(F)

(1.) a) $f'(x) = \left(\sqrt{x^4 - \frac{5}{x}}\right)' = \dfrac{4x^3 + \frac{5}{x^2}}{2\sqrt{x^4 - \frac{5}{x}}} = \dfrac{\frac{4x^5+5}{x^2}}{2\cdot\sqrt{\frac{x^5-5}{x}}} =$

$= \dfrac{\sqrt{x}}{2x^2} \cdot \dfrac{4x^5+5}{\sqrt{x^5-5}} = \dfrac{1}{2}x^{-\frac{3}{2}} \cdot \dfrac{4x^5+5}{\sqrt{x^5-5}}$

b) $g'(x) = \left(\dfrac{\ln(5-x)}{x^4+1}\right)' = \dfrac{-\frac{1}{5-x}\cdot(x^4+1) - \ln(5-x)\cdot 4x^3}{(x^4+1)^2}$

(2.) $f(x) = -2x^2 - 2x + 3$

$f'(x) = -4x - 2 = 2 \quad | +2$

$-4x = 4 \quad | : (-4)$

$x = -1$

$f(-1) = -2 - 2\cdot(-1) + 3 = 3$

TEČNÝ BOD : $[-1; 3]$

TEČNA : $y = 2x + b$

$3 = 2\cdot(-1) + b \Rightarrow b = 5$

$\boxed{y = 2x + 5}$

(3.) $\lim\limits_{x\to+\infty} \left(\dfrac{1}{7}\right)^x \cdot (5x+3) = \lim\limits_{x\to+\infty} \dfrac{5x+3}{7^x} \overset{L.P.}{=}$ "$\dfrac{\infty}{\infty}$"

$= \lim\limits_{x\to\infty} \dfrac{5}{7^x \cdot \ln 7} = \dfrac{5}{\infty \cdot \ln 7} = \underline{\underline{0}}$