Question 1

QUESTION 7

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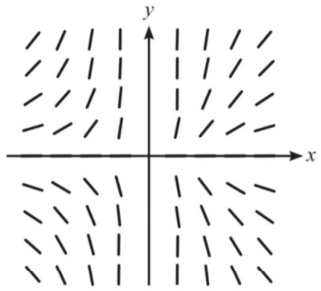
2020

The diagram shows a slope field.



The differential equation represented by the slope field is

(A) $\frac{dy}{dx}=\frac{5y}{x}$

(B) $\frac{dy}{dx}=\frac{5y^2}{x}$

(C) $\frac{dy}{dx}=\frac{5y}{x^2}$

(D) $\frac{dy}{dx}=\frac{5y^2}{x^2}$

Question 2

QUESTION 12 (6 marks)

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Given $z_1=a+bi$, $z_2=c+di$ $\forall a, b, c, d \in R$, and $z_2 \neq 0$, prove the identity

$$\left|\frac{z_1}{z_2}\right|=\frac{|z_1|}{|z_2|}$$

Question 4

QUESTION 13 (6 marks)

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a) Use partial fractions to determine $\int \frac{22}{(2x-3)(x+4)}dx$ *[4 marks]*

b) Use the result from Question 13a) to determine $\int_{-3}^{0} \frac{22}{(2x-3)(x+4)}dx$

Express your answer in simplest form. *[2 marks]*

Question 5

QUESTION 17 (5 marks)

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The region between the x-axis and the curve of the function $y=1+\sin(2x)$ for $0 \leq x \leq \frac{\pi}{2}$ is rotated about the x-axis to form a solid of revolution.

Determine the volume of this solid. Express your answer in simplest form.