(1) [5] Use a linear approximation to estimate $(8.06)^{2/3}$.

$$(8.06)^{2/3} = \left(8 + \frac{3}{50}\right)^{\frac{2}{3}}.$$

Let $f(x) = x^{2/3}$, $a = 8$, so $f(a) = 8^{2/3} = 4$

$$f'(x) = \frac{2}{3x^{1/3}}; \quad f'(a) = \frac{2}{3\cdot 8^{1/3}} = \frac{1}{3}.$$

$$\therefore \quad f(x) \approx f(a) + f'(a)(x-a)$$

$$= 4 + \frac{1}{3}(x-8)$$

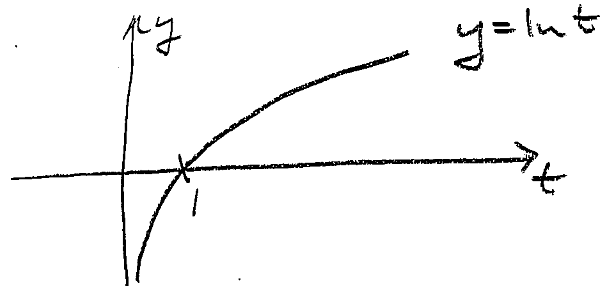
$$\therefore \quad (8.06)^{2/3} = f(8.06)$$

$$\approx 4 + \frac{1}{3}\left(8 + \frac{3}{50} - 8\right)$$

$$= 4 + \frac{1}{3}\left(\frac{3}{50}\right)$$

$$= \boxed{\frac{201}{50}}$$

(2) [5] Determine $\lim_{x\to 2^-} \ln(2-x)$.



As $x \to 2^-$,

$2 - x \to 0^+$,

So $\ln(2-x) \to -\infty$

$\therefore \lim_{x\to 2^-} \ln(2-x) = -\infty.$

(3) [5] Find an equation of the tangent line to the curve $y = \ln(\ln x)$ at the point $(e, 0)$.

$$y' = \frac{1}{\ln x} \cdot \frac{1}{x}$$

$$y'\Big|_{x=e} = \frac{1}{\cancelto{1}{\ln(e)}} \cdot \frac{1}{e} = \frac{1}{e}$$

$\therefore$ equation is

$$y = \frac{1}{e}(x - e)$$

<u>or</u> $$y = \left(\frac{1}{e}\right)x - 1$$