6.3 – Practice

1. Either evaluate the given improper integral or show that it diverges.

$$\int_1^{+\infty} x^{-3/2}\,dx = \lim_{N\to+\infty} \int_1^N x^{-3/2}\,dx$$

$$= \lim_{N\to+\infty} \left(-2x^{-1/2}\right)\Big|_1^N$$

$$= \lim_{N\to+\infty} \left(-2N^{-1/2} - \left(-2(1)^{-1/2}\right)\right)$$

$$= \lim_{N\to+\infty} \left(\frac{-2}{\sqrt{N}} + 2\right) \quad \left(\frac{-2}{\sqrt{N}} \to 0\right)$$

$$= \boxed{2}$$

Q: What word can you make by adding letters to each side of XYG?
(Hint: add one letter to the left side, and two letters to the right side.)