1.1 Pure: Proof: 10-minute Pack

EDEXCEL 9MA0 · Calculator allowed · about 10 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 State whether 78 is odd or even, and write it in the form 2n for an integer n.

(Total for Question 1 is 1 mark)

2 Fully factorise $n^2 - n$.

(Total for Question 2 is 1 mark)

3 Expand and fully simplify $(2k + 1)(2k - 1)$.

(Total for Question 3 is 1 mark)

4 State the general algebraic form used to represent an even integer, and hence write 132 in that form.

(Total for Question 4 is 1 mark)

5 Prove that the sum of any two even integers is always even.

(Total for Question 5 is 2 marks)

6 Prove that the product of any two odd integers is always odd.

(Total for Question 6 is 2 marks)

7 Give one value of n that disproves the statement: "$n^2 + 1$ is even for every positive integer n."

(Total for Question 7 is 1 mark)

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Mark scheme · 1.1 Pure: Proof: 10-minute Pack

Question 1

even, 78 = 2(39), n = 39 **B1**

Answer: Even; n = 39

Question 2

n(n - 1) cao **B1**

Answer: n(n - 1)

Question 3

$4k^2$ - 1 cao **B1**

Answer: $4k^2$ - 1

Question 4

2n, with n = 66 **B1**

Answer: 2n, n = 66

Question 5

writes the two even integers as 2a and 2b, for integers a and b, and forms the sum 2a + 2b **M1**

writes the sum as 2(a + b), a multiple of 2, hence even, cso **A1**

Answer: Proof: 2a + 2b = 2(a + b), which is even

Question 6

writes the two odd integers as 2p + 1 and 2q + 1, and expands (2p + 1)(2q + 1) = 4pq + 2p + 2q + 1 **M1**

writes this as 2(2pq + p + q) + 1, a multiple of 2 plus 1, hence odd, cso **A1**

Answer: Proof: (2p+1)(2q+1) = 2(2pq+p+q)+1, which is odd

Question 7

n = 2 (gives 5, which is odd), or any other even n, oe **B1**

Answer: n = 2, since 2^2 + 1 = 5 is odd

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