

## Sheet 6

(1) Approximate the following integrals

- a) Using trapezoidal rule.
- b) Using Simpson's rule.

$$(1) \quad \int_0^1 \frac{e^x}{\sqrt{x}} dx \quad h = 0.1$$

$$(2) \quad \int_0^1 \sqrt{\tan x} dx \quad h = 0.1$$

$$(3) \quad \int_0^1 \sqrt{1+x^2} dx$$

$$(4) \quad \int_0^{\pi/2} e^{\sin x} dx$$

$$(5) \quad \int_0^1 \frac{e^x}{\sqrt{1-x^2}} dx$$

$$(6) \quad \int_{-\infty}^{\infty} \frac{1}{1+x^2} dx$$

(2) Using the following data to approximate the integration of the function  $f(x)$  from 1 to 5

|   |   |      |      |      |     |      |      |     |      |
|---|---|------|------|------|-----|------|------|-----|------|
| x | 1 | 1.5  | 2    | 2.5  | 3   | 3.5  | 4    | 4.5 | 5    |
| y | 0 | 0.41 | 0.69 | 0.92 | 1.1 | 1.25 | 1.39 | 1.5 | 1.61 |

(3) Approximate

$$(a) \quad \int_1^{\infty} x^{-2} \sin x dx$$

$$(b) \quad \int_{10}^{\infty} \sqrt{x} e^{-x} dx$$

(4) Evaluate each of the following integrals:

$$(a) \quad \int_0^2 \frac{\sin x}{x} dx$$

$$(b) \quad \int_0^2 \frac{x}{e^x - 1} dx$$

(four decimal places are required).