

Source: [\[KBe2020math401index\]](#)

1 | Limit Laws

see [\[KBe20math401srcLimitLawsBrainstorm\]](#).pdf

2 | Openstax Calculus Vol1 2.3 Exercises

• Link ## 84

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

85

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

86

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

94

$$\begin{aligned} \lim_{x \rightarrow 4} \frac{x^2 - 16}{x - 4} &= \frac{0}{4 - 4} = \frac{0}{0} \\ &\Rightarrow \lim_{x \rightarrow 2} \frac{\cancel{x-2}}{x(\cancel{x-2})} = \lim_{x \rightarrow 2} \frac{1}{x} = \frac{1}{2} \end{aligned}$$

98

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

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 $\boxed{0}$. ## 100

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