$$U(x,y) = y\left[-2\frac{\ln(\cosh x)}{x^2} + \frac{x-\tanh x}{x^2}y + \frac{\tanh x}{x}(2 - y\tanh x)\right]$$
$$= y\left[1 + \frac{2}{9}x^4 - \left(\frac{2}{3}x - \frac{8}{15}x^3\right)y\right] + [5]$$

$$V(x,y) = 2\frac{\ln(\cosh x)}{x} + 2\frac{\tanh x - x}{x}y$$
$$= x\left[1 - \frac{1}{3}x^2 - \left(\frac{2}{3}x - \frac{4}{15}x^3\right)y\right] + [5]$$