

Topical Revision Paper 7

Term 2 Unit 7: Graph Transformations

Question 1:

- (i) Sketch the graphs of $y = \ln x$ and $y = e^x$ on the same axes. [2]
- (ii) Describe using geometrical transformations how you would obtain the graphs of
- (a) $y = \ln x^2$ from $y = \ln x$ [1]
- (b) $y = 2 + e^{-x}$ from $y = e^x$ [2]

Answer :

(ii)(a) Stretch graph of $y = \ln x$ by a scale factor of 2 parallel to the y-axis

(b)

Step 1: Reflect the graph of $y = e^x$ about y-axis to obtain $y = e^{-x}$.

Step 2: Translate the graph of $y = e^{-x}$ in the positive y-direction by 2 units to obtain $y = 2 + e^{-x}$.

Question 2:

A graph with equation $y = -x^3 + 3$ undergoes the following two successive transformations.

I A translation of 3 units in the positive y direction,

II A stretch parallel to the y -axis with a scale factor of 2.

Find the equation of the resultant graph $y = g(x)$. [2]

Answer : $\therefore g(x) = -2x^3 + 12$

Question 3:

Given that $f(x) = \ln x$ and $g(x) = 2 \ln(3 + x)$, describe the transformation of the graph of $f(x)$ to the graph of $g(x)$ in two successive steps. [2]

Answer :

Translate the graph of $y = \ln x$ in the negative x -direction by 3 units to obtain $y = \ln(x + 3)$.
Stretch the graph of $y = \ln(x + 3)$ by a scale factor of 2 parallel to y -axis to obtain $y = 2 \ln(x + 3)$.

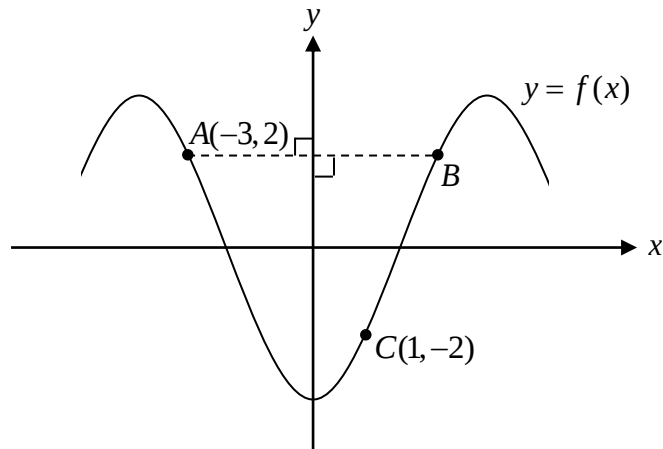
Question 4:

Given that the graph of $y = 5e^{-x}$ is drawn, find the equation of the straight line to be drawn to obtain the solution to the equation $(x - 2)e^x = 5$. [2]

Answer: $y = x - 2$

Question 5:

The diagram below shows partially the graph of a function f which is symmetrical about the y -axis. The points A , B and C lie on the graph.



- (a) Write down the new coordinates of C under the transformation $y = 3f(x)$. [1]
- (b) Sketch the graph of $y = f(x + 2)$, and label clearly the new coordinates of A , B and C . [4]

Answer : (a) $C_{new} : (1, -6)$