

- Please see the course webpage for the answer key.

1. Compute  $\int_0^{e^5} \frac{1}{x(25 + (\ln x)^2)} dx$ .

2. Compute  $\int_{\frac{\pi}{3}}^{\frac{\pi}{2}} \frac{\tan x}{(\ln(\cos x))^2} dx$ .

3. Compute  $\int_0^3 \frac{1}{\sqrt{x}(x+1)} dx$ .

4. Compute  $\int_1^7 \frac{15-x}{x^2-6x-7} dx$ .

5. Compute  $\int_0^1 \frac{1}{e^x - e^{-x}} dx$ .

6. Consider the sequence  $\left\{ \left( \frac{n}{n+1} \right)^n \right\}_{n=1}^{\infty}$ . Compute  $\lim_{n \rightarrow \infty} \left( \frac{n}{n+1} \right)^n =$