1.17 Pure: Functions, Graphs and Transformations: 10-minute Pack

EDEXCEL 9MA0 · Calculator allowed · about 10 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 The curves C1: $y = 1/x$ and C2: $y = 1/x^2$ are both defined for x not equal to 0.

(a) State the equations of the asymptotes of C1. **(2)**

(b) Sketch the graph of C1 for $-3 \leq x \leq 3$, x not equal to 0, showing the shape of the curve in each of the regions $x > 0$ and $x < 0$. **(3)**

(c) Explain how the graph of C2: $y = 1/x^2$ differs from the graph of C1 in the regions $x > 0$ and $x < 0$. **(2)**

(d) Write down the equations of the asymptotes of C2, and state the number of points at which C2 crosses either coordinate axis. **(2)**

(Total for Question 1 is 9 marks)

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Mark scheme · 1.17 Pure: Functions, Graphs and Transformations: 10-minute Pack

Question 1

(a) x = 0 cao **B1**

(a) y = 0 cao **B1**

(a) Answer: x = 0 and y = 0

(b) correct branch for x > 0: positive, decreasing towards y=0 as x increases, increasing without bound as x -> 0 from the right **B1**

(b) correct branch for x < 0: negative, increasing towards y=0 as x decreases, decreasing without bound as x -> 0 from the left **B1**

(b) both asymptotes x=0 and y=0 drawn/labelled **B1**

(b) Answer: Two-branch curve: one branch in the region x>0, y>0 approaching y=0 as x increases and approaching the y-axis as x->0+; one branch in the region x<0, y<0 approaching y=0 as x decreases and approaching the y-axis as x->0-; asymptotes x=0 and y=0

(c) both branches of C2 lie above the x-axis (y > 0 for all x not equal to 0), since squaring removes negative values, unlike C1 which is negative for x < 0 **B1**

(c) C2 is symmetric about the y-axis (an even function), whereas C1 has rotational symmetry about the origin (an odd function) **B1**

(c) Answer: C2 lies entirely above the x-axis and is symmetric about the y-axis; C1 has one branch above the axis (x>0) and one below (x<0), with rotational symmetry about the origin

(d) asymptotes x = 0 and y = 0, both needed **B1**

(d) C2 crosses neither axis: 0 intercepts, cao **B1**

(d) Answer: Asymptotes x = 0 and y = 0; C2 crosses neither axis (0 intercepts)

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