

Math 31 – Workshop #15

1. There are two situations for which we would call an integral improper. What are the two situations?
2. Circle the integrals below that are improper? (Be sure you can justify why it is improper.)

$$\int_0^{\pi} \tan x \, dx$$

$$\int_1^2 \frac{x}{e^x} \, dx$$

$$\int_1^2 \frac{1}{x \ln x} \, dx$$

$$\int_1^{\infty} \frac{e^{-\sqrt{x}}}{\sqrt{x}} \, dx$$

$$\int_1^2 \frac{x}{\sqrt{x^2-1}} \, dx$$

$$\int_1^{\infty} \frac{(\ln x)^2}{x} \, dx$$

3. Compute each of the following integrals or show that it diverges.

(a) $\int_4^{\infty} \frac{1}{\sqrt{x}} \, dx$

(b) $\int_0^4 \frac{1}{\sqrt{x}} \, dx$

(c) $\int_1^2 \frac{1}{x \ln x} \, dx$

(d) $\int_1^2 \frac{x}{\sqrt{x^2-1}} \, dx$

(e) $\int_1^{\infty} \frac{(\ln x)^2}{x} \, dx$

(f) $\int_1^{\infty} \frac{e^{-\sqrt{x}}}{\sqrt{x}} \, dx$