

MATHEMATICS 3

NAME:	
DATE:	TEACHER:

Total credit:

Give reasons for all the answers !

1. Find the fundamental system of linear differential equation

$$y'' + 8y' + 25y = 0$$

.

Eval:

2. Find a particular solution of differential equation

$$y'' + 2y' + 2y = 2x + 2.$$

Eval:

3. Decide the solvability of the boundary value problem

$$u'' + 9u = 9,$$

$$u(0) = 0, \quad u(\pi/2) = 0.$$

Eval:

4. Decide the solvability of the boundary value problem

$$u'' + \pi^2 u = \pi^2,$$

$$u(0) = 0, \quad u(1) = 0.$$

Eval:

5. Compute

$$\int_M xy \, dA$$

where $M = \langle -1, 0 \rangle \times \langle 0, 2 \rangle$.

Eval:

6. Convert the region $M = \{(x, y) \in \mathbb{R}^2 : x \leq 0, \quad x^2 + y^2 \leq 4\}$ to the polar coordinates.

Eval:

7. Compute

$$\int_M xz \, dV$$

where $M = \langle -1, 1 \rangle \times \langle 0, 1 \rangle \times \langle 1, 2 \rangle$.

Eval:

8. Convert the region

$$M = \{(x, y, z) \in R^3 : y \geq 0, z \geq 0, x^2 + y^2 + z^2 \leq 4\}$$

to the spherical coordinates.

Eval:

9. Compute the integral

$$\int_{\gamma} \frac{y}{x} ds$$

where γ is a segment AB with end-points $A(1, 1)$, $B(2, 2)$. **Eval:**

10. Convert the region

$$M = \{(x, y, z) \in R^3 : y \geq 0, 1 \leq z \leq 2, 1 \leq x^2 + y^2 \leq 4\}$$

to the cylindrical coordinates.

Eval:
