adamjee maths

A-LEVEL MATHS / EDEXCEL / FREE RESOURCES

Logarithmic and exponential equations

Mark scheme

1 questions

Exam questions and marking instructions remain credited to their board.

Contents

1 October 2021 - Paper 2 - Q3

Q			
3	$\log_3(12y+5)-\log_3(1-3y)=2\Rightarrow\log_3\dfrac{12y+5}{1-3y}=2$ or e.g. $2=\log_3 9$	B1 M1 on EPEN	1.1b
	$\log_3\dfrac{12y+5}{1-3y}=2\Rightarrow\dfrac{12y+5}{1-3y}=3^2\Rightarrow 9-27y=12y+5\Rightarrow y=...$ or e.g. $\log_3(12y+5)=\log_3\left(3^2(1-3y)\right)\Rightarrow(12y+5)=3^2(1-3y)\Rightarrow y=...$	M1	2.1
	$y=\dfrac{4}{39}$	A1	1.1b
		(3)	
			(3 marks)

Notes

B1(M1 on EPEN): Applies at least one addition or subtraction law of logs correctly.
Can also be awarded for using $2=\log_3 9$. This may be implied by e.g.
$\log_3 ...=2\Rightarrow ...=9$

M1: A rigorous argument with no incorrect working to remove the log or logs correctly and obtain a correct equation in any form **and** solve for *y*.

A1: Correct **exact** value. Allow equivalent fractions.

Guidance on how to mark particular cases:

$$\log_3(12y+5)-\log_3(1-3y)=2\Rightarrow\frac{\log_3(12y+5)}{\log_3(1-3y)}=2$$
$$\Rightarrow\frac{12y+5}{1-3y}=3^2\Rightarrow 9-27y=12y+5\Rightarrow y=\frac{4}{39}$$

B1M0A0

$$\log_3(12y+5)-\log_3(1-3y)=2\Rightarrow\frac{\log_3(12y+5)}{\log_3(1-3y)}=2\Rightarrow\log_3\frac{12y+5}{1-3y}=2$$
$$\Rightarrow\frac{12y+5}{1-3y}=3^2\Rightarrow 9-27y=12y+5\Rightarrow y=\frac{4}{39}$$

B1M0A0

$$\log_3(12y+5)-\log_3(1-3y)=2\Rightarrow\frac{12y+5}{1-3y}=3^2\Rightarrow 9-27y=12y+5\Rightarrow y=\frac{4}{39}$$

B1M1A1

Question	Scheme	Marks	AOs