

# MEMORIAL UNIVERSITY OF NEWFOUNDLAND

## DEPARTMENT OF MATHEMATICS AND STATISTICS

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SECTION 3.4

Math 1001 Worksheet

WINTER 2024

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**For practice only. Not to be submitted.**

1. Determine whether each of the following improper integrals converges or diverges, finding the value of those integrals that converge.

(a)  $\int_2^{\infty} \frac{1}{\sqrt{4x+1}} dx$

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

(c)  $\int_{-\infty}^0 e^{3x} dx$

(d)  $\int_1^{\infty} \frac{1}{(x+3)^{\frac{3}{2}}} dx$

(e)  $\int_0^{\infty} \frac{x}{x^4+1} dx$

(f)  $\int_{-\infty}^0 \frac{e^x}{1+e^x} dx$

(g)  $\int_0^3 \frac{1}{\sqrt{9-x^2}} dx$

(h)  $\int_0^3 \frac{x}{\sqrt{9-x^2}} dx$

(i)  $\int_e^{\infty} \frac{1}{x \ln^2(x)} dx$

(j)  $\int_{-\infty}^{\frac{3}{2}} \frac{1}{4x^2+9} dx$

(k)  $\int_0^{\infty} x e^{-x} dx$

(l)  $\int_1^{\infty} \frac{\ln(x)}{x\sqrt{x}} dx$