MATH 1042 Answers to Even Review Problems for Test 2 Fall 2021

Text: **James Stewart**, <u>*Calculus, Early Transcendentals*</u>, **8**th Edition, Cengage Learning

Section 7.3 **4.** $\frac{9}{2}\sin^{-1}\left(\frac{x}{3}\right) - \frac{1}{2}x\sqrt{9-x^2} + C$ **12.** $\ln(1+\sqrt{2})$

Section 7.4 **22.** $\frac{x^3}{3} + \frac{1}{2}\ln(x^2+9) + \frac{2}{3}\tan^{-1}\left(\frac{x}{3}\right) + C$ **28.** $\frac{1}{3x} + \ln x + \frac{1}{3\sqrt{6}}\tan^{-1}\left(\frac{x}{\sqrt{6}}\right) + C$

Section 7.8

2.

(a) Proper because $\tan x$ is continuous on $[0, \pi/4]$

(b) Improper because $\tan x$ is discontinuous at $\pi/2$.
$$\int_0^{\pi} \tan x\,dx = \lim_{s\to\pi/2^-}\int_0^s \tan x\,dx + \lim_{t\to\pi/2^+}\int_t^{\pi} \tan x\,dx$$

(c) Improper because $\frac{1}{x^2-x-2}$ has a vertical asymptote at $x=-1$.
$$\int_{-1}^{1} \frac{dx}{x^2-x-2} = \lim_{t\to-1^+}\int_t^1 \frac{dx}{x^2-x-2}$$

(d) Improper because the domain goes to ∞.
$$\int_0^{\infty} e^{-x^2}\,dx = \lim_{t\to\infty}\int_0^t e^{-x^2}\,dx$$

50. The integral diverges by the Comparison Theorem because $\frac{1+\sin^2 x}{\sqrt{x}} \ge \frac{1}{\sqrt{x}}$ and $\int_1^{\infty} \frac{1}{\sqrt{x}}\,dx$ diverges because it is a p-integral with $p = \frac{1}{2} \le 1$.

Chapter 7 Review True or False

6. True ($p = \sqrt{2} > 1$)

Section 11.1:

30. 0 **32.** -1 **44.** 8 **56.** 0

Section 11.2:

4. 1/4 **22.** $5/(\pi-1)$ **26.** Divergent **38.** $2+\sqrt{2} = \frac{\sqrt{2}}{\sqrt{2}-1}$
44. Diverges to $-\infty$ **46.** 1/2

Section 11.4:

2. (a) $\sum a_n$ diverges by the Comparison Test. (b) No conclusion about convergence of $\sum a_n$
6. Converges **10.** Converges **28.** Diverges

Section 11.5:

12. Converges **18.** Diverges

Section 11.6:

2. Conditionally convergent **4.** Absolutely convergent **6.** Conditionally convergent