4.5 Homework

A-Level Pure Mathematics : Year 1
Exponentials and Logarithms

Any solution based entirely on graphical
or numerical methods is not acceptable
Marks Available : 40

Question 1
Solve this equation, giving your answer to three decimal places,

$$3^{x-7} = 2^{x}$$

[4 marks]

Question 2
By first using a Law of Indices, or otherwise, solve the equation,

$$2^{5x} \times 2^{2x-3} = 3^{x}$$

Give your answer to three significant figures.

[4 marks]

Question 3

Find the solution to the equation,

$$\frac{1}{5^{3x-1}} = 7^x$$

Give your answer accurate to three decimal places.

[4 marks]

Question 4

Solve, correct to 3 decimal places, the equation

$$5^x - 3 = 0$$

[3 marks]

Question 5

(i) Sketch the curve

$$y = 3^x$$

[2 marks]

(ii) Hence or otherwise, discuss trying to solve the equation

$$3^x = -1$$

[2 marks]

Question 6

Use the fact that $ln\left(4 \times 3^x\right) = ln\,4 + ln\,3^x$ to assist in finding the solution to,

$$4 \times 3^x = 5^{3x}$$

Give your answer accurate to three decimal places.

[4 marks]

Question 7

Solve the equation,

$$3 \times 7^{x+2} = 4^{x}$$

Give your answer accurate to three decimal places.

[4 marks]

Question 8

(i) Solve,

$$log_3 x = 4$$

[1 mark]

(ii) Solve,

$$log_7 x = 0.25$$

Give your answer to three decimal places.

[1 mark]

(iii) Solve,

$$log_2 x = -5$$

Give the exact answer.

[1 mark]

Question 9

Solve this equation, giving your answer to three decimal places,

$$5^{4x+7} = 2^{x-3}$$

[5 marks]

Question 10

Solve the equation,

$$6 \times 5^{2x+1} = 7^{x}$$

Give your answer accurate to three decimal places.

[5 marks]