



**King Saud University**

**Department of Mathematics**

**First semester 1446H**

**2/12/2024 – 1/6/1446H. (9 -11 a.m.)**

**104 Math**

**2<sup>nd</sup> Midterm Exam**

**Duration: 2 hours**

**Makeup**

**Name:**

**Sequence Number:**

**Section:**

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| Question | I | II | III | IV | Total |
|----------|---|----|-----|----|-------|
| Mark     |   |    |     |    |       |

**I) Evaluate the following integrals: (14 points)**

a)  $\int_1^3 (x - 2)(x + 3)dx$

b)  $\int \frac{\sin x}{1+\cos^2 x} dx$

c)  $\int x^2 e^x dx$

d)  $\int \frac{e^{\sqrt{x}}}{\sqrt{x}} dx$

e)  $\int \sec^2(3x - 5) dx$

f)  $\int \frac{x+1}{x(x^2+1)} dx$

**II) (3 Points)**

Let  $R$  be the region in the plane bounded by the graphs of equations:

$y = x$  ,  $y = 2 - x$ , and  $x$ -axis

i) Sketch and shade the region  $R$  in a rectangular system of coordinates.

ii) Find the area of  $R$ .

**III)(4 Points)**

Let  $R$  be the region determined by the graphs of:

$$y = x^2, \quad y = 4 - x^2$$

- i) Sketch and shade the region R.

**IV)(4 Points)**

The region bounded by the curves  $y = \sqrt{x}$ ,  $y = x - 6$ , and  $y = 0$  is rotated about the  $x$ -axis to form a solid  $S$ . Use the method of disk to find the volume of  $S$ .

