Assignment 6

The due date for submitting this assignment has passed.

Due on 2021-03-03, 23:59 IST.

As per our records you have not submitted this assignment.

1) Find the curves for which the functional *1 point*

$$I = \int_0^{x_1} \frac{\sqrt{1+y'^2}}{y} dx$$

with y(0) = 0 can have extrema if the point (x_1, y_1) can vary along the line $y = x - 5$

- $y = \pm\sqrt{x - 2x^2}$
- $y = \pm\sqrt{2x + 3x^2}$
- $y = \pm\sqrt{x - 5x^2}$
- $y = \pm\sqrt{3x - x^2}$
- $y = \pm\sqrt{10x + 5x^2}$
- $y = \pm\sqrt{10x - x^2}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$y = \pm\sqrt{10x - x^2}$

2) Find the curves for which the functional *1 point*

$$I = \int_0^{x_1} \frac{\sqrt{1+y'^2}}{y} dx$$

with y(0) = 0 can have extrema if the point (x_1, y_1) can vary along the circle $(x-9)^2 + y^2 = 9$

- $y^2 = x^2 + 4x$
- $y^2 = -x^2 + 3x - 1$
- $y^2 = -x^2 + 5x + 3$
- $y^2 = -3x^2 + 2x + 1$
- $y^2 = -x^2 + 8x$
- $y^2 = x^2 - x$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$y^2 = -x^2 + 8x$

3) Consider general functionals of the form $I = \int_0^{x_1} k(x,y) e^{\tan^{-1} y'} \sqrt{1+y'^2}\, dx$ where k(x, y) $\neq 0$ and the desired extremals are subject to the endpoint conditions that (x_o, y_o) is prescribed and fixed but (x_1, y_1) is only constrained to lie on the curve $y = \phi(x)$. Find the traversality condition that applies at (x_1, y_1) *1 point*

- $(1 - y', 1 + y')(0, \phi')$
- $(1 + y', 1 - y')(0, \phi')$
- $(1 + y', 1 - y')(1, \phi')$
- $(1 - y', 1 + y')(1, \phi')$
- $(1 - y', 1 + y')(\phi', 1)$
- $(1 + y', 1 - y')(\phi', 1)$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$(1 - y', 1 + y')(1, \phi')$
$(1 + y', 1 - y')(\phi', 1)$