

Brief solutions to selected problems in homework week 17

1. Section 8.4, problem 48:

Sec 8.4, 48. $\int \frac{\sqrt{x-2}}{\sqrt{x-1}} dx$

$x \geq 2$ $u \geq 1$

$u = \sqrt{x-1}$
 $u^2 = x-1$
 $2u du = dx$

$u = \sec \theta$
 $0 \leq \theta < \frac{\pi}{2}$

$\int \frac{\sqrt{u^2-1}}{u} \cdot 2u du$

$= 2 \int |\tan \theta| \sec \theta \tan \theta d\theta$

$= 2 \int \sec \theta \tan^2 \theta d\theta$

$du = \sec \theta \tan \theta d\theta$

$= \sec \theta \tan \theta - \ln |\sec \theta + \tan \theta| + C$

Figure 1: Section 8.4, problem 48.

2. Chapter 8, problem 113:

Chap 8, 113.

a. $\int_a^b f(x) dx = \int_b^a f(a-t) dt$
 $\int_a^b f(a-t) dt$

b. $\int_0^{\pi/2} \frac{\sin x}{\sin x + \cos x} dx$

$= \int_0^{\pi/2} \frac{\sin(\frac{\pi}{2}-x)}{\sin(\frac{\pi}{2}-x) + \cos(\frac{\pi}{2}-x)} dx$

$= \int_{\pi/2}^0 \frac{\cos x}{\cos x + \sin x} dx$

$= \int_0^{\pi/2} \frac{\sin x}{\sin x + \cos x} dx$

$\int_0^{\pi/2} 1 dx = \frac{\pi}{2}$

$= \int_0^{\pi/2} \frac{\sin x}{\sin x + \cos x} + \frac{\cos x}{\sin x + \cos x} dx$

$= 2 \int_0^{\pi/2} \frac{\sin x}{\sin x + \cos x} dx$

Figure 2: Chapter 8, problem 113