

(C)

$$\frac{d}{dx} \left[\sqrt{\frac{x^2 + \frac{1}{4}}{2}} \right]$$

$$\ln y = \frac{1}{4} x^2 - \frac{1}{4}$$

$$y = e^{\frac{x^2+1}{4}}$$

$$y(1.2) = e^{\frac{(1.2)^2+1}{4}}$$

$$y(1.2) = e^{\frac{44}{4}}$$

$$y(1.2) = e^{11} \approx 1.116$$

$$\frac{dy}{dx} = \frac{xy}{2}$$

$$\frac{dy}{dx} \cdot \frac{1}{y} = \frac{x}{2}$$

$$\frac{1}{y} dy = \frac{1}{2} x dx$$

$$\int \frac{1}{y} dy = \frac{1}{2} \int x dx$$

$$\ln y = \frac{1}{4} x^2 + C$$

$$\ln 1 = \frac{1}{4} 1^2 + C$$

$$0 = \frac{1}{4} + C$$

$$-\frac{1}{4} = C$$

(b)

$$y = f(x) \quad (1,1)$$

$$\frac{\partial y}{\partial x} = \frac{xy}{2}$$

$$\frac{\partial y}{\partial x} = \frac{1}{2}$$

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

$$f(1.2) \approx \frac{1}{2}(1.2) + \frac{1}{2} \approx 1.1$$

(d)

It was an underestimate since in the slope field, the further right you go, the steeper the slope is. Therefore, the slope in the estimation is $<$ than the actual slope at $f(1.2)$.