

Brief answer to selected problems in Homework 14

1. Section 7.4

Problem 8: Note that $\ln 2 < 1$. Answer (from slow to fast growth): $(\ln 2)^x$, x^2 , $2^x \approx e^x$.

Problem 24: Answer (from slow to fast growth): $(\log_2 n)^2$, $\sqrt{n} \log_2 n$, n . The slower growth rate, the more efficient.

2. Section 8.1:

Problem 65: Define $F(x) = \int_x^b f(t)dt$. It follows that $F(b) = 0$, $F'(x) = -f(x)$. Then apply integration by parts to $\int_a^b F(x)dx$.

3. Section 8.2:

Problem 28: With the hint, $= \int_0^{\frac{1}{2}} \frac{ds}{\sqrt{1-s}} = 2 - \sqrt{2}$.

Problem 34:

$$\begin{aligned} \text{Sol 1: } \int \sec x \tan^2 x dx &= \int \tan x d \sec x = \tan x \sec x - \int \sec^3 x dx \\ &= \tan x \sec x - \int \sec x \tan^2 x dx - \int \sec x dx. \end{aligned}$$

Sol 2: $\int \sec x \tan^2 x dx = \int \frac{\sin^2 x}{\cos^3 x} dx = \int \frac{s^2 ds}{(1-s^2)^2}$. Then apply technique of partial fractions in Section 8.4.