



Additional Assessment Materials

Summer 2021

Pearson Edexcel GCE in As Mathematics

8MA0_01 (Public release version)

Resource Set 1: Topic 1

Proof

Pearson: helping people progress, everywhere

Pearson aspires to be the world's leading learning company. Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: www.pearson.com/uk

Additional Assessment Materials, Summer 2021

All the material in this publication is copyright

© Pearson Education Ltd 2021

General guidance to Additional Assessment Materials for use in 2021

Context

- Additional Assessment Materials are being produced for GCSE, AS and A levels (with the exception of Art and Design).
- The Additional Assessment Materials presented in this booklet are an optional part of the range of evidence teachers may use when deciding on a candidate's grade.
- 2021 Additional Assessment Materials have been drawn from previous examination materials, namely past papers.
- Additional Assessment Materials have come from past papers both published (those materials available publicly) and unpublished (those currently under padlock to our centres) presented in a different format to allow teachers to adapt them for use with candidate.

Purpose

- The purpose of this resource to provide qualification-specific sets/groups of questions covering the knowledge, skills and understanding relevant to this Pearson qualification.
- This document should be used in conjunction with the mapping guidance which will map content and/or skills covered within each set of questions.
- These materials are only intended to support the summer 2021 series.

1.

(i) Show that $x^2 - 8x + 17 > 0$ for all real values of x (3)

(ii) "If I add 3 to a number and square the sum, the result is greater than the square of the original number."

State, giving a reason, if the above statement is always true, sometimes true or never true. (2)

(Total for Question 1 is 5 marks)

2.

(i) Use a counter example to show that the following statement is false.

" $n^2 - n - 1$ is a prime number, for $3 \leq n \leq 10$." (2)

(ii) Prove that the following statement is always true.

"The difference between the cube and the square of an odd number is even."

For example $5^3 - 5^2 = 100$ is even. (4)

(Total for Question 2 is 6 marks)

3.

(a) Prove that for all positive values of x and y

$$\sqrt{xy} \leq \frac{x+y}{2} \quad (2)$$

(b) Prove by counter example that this is not true when x and y are both negative. (1)

(Total for Question 3 is 3 marks)

4.

. Given $n \in \mathbb{N}$, prove that $n^3 + 2$ is not divisible by 8

(4)

(Total for Question 4 is 4 marks)

5.

(a) Prove that for all positive values of a and b

$$\frac{4a}{b} + \frac{b}{a} \geq 4$$

(4)

(b) Prove, by counter example, that this is not true for all values of a and b .

(1)

(Total for Question 5 is 5 marks)