Curve Sketching - Overview (14/6/23)

Sketches

Q1 [3 marks]

Sketch the curve $x^2 = y(1 - y)$

Q2 [Practice/Y2/E]

Sketch $y = |x - 2| + 1$

Q3 [Practice/Y2/M]

If $f(x) = (x + 1)(x - 1)(x - 2)$, sketch the following:

(i) $y = f(x)$ (ii) $y = |f(x)|$ (iii) $y = f(|x|)$ (iv) $|y| = f(x)$

Q4 [17 marks]

(i) Sketch the curve $y = \frac{4x^2+5x+7}{2x+3}$ [9 marks]

(ii) Without using calculus, find the coordinates of the stationary points (to 3sf) [8 marks]

Q7 [15 marks]

Sketch the function $y = \frac{x^2}{x-1}$, establishing the location of any local maxima or minima.

Transformations

Q5 [Practice/M]

What combination of transformations converts $y = 2^x$ to $y = 2^{4x-2}$?

Q6 [9 marks]

(i) Find a series of transformations that can be applied to $y = \frac{1}{x}$ to produce $y = \frac{3x-2}{6x-1}$. [6 marks]

(ii) Hence or otherwise, sketch the curve $y = \frac{3x-2}{6x-1}$. [3 marks]

Q8 [Problem/M]

(i) Suppose that we wish to reflect $y = f(x)$ in the line $x = a$. What combination of transformations could be used to do this?

(ii) Find the equation of the line resulting from the reflection of $y = 2x + 1$ in the line $x = 1$.

Q9 [Practice/M]

What combination of transformations converts $y = 3^{-x}$ to $y = 3^{2x-1}$?

Q10 [Practice/M]

Describe the transformation represented by $y = e^x \rightarrow y = e^{4-x}$