$$\lim_{x\to 4} \frac{3(\ln(9x+10)+1)}{4((2x+2)^{1/3}+1)}$$

$$\frac{3(\ln(46)+1)}{4(\sqrt[3]{10}+1)}$$

$$\to \boxed{\frac{3\ln(46)+3}{4\sqrt[3]{10}+4}}$$

HW5 #7

$$\lim_{h\to 0} \frac{15\left((h-8)^2-64\right)}{h} \quad \frac{0}{0}$$

$$\lim_{h\to 0} \frac{15\left[h^2-16h+\cancel{64}-\cancel{64}\right]}{h}$$

$$\lim_{h\to 0} \frac{15\left[h^2-16h\right]}{h}$$

$$\lim_{h\to 0} \frac{15\cancel{h}(h-16)}{\cancel{h}}$$

$$\lim_{h\to 0} 15(h-16)$$

$$15(-16)$$

$$\boxed{=-240}$$

$$\lim_{x\to\infty} \frac{x^2+4x+4}{3x^2-5x+1}$$

$$\lim_{x\to\infty} \frac{\frac{x^2}{x^2}+\frac{4x}{x^2}+\frac{4}{x^2}}{\frac{3x^2}{x^2}-\frac{5x}{x^2}+\frac{1}{x^2}}$$

$$\lim_{x\to\infty} \frac{1+\overset{0}{\frac{4}{x}}+\overset{0}{\frac{4}{x^2}}}{3-\underset{0}{\frac{5}{x}}+\underset{0}{\frac{1}{x^2}}} \rightarrow \boxed{\frac{1}{3}}$$

$s(t) = t^2 + 1$

avg vel. $t=1, t=3$

$\quad\quad\quad\quad a \quad\quad b$

$$\frac{s(b)-s(a)}{b-a} \rightarrow \frac{s(3)-s(1)}{3-1} \rightarrow \frac{10-2}{3-1} = \frac{8}{2} = \boxed{4}$$

avg. vel

from

$t=1$ to $t=3$

$s(3) = 3^2+1 = 10$

$s(1) = 1^2+1 = 2$

$s(t) = t^2 + 1$

instantaneous vel. @ $\boxed{t=2}$

$$\lim_{h \to 0} \frac{s(2+h) - s(2)}{h}$$

inst. vel.

@ $t=2$

$s(2) = 2^2 + 1 = \underline{5}$

$s(2+h) = (2+h)^2 + 1 \rightarrow 4 + 4h + h^2 + 1 \rightarrow \underline{h^2 + 4h + 5}$

$$\lim_{h \to 0} \frac{h^2 + 4h + \cancel{5} - \cancel{5}}{h} \rightarrow \lim_{h \to 0} \frac{(h+4)\cancel{h}}{\cancel{h}} \rightarrow \lim_{h \to 0} h + 4 = \boxed{4}$$

$$\lim_{x \to 9^+} \ln\left[(x+1)(x-9)\right]$$

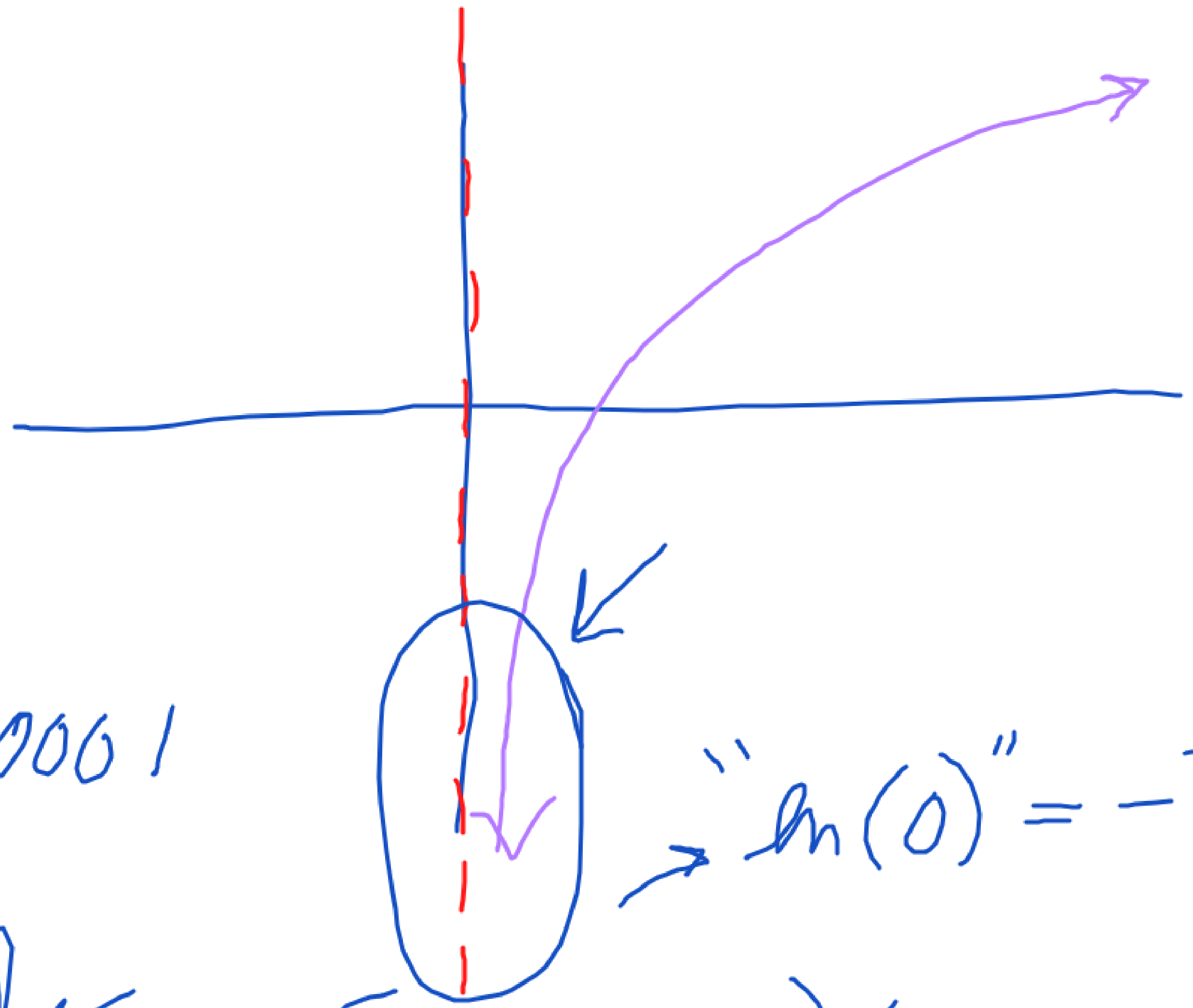
9.1

9.01

$\boxed{9.001}$

9.000001

$$\ln\left[\underbrace{(10{,}001)}_{\to 10}(0{,}001)\right]$$



"ln(0)" $= -\infty$

$$\ln\left[\underbrace{(10.000001)}_{\to \boxed{10}}\underbrace{(0.000001)}_{\to \boxed{0}}\right]$$