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3. (i) Use algebra to prove that for all real values of x

$$(x - 4)^2 \geqslant 2x - 9$$

(3)

(ii) Show that the following statement is untrue.

$2^n + 1$ is a prime number for all values of n, $n \in \mathbb{N}$

(1)

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Question 3 continued

Q3

(Total 4 marks)

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4. (a) Find the first four terms, in ascending powers of x, of the binomial expansion of

$$\left(2 - \frac{1}{4}x\right)^6$$

(4)

(b) Given that x is small, so terms in x^4 and higher powers of x may be ignored, show

$$\left(2 - \frac{1}{4}x\right)^6 + \left(2 + \frac{1}{4}x\right)^6 = a + bx^2$$

where a and b are constants to be found.

(3)

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