

Topic Test

Summer 2022

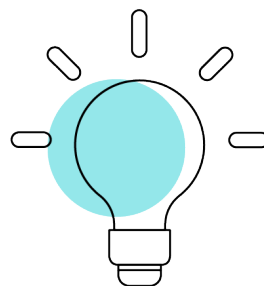
Pearson Edexcel GCE Mathematics (9MA0)

Paper 1 and Paper 2

Topic 1: Proof

Contents

<u>General guidance to Topic Tests</u>	<u>3</u>
<u>Revise Revision Guide content coverage</u>	<u>4</u>
<u>Questions</u>	<u>5</u>
<u>Mark Scheme</u>	<u>20</u>



Questions

Question T1_Q1

3. (a) “If m and n are irrational numbers, where $m \neq n$, then mn is also irrational.”

Disprove this statement by means of a counter example.

(2)

(b) (i) Sketch the graph of $y = |x| + 3$

(ii) Explain why $|x| + 3 \geq |x + 3|$ for all real values of x .

(3)

Question T1_Q2

10. (i) Prove that for all $n \in \mathbb{N}$, $n^2 + 2$ is not divisible by 4

(4)

(ii) “Given $x \in \mathbb{R}$, the value of $|3x - 28|$ is greater than or equal to the value of $(x - 9)$.”

State, giving a reason, if the above statement is always true, sometimes true or never true.

(2)

Question T1_Q3

16. Prove by contradiction that there are no positive integers p and q such that

$$4p^2 - q^2 = 25$$

(4)

[illegible]

(4)

Question T1_Q5

15. (i) Use proof by exhaustion to show that for $n \in \mathbb{N}$, $n \leq 4$

$$(n+1)^3 > 3^n \quad (2)$$

(ii) Given that $m^3 + 5$ is odd, use proof by contradiction to show, using algebra, that m is even.

(4)

