

Proofs (Foundation)

Please write clearly in block capitals

Forename:

Surname:

Materials

For this paper you must have:

- mathematical instruments



You must **not** use a calculator.

Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer all questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information

- The marks for questions are shown in brackets.
- You may ask for graph paper, tracing paper and more answer paper. These must be tagged securely to this answer book.

Advice

- In all calculations, show clearly how you work out your answer.

1 Show that the following statements are true: (Level 5)

1(a) $5(2x - 3) - 2 \equiv 10x - 17$

[2 marks]

Answer _____

1(b) $(n - 2)^2 + 3 \equiv n^2 - 4n + 7$

[2 marks]

Answer _____

1(c) $(x + 1)^2 - x^2 \equiv 2x + 1$

[2 marks]

Answer _____

Turn over for next question

2 Show that the following statements are true: (Level 5)

2(a) $5(3x - 5) - 2(2x + 9) \equiv 11x - 43$

[3 marks]

Answer _____

2(b) $(n - 2)^2 - (n - 5)^2 \equiv 3(2n - 7)$

[3 marks]

Answer _____

2(c) $(n + 2)^2 - 3(n + 4) \equiv (n + 4)(n - 3) + 4$

[3 marks]

Answer _____

2(d) $3(n + 3)(n - 1) - 3(1 - n) \equiv (3n - 3)(n + 4)$

[3 marks]

Answer _____

Turn over for next question

3 Show that the following statements are true,

3(a) $(3n + 1)(n + 3) - n(3n + 7) \equiv 3(n + 1)$

(Level 5)

[3 marks]

Answer _____

3(b) $(n + 3)^2 - (3n + 5) \equiv (n + 1)(n + 2) + 3$

[3 marks]

Answer _____

3(c) $(n - 3)^2 - (2n + 1) \equiv (n - 4)^2 - 8$

[3 marks]

Answer _____

3(d) $\frac{1}{8}(4n + 1)(n + 8) - \frac{1}{8}n(4n + 1) \equiv 4n + 1$

[3 marks]

Answer _____

Turn over for next question

- 4 Prove the product of two even numbers is always even. (Level 5)
[2 marks]

Answer _____

- 5 Prove that the product of two odd numbers is always odd. (Level 5)
[2 marks]

Answer _____

- 6 Prove algebraically that the sum of two consecutive numbers is odd. (Level 5)
[3 marks]

Answer _____



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7(a) Tom says that $7x - (2x + 3)(x + 2)$ is always negative. (Level 5)

Is he correct? Explain your answer.

[3 marks]

Answer _____

7(b) Change a single number in Tom's statement that would lead to a change in your conclusion.

Why is this the case?

[1 mark]

Answer _____



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