Source: ⟦KBe2020math401index⟧

1 | **Limit Laws**

see pdf

2 | **Openstax Calculus Vol1 2.3 Exercises**

- **Link**

84

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

85

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

86

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

94

$$\lim_{x \to 4} \frac{x^2 - 16}{x - 4} = \frac{0}{4 - 4} = \frac{0}{0}$$

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

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 $\boxed{\dfrac{-1}{a^2}}$.

In class review

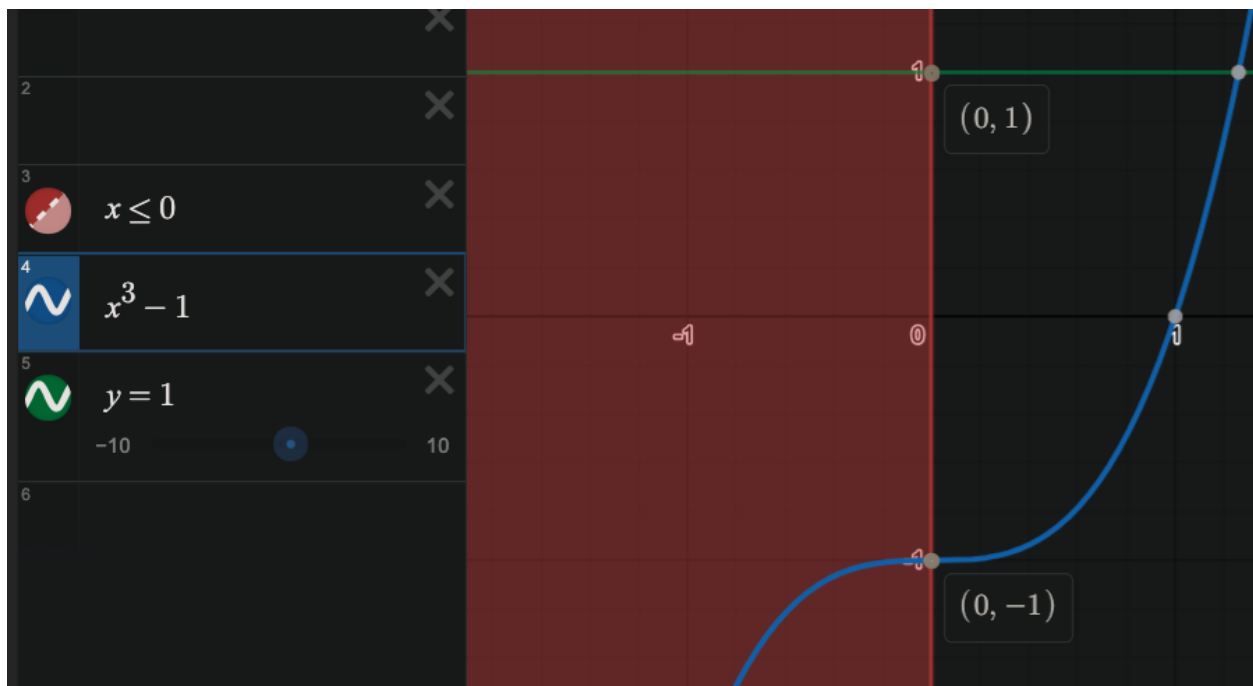$$\lim_{h \to 0} \frac{\frac{a - a - h}{(a+h)a}}{h} \Rightarrow \lim_{h \to 0} \frac{-1}{a(a + h)}$$

100

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

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

116

$\boxed{-1, 1}$

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