

1. Evaluate the indefinite integrals. (Don't forget to add the constant!)

a)  $\int (x^2 + x + 1)e^{2x} dx$

b)  $\int \tan^4 x \sec^4 x dx$

c)  $\int \frac{x^2}{\sqrt{4-x^2}} dx$

d)  $\int \frac{4x^2 + x + 10}{x^3 - x^2 + 4x - 4} dx$

e)  $\int \ln x dx$

f)  $\int e^{\sqrt{x}} dx$

g)  $\int \frac{dv}{v^2 + 2v + 1}$

h)  $\int \frac{dy}{1 + \frac{1}{y}}$

2. Compute the indefinite integral and simplify your answer.  $\int \frac{5x^2 + 7x + 6}{x^3 + 2x^2 + 2x}$

3. Evaluate the integrals or conclude that they diverge. Give clear reasons for your answers.

a)  $\int_{-1}^1 \frac{dx}{x^2}$

b)  $\int_0^{\infty} \frac{x dx}{(x^2 + 1)^3}$

c)  $\int_0^e x \ln x dx$

d)  $\int_0^3 \frac{dx}{(x-1)^2}$

4. Evaluate the indefinite integrals. (Don't forget to add the constant!)

a)  $\int \frac{tdt}{\sqrt{25-t^2}}$

b)  $\int \frac{4x^2 - 4x + 8}{x^4 + 4x^2} dx$

c)  $\int \sin^{-1} x dx$

d)  $\int \sqrt{5 + 4x - x^2} dx$

5. Evaluate the indefinite integrals. (No constant necessary, but make sure you evaluate the integral!)

a)  $\int_0^{\pi/4} \tan^3 \theta \sec^3 \theta d\theta$

b)  $\int_0^1 (x^2 - x) \sin n\pi x dx$

c)  $\int_0^1 y^3 e^{y^2} dy$

6. Evaluate the integrals or conclude that they diverge. Give clear reasons for your answers.

a)  $\int_{-\infty}^{\infty} \frac{dx}{x^2 + 1}$

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

c)  $\int_{-1}^1 \frac{dx}{x^2}$

7. Evaluate:

a)  $\int \sin^2 x \cos^3 x dx$

b)  $\int e^x \sin 2x dx$

c)  $\int \sqrt{2x - x^2} dx$

d)  $\int (x^2 + 2x)e^{2x} dx$

e)  $\int \frac{-x^2 + 7x - 16}{(x + 4)(x^2 + 4)} dx$

8. Compute the indefinite integral and simplify your answer.  $\int \frac{dx}{x\sqrt{1+x}}$

9. Evaluate:

a)  $\int x \sec x \tan x dx$

b)  $\int \cos^3 x \sin 2x dx$

10. Compute:  $\int \sqrt{1+e^x} dx$ . Hint: Let  $u = \sqrt{1+e^x}$ .

11. Evaluate the integrals or conclude that they diverge. Give clear reasons for your answers.

a)  $\int_2^{\infty} \frac{dx}{x^2 + 4}$

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

c)  $\int_{-2}^2 \frac{dx}{x^4}$