HW:

1. Section 8.8: Evaluate the following improper integrals (of the second type). Determine if the integral converges or diverges. If it converges, then find its value. Write out your answers completely, being careful to use $t$ and limit appropriately. Recall that if $f(0)$ is undefined then

$$\int_0^1 f(x) \, dx = \lim_{t \to 0} \int_t^1 f(x) \, dx.$$ 

1a. $\int_0^1 \frac{1}{x^2} \, dx.$

1b. $\int_0^1 \frac{1}{\sqrt{x}} \, dx.$

1c. $\int_0^1 \frac{1}{x} \, dx.$

1d. Summarize these results by finishing the following statement.

The $\int_0^1 \frac{1}{x^p} \, dx$ converges if and diverges if

2. If an integral is improper for two reasons, then you must split the integral into two pieces and check each piece for convergence or divergence. If both pieces converge then the integral converges.

2a. Determine the convergence or divergence of

$$\int_0^\infty \frac{1}{x^2} \, dx = \int_0^1 \frac{1}{x^2} \, dx + \int_1^\infty \frac{1}{x^2} \, dx.$$ 

Sect. 12.2 #21, 22

Sect. 12.3 #3, 5, 6, 11

Sect. 12.4 #3, 4, 10, 11, 14.