
1 [ACJC/PROMO/2021/Q1]

State a sequence of transformations that will transform the curve with equation $y = 2 \sin(2x + \alpha) \cos(x)$ on to the curve with equation $y = -2 \sin(4x + 3\alpha) \cos(2x + \alpha)$, where α is a positive constant. [3]

1 [ACJC/PROMO/9758/2021/Q2]

Solve algebraically the inequality $\frac{x+3}{x^2+x-2} > -1$. [3]

Hence solve the inequality $\frac{x+3x^2}{1+x-2x^2} > -1$. [2]

1 [ACJC/PROMO/9758/2021/Q3]

A curve C has equation

$$\frac{x^2 - 4y^2}{x^2 + xy^2 + 100} = \frac{1}{2}, x \in \mathbb{R}, x \neq -8.$$

Show that $\frac{dy}{dx} = \frac{2x-y^2}{2xy+16y}$. [2]

Hence, prove that curve C does not have any stationary point. [3]
