Problem 3

Part a.

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The derivative, $f'(x) = 1 + \frac{1}{2}\frac{1}{\sqrt{x}}$, (5 pt.)

satisfies $f'(x) > 0$ on $(0, \infty)$. Then there is an inverse on the interval $(0, \infty)$, which includes $x = 2$. (5 pt.)

The largest interval in which an inverse exists is $[0, \infty)$. (5 pt.)

Part b.

$$[f^{-1}]'(c) = \frac{1}{f'(a)}, \tag{1}$$

where $f(a) = c$, if f is continuous near a. (5 pt.)
Then

$$[f^{-1}]'(2) = \frac{1}{f'(1)} = \frac{2}{3}. \tag{2}$$

(5 pt.)