11,00 bod.

1(a) $\int \ln(x-2)\,dx = \int \underbrace{1}_{f'} \cdot \underbrace{\ln(x-2)}_{g}\,dx \overset{1}{=} \underbrace{x}_{f}\underbrace{\ln(x-2)}_{g} -$

$- \int \underbrace{x}_{f} \cdot \underbrace{\frac{1}{x-2}}_{g'}\,dx \overset{1}{=} x\ln(x-2) - \int \frac{(x-2)+2}{x-2}\,dx =$

$= x\ln(x-2) - (x + 2\ln(x-2)) + C$ 2

na intervale $(2,\infty)$.

skúška: $[x\ln(x-2)-(x+2\ln(x-2))+C]' =$

$= \ln(x-2) + \frac{x}{x-2} - 1 - \frac{2}{x-2} = \ln(x-2) - 1 + \frac{x-2}{x-2} =$

$= \ln(x-2)$ na $(2,\infty)$. 2

1(b) Vypočítajte $\int_0^\infty \frac{2x+2}{(x^2+2x+2)^2}\,dx$ ak existuje

$\int \frac{2x+2}{(x^2+2x+2)^2}\,dx = \int \frac{du}{u^2} = -\frac{1}{u} + C = -\frac{1}{x^2+2x+2} + C$

subst: $x^2+2x+2 = u$ 3

$(2x+2)\,dx = du$

$\int_0^\infty \frac{2x+2}{(x^2+2x+2)^2}\,dx = \lim_{t\to\infty} \int_0^t \frac{2x+2}{(x^2+2x+2)^2}\,dx \overset{1}{=} \lim_{t\to\infty}\left[-\frac{1}{x^2+2x+2}\right]_0^t =$

$= \lim_{t\to\infty}\left(+\frac{1}{2} - \frac{1}{(t+1)^2}\right) = \boxed{+\frac{1}{2}}$ 2

Teda daný nevlastný integrál existuje (konverguje).