7: **In this question you must show all stages of your working.**
Solutions relying entirely on calculator technology are not acceptable.

(i) A **geometric** series begins

$$10 + 8 + 6.4 + \ldots$$

(a) Find the sum to infinity of this series.

(2)

Given that the kth term of this series is less than 0.0005

(b) use algebra to find the smallest possible value of k.

(3)

(ii) An **arithmetic** series begins

$$850 + 843 + 836 + \ldots$$

Given that the sum of the first n terms of this series is S_n
find the greatest possible value of S_n

(4)

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Question 7 continued

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Question 7 continued

(Total for Question 7 is 9 marks)

8: **In this question you must show all stages of your working.**
Solutions relying entirely on calculator technology are not acceptable.

(i) Solve, for $0 \leqslant x < \pi$, the equation

$$3\tan\left(2x + \frac{\pi}{5}\right) = \sqrt{3}$$

giving the answers in radians in the form $k\pi$, where k is a rational constant to be found.

(3)

(ii) Solve, for $0 \leqslant \theta < 360°$, the equation

$$5\sin\theta\tan\theta = \cos\theta + 4$$

giving your answers, in degrees, to one decimal place.

(5)

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