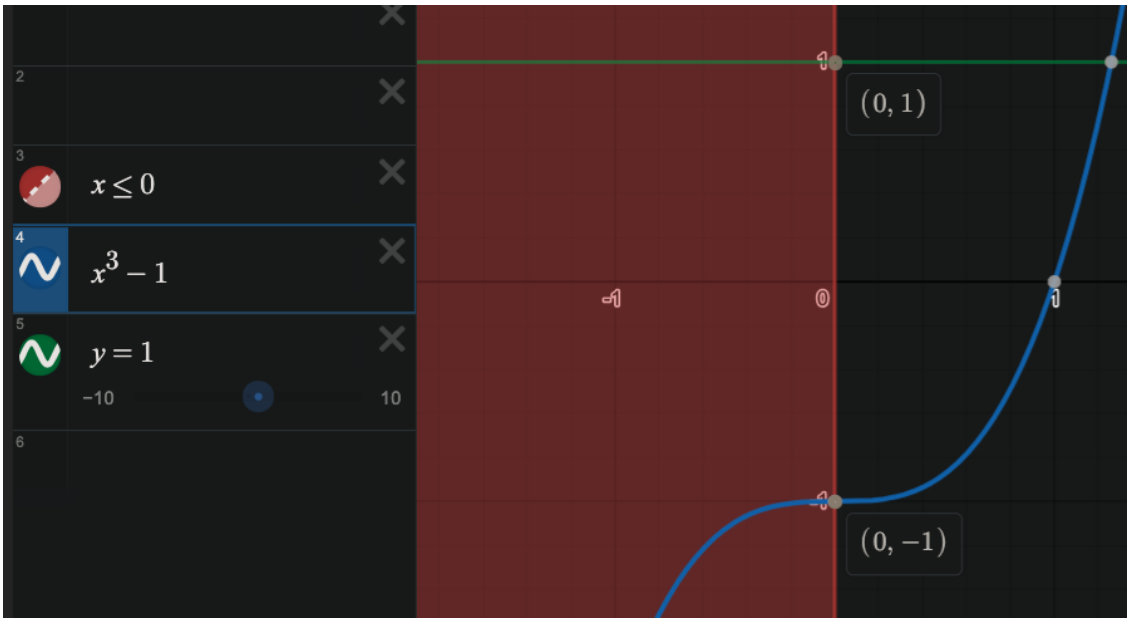
$$\lim_{x\to 1} \frac{x^3-1}{x^2-1} \Rightarrow \lim_{x\to 1} \frac{\cancel{(x-1)}(x^2+1+x)}{(x+1)\cancel{(x-1)}} = \lim_{x\to 1} \frac{x^2+x+1}{x+1} = \boxed{\frac{3}{2}}$$

2.7 | **Time Check**

It's been an 45 minutes. I will now give up on LaTeXing things:

Problem	Result
108	2
109	7
110	108
111	$\sqrt{5}$
112	36
113	28
114	30

2.8 | **116**



$\boxed{-1, 1}$

2.9 | **Continuity**

- Function compositions are continuous if their parts are continuous
- Sum, difference, multiples, powers are continuous if you don't divide by zero or take an even root of a negative

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