Assignment 4

The due date for submitting this assignment has passed.

As per our records you have not submitted this assignment.

1) Solve the isoparametric problem

\[ J(y) = \int_1^2 \left( (y')^2 + x^2 \right) \, dx, \quad y(0) = y(1) = 0 \]

and

\[ \int_1^2 y' \, dx = 2 \]

- \( y = \pm 3 \sin (\pi x), \quad n = 1, 3, 5, \ldots \)
- \( y = \pm \sin (2\pi x), \quad n = 1, 2, 3, \ldots \)
- \( y = \pm \cos (\pi x), \quad n = 1, 2, 3, \ldots \)
- \( y = \pm 2 \cos (2\pi x), \quad n = 1, 3, 5, \ldots \)
- \( y = \pm 2 \cos (n\pi x), \quad n = 1, 2, 3, \ldots \)

No, the answer is incorrect.

Score: 0

Accepted Answers:

- \( y = \pm 2 \sin (n\pi x), \quad n = 1, 3, 5, \ldots \)
- \( y = \pm 2 \sin (2\pi x), \quad n = 1, 2, 3, \ldots \)

2) Determine the radius and height of the right circular cylinder of maximum volume subject to the constraint of having a surface area of 1 m²

\[ \text{Radius} = \frac{1}{\sqrt{2\pi}}, \quad \text{Height} = \frac{1}{\sqrt{2\pi}} \]

\[ \text{Radius} = \frac{1}{\sqrt{3\pi}}, \quad \text{Height} = \frac{2}{\sqrt{3\pi}} \]

\[ \text{Radius} = \frac{1}{\sqrt{5\pi}}, \quad \text{Height} = \frac{1}{\sqrt{5\pi}} \]

\[ \text{Radius} = \frac{1}{\sqrt{6\pi}}, \quad \text{Height} = \frac{2}{\sqrt{6\pi}} \]

\[ \text{Radius} = \frac{2}{\sqrt{6\pi}}, \quad \text{Height} = \frac{1}{\sqrt{6\pi}} \]

No, the answer is incorrect.

Score: 0

Accepted Answers:

- \( \text{Radius} = \frac{1}{\sqrt{6\pi}}, \quad \text{Height} = \frac{2}{\sqrt{6\pi}} \)

3) Among all the curves in \( C^1 \) joining a given point \((0, A)\) on the positive \( y\)-axis to a point on the positive \( x\)-axis, and enclosing a given area \( S \), together with the \( x\)- and \( y\)-axes, find the curve which generates the least area when rotated about the \( x\)-axis

- Straight line from \((b, 0)\) to \(\left( \frac{2A}{b}, 0 \right)\)

- Straight line from \((0, b)\) to \(\left( \frac{2A}{b}, 0 \right)\)

- Circle passing through \((b, 0)\) to \(\left( \frac{2A}{b}, 0 \right)\)

- Circle passing through \((0, b)\) to \(\left( \frac{2A}{b}, 0 \right)\)

- Any curve passing through \((b, 0)\) to \(\left( \frac{2A}{b}, 0 \right)\)

- Any curve passing through \((0, b)\) to \(\left( \frac{2A}{b}, 0 \right)\)

No, the answer is incorrect.

Score: 0

Accepted Answers:

- Straight line from \((0, b)\) to \(\left( \frac{2A}{b}, 0 \right)\)