

10.1 Mr Clever Sits An Exam

Exam questions on Implicit Differentiation often feature exponential, logarithmic or trigonometric functions. So, get some coffee in your Mr Clever cup, and give these questions a go !

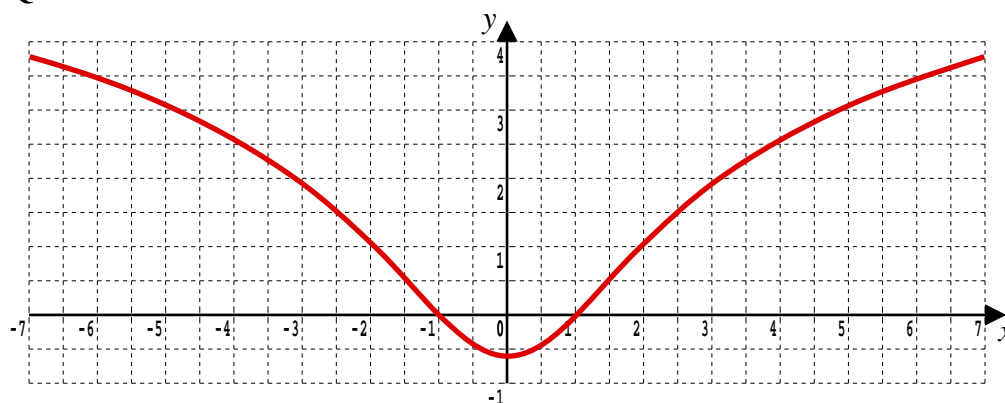


10.2 Exercise

Any solution based entirely on graphical or numerical methods is not acceptable

Marks Available : 40

Question 1



The graph is of the equation $e^y + y = x^2$

Find the equation of the normal at $(1, 0)$ in the form $y = mx + c$ and, having found it, draw the normal onto the graph.

[8 marks]

Question 2

A-Level Examination Question from June 2009, Paper C4, Q4 (Edexcel)

The curve C has the equation

$$y e^{-2x} = 2x + y^2$$

- (a) Find $\frac{dy}{dx}$ in terms of x and y

[5 marks]

The point P on C has coordinates $(0, 1)$

- (b) Find the equation of the normal to C at P , giving your answer in the form $ax + by + c = 0$, where a , b and c are integers.

[4 marks]

Question 3

A-Level Examination Question from June 2011, Paper C4, Q5 (Edexcel)

Find the gradient of the curve with equation

$$\ln y = 2x \ln x, \quad x > 0, \quad y > 0$$

at the point on the curve where $x = 2$

Give your answer as an exact value

[7 marks]

Question 4

A-Level Examination Question from January 2010, Paper C4, Q3 (Edexcel)

The curve C has the equation

$$\cos 2x + \cos 3y = 1, \quad -\frac{\pi}{4} < x < \frac{\pi}{4}, \quad 0 \leq y \leq \frac{\pi}{6}$$

- (a) Find $\frac{dy}{dx}$ in terms of x and y

[3 marks]

The point P lies on C where $x = \frac{\pi}{6}$

- (b) Find the value of y at P

[3 marks]

- (c) Find the equation of the tangent to C at P , giving your answer in the form $ax + by + c\pi = 0$, where a , b and c are integers

[3 marks]

Question 5

A-Level Examination Question from January 2007, Paper C4, Q5 (Edexcel)

A set of curves is given by the equation

$$\sin x + \cos y = 0.5$$

- (a) Use implicit differentiation to find an expression for $\frac{dy}{dx}$

[2 marks]

For $-\pi < x < \pi$ and $-\pi < y < \pi$

- (b) Find the coordinates of the points where $\frac{dy}{dx} = 0$

[5 marks]

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Teachers may obtain detailed worked solutions to the exercises by email from mhh@shrewsbury.org.uk