

Review 1

1. Evaluate the following integrals

a)  $\int \sin^4 x \cos^3 x \, dx$       b)  $\int (\ln x)^2 \, dx$       c)  $\int \frac{x^4 + x^2 + 3}{x^3 + x} \, dx$   
d)  $\int \sin^2 2x \cos^2 2x \, dx$       e)  $\int \tan^5 x \, dx$       f)  $\int \frac{dx}{x\sqrt{g - (\ln x)^2}}$   
g)  $\int \sec^4 3x \, dx$       h)  $\int e^{2x} \sin 3x \, dx$       i)  $\int xe^{-2x} \, dx$

2. Evaluate

a)  $\int_{-1}^{-\frac{1}{2}} \frac{dx}{\sqrt{4x^2 - 1}}$       b)  $\int_{-1}^1 \frac{x + 3}{x^2 + 2x + 2} \, dx$

3. Determine whether the following integrals converge:

a)  $\int_2^\infty \frac{1}{x^2 - 1} \, dx$       b)  $\int_{-1}^2 \frac{1}{x^2 - 1} \, dx$       c)  $\int_1^\infty \frac{x^2 e^x}{e^x + x^2} \, dx$

4.

a) Use the trapezoidal rule to approximate

$$\int_0^2 \sin(x^2) \, dx.$$

Let  $n = 4$  and leave your answer as a sum.

b) Use Simpson's rule and  $n = 4$  for the integral in (a).