G

1. a) $f'(x) = \left(\ln(x^4-5x)\right)' = \frac{4x^3-5}{x^4-5x}$

b) $g'(x) = \left(\frac{\sqrt{1-x}}{3x^4+2}\right)' = \frac{-\frac{1}{2\sqrt{1-x}}\cdot(3x^4+2) - \sqrt{1-x}\cdot 12x^3}{(3x^4+2)^2}$

$$= \frac{-\frac{3x^4+2+(1-x)\cdot 12x^3\cdot 2}{2\sqrt{1-x}}}{(3x^4+2)^2} = -\frac{-21x^4+24x^3+2}{2\sqrt{1-x}\cdot(3x^4+2)^2}$$

2. $f(x) = -x^2+4x+10$

$f'(x) = -2x+4 = 6 \iff x=-1$

$f(-1) = -1-4+10 = 5$

TEČNÝ BOD: $[-1; 5]$

TEČNA: $y = ax+b = 6x+b$

$5 = 6\cdot(-1)+b \implies b = 11$

$\boxed{y = 6x+11}$

3. $\lim\limits_{x\to-\infty} e^x\cdot(x^2-x+3) = \lim\limits_{y\to+\infty} e^{-y}\cdot(y^2+y+3)$

$|x=-y|$

$$= \lim_{y\to\infty} \frac{y^2+y+3}{e^y} \underset{\text{„}\frac{\infty}{\infty}\text{"}}{\overset{\text{L.P.}}{=}} \lim_{y\to\infty} \frac{2y+1}{e^y} \underset{\text{„}\frac{\infty}{\infty}\text{"}}{\overset{\text{L.P.}}{=}} \lim_{y\to\infty} \frac{2}{e^y} = \underline{\underline{0}}$$