## AQA – Exponentials and logarithms – AS Mathematics P1

1. June/2020/Paper\_1/No.10

Raj is investigating how the price, P pounds, of a brilliant-cut diamond ring is related to the weight, C carats, of the diamond.

He believes that they are connected by a formula

$$P = aC^n$$

where a and n are constants.

(a) Express  $\ln P$  in terms of  $\ln C$ .

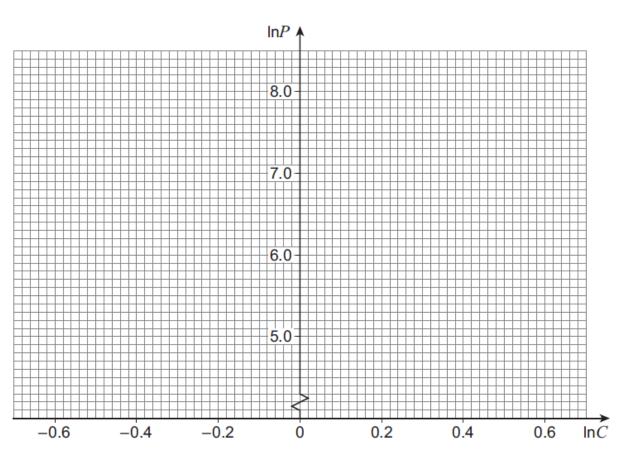
,			[2 marks]
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(b) Raj researches the price of three brilliant-cut diamond rings on a website with the following results.

С	0.60	1.15	1.50
P	495	1200	1720

(b) (i) Plot  $\ln P$  against  $\ln C$  for the three rings on the grid below.

[2 marks]



(b) (ii) Explain which feature of the plot suggests that Raj's belief may be correct.

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[1 mark]

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i) (	Using the graph on page 15, estimate the value of $a$ and the value of $n$ .	[4 marks]
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	Explain the significance of a in this context	
	Explain the significance of $a$ in this context.	[1 mark]
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d)	Raj wants to buy a ring with a brilliant-cut diamond of weight 2 carats.	
	Estimate the price of such a ring.	[2 marks]
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