Module 5 Lesson 2 Assignment 1
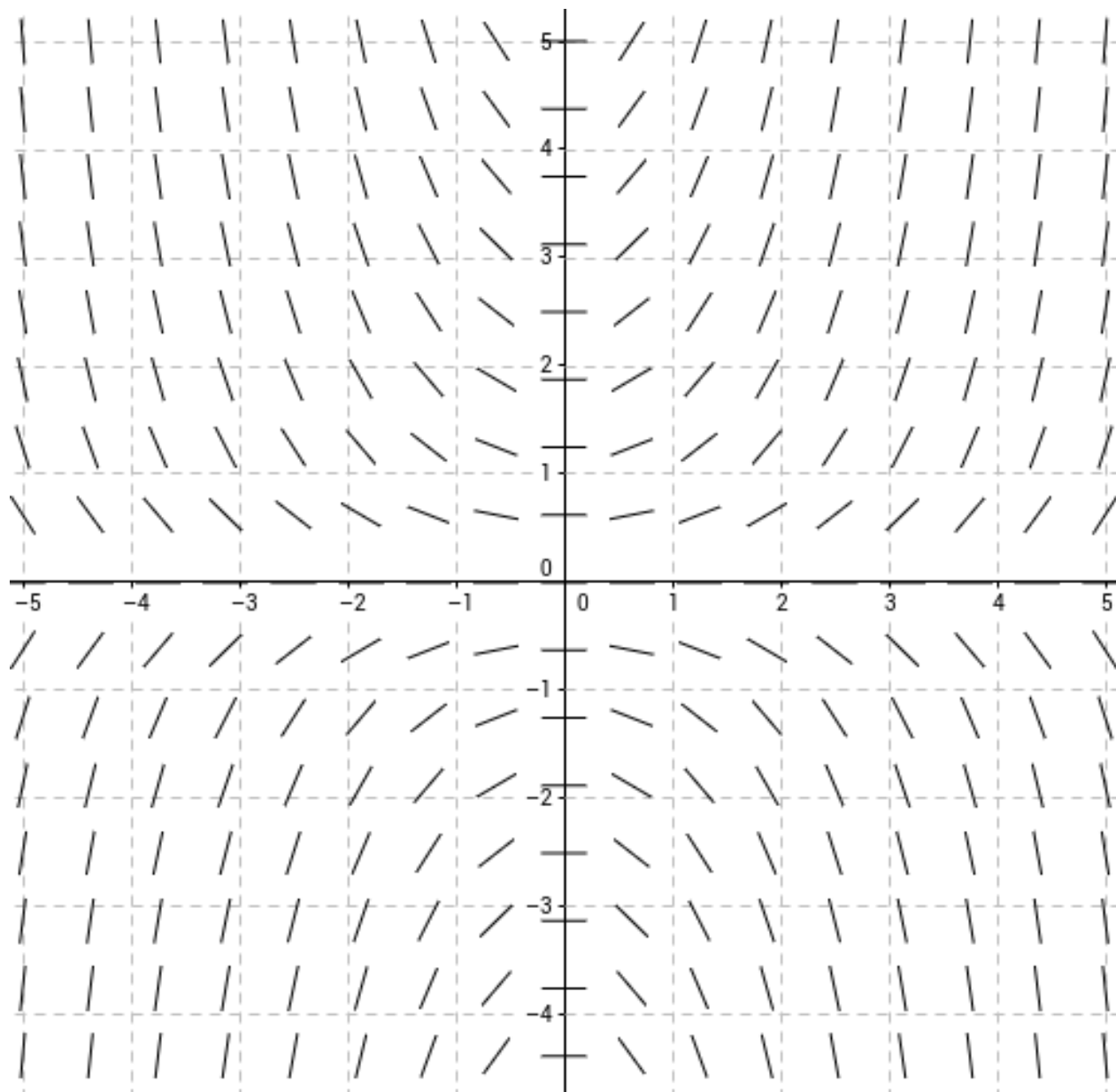
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$$\frac{dy}{dx} = \frac{xy}{2}$$

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

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

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

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

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

$$y(1.2) = e^{.411} \approx 1.116$$

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

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

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

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

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

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

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

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

(b) $\quad y = f(x) \quad (1,1) \qquad\qquad \dfrac{\partial y}{\partial x} = \dfrac{xy}{2}$

$\dfrac{dy}{dx} = \dfrac{1}{2} \qquad y + 1 = \dfrac{1}{2}(x-1) \;\Rightarrow\; y = \dfrac{1}{2}x + \dfrac{1}{2}$

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

(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 $f(1.2)$