# Assignment 4

**The due date for submitting this assignment has passed.**

**As per our records you have not submitted this assignment.**

**Due on 2021-02-17, 23:59 IST.**

1) Solve the isoparametric problem *1 point*

$$J(y) = \int_0^1 \left((y')^2 + x^2\right) dx, \quad y(0) = y(1) = 0$$

and

$$\int_0^1 y^2 dx = 2$$

- [ ] $y = \pm 2 \sin(n\pi x), \ n = 1, 3, 5, \ldots.$
- [ ] $y = \pm \sin(n\pi x), \ n = 1, 2, 3....$
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- [ ] $y = \pm 2 \cos(n\pi x), \ n = 1, 3, 5....$
- [ ] $y = \pm 2 \cos(n\pi x), \ n = 1, 2, 3....$

No, the answer is incorrect.
Score: 0

**Accepted Answers:**
$y = \pm 2 \sin(n\pi x), \ n = 1, 3, 5, \ldots.$
$y = \pm 2 \sin(n\pi x), \ n = 1, 2, 3....$

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 $m^2$ *1 point*

- Radius = $\frac{1}{\sqrt{2\pi}}$, Height = $\frac{1}{\sqrt{3\pi}}$
- Radius = $\frac{1}{\sqrt{2\pi}}$, Height = $\frac{2}{\sqrt{6\pi}}$
- Radius = $\frac{1}{\sqrt{3\pi}}$, Height = $\frac{1}{\sqrt{2\pi}}$
- Radius = $\frac{1}{\sqrt{6\pi}}$, Height = $\frac{3}{\sqrt{2\pi}}$
- Radius = $\frac{1}{\sqrt{6\pi}}$, Height = $\frac{2}{\sqrt{6\pi}}$
- Radius = $\frac{2}{\sqrt{6\pi}}$, Height = $\frac{1}{\sqrt{3\pi}}$

No, the answer is incorrect.
Score: 0

**Accepted Answers:**
*Radius* = $\frac{1}{\sqrt{6\pi}}$, *Height* = $\frac{2}{\sqrt{6\pi}}$

3) Among all the curves in $C^2$ joining a given point $(0, b)$ 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 *1 point*

- Straight line from ( b, 0 ) to $\left(\frac{2S}{b}, 0\right)$
- Straight line from (0, b) to $\left(\frac{2S}{b}, 0\right)$
- Circle passing through (b, 0 ) to $\left(\frac{2S}{b}, 0\right)$
- Circle passing through (0, b) to $\left(\frac{2S}{b}, 0\right)$
- Any curve passing through (b, 0 ) to $\left(\frac{2S}{b}, 0\right)$
- Any curve passing through (0, b) to $\left(\frac{2S}{b}, 0\right)$

No, the answer is incorrect.
Score: 0

**Accepted Answers:**
*Straight line from (0, b) to* $\left(\frac{2S}{b}, 0\right)$