Partial derivative

Calculate the partial derivatives of the function $f(x, y) = \sqrt{xy + \frac{y}{x}}$ at the point $(2, 1)$.

The partial derivative with respect to x

$$\frac{\partial f}{\partial x} = \frac{1}{2}(xy + \frac{y}{x})^{-0,5}(y - yx^{-2})$$

Substituting at the point

$$\frac{\partial f}{\partial x} = \frac{3}{8}(2 + \frac{1}{2})^{-0,5} = \frac{3}{8\sqrt{(5/2)}} = \frac{3}{8}\sqrt{\frac{2}{5}} = \frac{3}{8}\sqrt{10/25} = \frac{3\sqrt{10}}{40} = 0{,}23717082$$

The partial derivative with respect to y

$$\frac{\partial f}{\partial y} = \frac{1}{2}(xy + \frac{y}{x})^{-0,5}(x + \frac{1}{x})$$

Substituting at the point.

$$\frac{\partial f}{\partial y} = 0{,}790569415$$