

$$b) f(x) = \frac{4}{x(1+4\ln x)^2} dx$$

$$u = 1 + 4\ln x + 1$$

$$\frac{du}{dx} = \frac{4}{x}$$

$$= \int \frac{1}{u^2} \quad \text{So } = -\frac{1}{u}$$

$$dx = \frac{x}{4} du$$

$$= \frac{-1}{4\ln x + 1} + C$$

$$y = \frac{1}{u^2}$$

$$\frac{dy}{du} = u^{-1}$$

$$c) \int_{\ln^2}^{\ln^5} \frac{3e^{2x}}{\sqrt{e^x - 1}} dx$$

$$u = e^x - 1 \quad dx = e^x du$$

$$\frac{du}{dx} = e^x$$

$$3 \int \frac{e^{2x}}{\sqrt{e^x - 1}} dx = 3 \int \frac{u+1}{\sqrt{u}} du = \int \sqrt{u} du$$

$$= \frac{u^{3/2}}{3/2} = \frac{2u^{3/2}}{3}$$