

QUESTION: 20. (10 marks) (10%)

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Consider the following two-dimensional vector field $\mathbf{F}$ in the plane:

Answer the questions:

(a) Compute the line integral of the vector field $\mathbf{F}$ along the curve C in the plane, where C is the circle of radius 1 centered at the origin, oriented counter-clockwise. Express your answer in terms of π .

(b) Compute the line integral of the vector field $\mathbf{F}$ along the curve C in the plane, where C is the line segment from $(-1, 0)$ to $(1, 0)$, oriented from left to right. Express your answer in terms of π .

(c) Compute the line integral of the vector field $\mathbf{F}$ along the curve C in the plane, where C is the line segment from $(-1, 0)$ to $(1, 0)$, oriented from right to left. Express your answer in terms of π .

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