1.4 Simple Proof & Reasoning

Question Paper

Course	DP IB Maths
Section	1. Number & Algebra
Topic	1.4 Simple Proof & Reasoning
Difficulty	Medium

Time allowed: 40

Score: /27

Percentage: /100

Question 1

Prove that $(4x-1)(2x+3)-(2x+1)^2=2(2x-1)(x+2)$.

[3 marks]

Question 2

Prove that x^2-3x+3 is positive for all values of x.

[3 marks]

Question 3

Prove that $(a-b)^2-(a+b)^2=-4ab$.

[3 marks]

Question 4

Prove that the sum of any three consecutive integers is a multiple of 3.

[3 marks]

Question 5

Prove that $x^2 + 2 \geq 2$ for all values of x.

[2 marks]

Question 6

Prove that the square of an even number is a multiple of 4.

[3 marks]

Question 7a

(a) Factorise $n^2 + 3n + 2$.

[1 mark]

Question 7b

(b) Hence show that $n^3 + 3n^2 + 2n = n(n + 1)(n + 2)$.

[1 mark]

Question 7c

(c) Given that n is even, write down whether $(n + 1)$ *and* $(n + 2)$ are odd or even.

[2 marks]

Question 7d

(d) Hence deduce whether $n^3 + 3n^2 + 2n$ is odd or even. Justify your answer.

[2 marks]

Question 8a

(a) Show that $(3n + 2)^2 - (n + 2)^2 = 8n^2 + 8n$, where $n \in \mathbb{Z}$.

[2 marks]

Question 8b

(b) Hence, or otherwise, prove that $(3n + 2)^2 - (n + 2)^2$ is a multiple of 8.

[2 marks]