Calculus II, Spring 2023 (Thomas' Calculus Early Transcendentals 13ed), http://www.math.nthu.edu.tw/~wangwc/

Brief solutions to selected problems in homework 10

1. Section 15.4: Solutions, common mistakes and corrections:

15.4.26  $\int \frac{\tan^2 4}{3} \int \frac{3\sec\theta}{2} r^2 dr d\theta + \int \frac{\pi}{\tan^2 4} \int \frac{4\csc\theta}{2} r^2 dr d\theta$ Jo (xty) dxdy 0 1 72 4

Figure 1: Section 15.4, problem 26

42.  

$$\int_{0}^{\infty} \int_{0}^{\infty} \frac{1}{(H \chi_{+}^{2} \eta_{-}^{2})^{2}} dx dy$$

$$= \int_{0}^{\frac{\pi}{2}} \int_{0}^{\infty} \frac{1}{(H \chi_{+}^{2} \eta_{-}^{2})^{2}} dx d\theta$$

$$= \int_{0}^{\frac{\pi}{2}} \int_{0}^{\infty} \frac{1}{(H \chi_{+}^{2} \eta_{-}^{2})^{-1}} \int_{0}^{1} d\theta$$

$$= \int_{0}^{\frac{\pi}{2}} \int_{0}^{\frac{\pi}{2}} \int_{0}^{\frac{\pi}{2}} (1 + r^{2})^{-1} \int_{0}^{1} d\theta$$

$$= -\frac{1}{2} \int_{0}^{\frac{\pi}{2}} \int_{0}^{\frac{\pi}{2}} (-1) d\theta$$

$$= \frac{\pi}{4} \frac{\pi}{4}$$

Figure 2: Section 15.4, problem 42