6

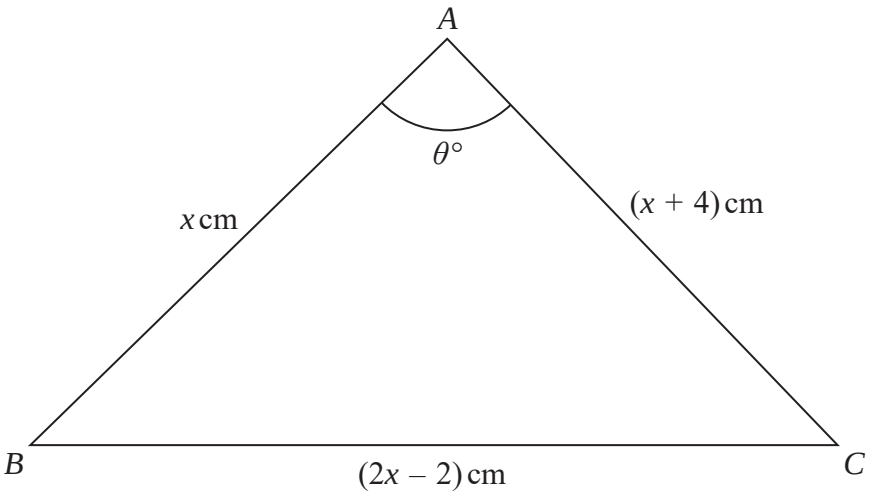

Diagram **NOT** accurately drawn

Figure 1

Figure 1 shows the triangle ABC with $AB = x$ cm, $BC = (2x - 2)$ cm, $AC = (x + 4)$ cm and $\angle BAC = \theta°$

Given that $\tan\theta° = \sqrt{255}$ and without finding the value of θ,

(a) show that $\cos\theta° = \frac{1}{16}$

(2)

Hence find

(b) the value of x,

(5)

(c) the size, in degrees to 1 decimal place, of $\angle ABC$,

(2)

(d) the area, in cm^2 to 3 significant figures, of triangle ABC.

(2)

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Question 6 continued

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Question 6 continued

(Total for Question 6 is 11 marks)

7 (a) Expand $(1 - 4x^2)^{-\frac{1}{2}}$ in ascending powers of x, up to and including the term in x^6, giving each coefficient as an integer.

(3)

(b) Write down the range of values of x for which your expansion is valid.

(1)

(c) Expand $\dfrac{3 + x}{\sqrt{(1 - 4x^2)}}$ in ascending powers of x up to and including the term in x^4, giving each coefficient as an integer.

(3)

(d) Hence, use algebraic integration to obtain an estimate, to 3 significant figures, of

$$\int_0^{0.3} \frac{3 + x}{\sqrt{(1 - 4x^2)}}\,\mathrm{d}x$$

(4)

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Question 7 continued

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Question 7 continued

(Total for Question 7 is 11 marks)

8 The sixth term of a geometric series G, with common ratio r ($r \neq 0$), is four times the second term.

(a) Find the two possible exact values of r.

(2)

The sum of the third and seventh terms of G is 30

(b) Find the first term of the series.

(3)

Given that $r > 0$

(c) find the sum of the first 10 terms of G.

(2)

Given that t_n is the nth term of G,

(d) find the least value of n for which $t_n > 2400$

(3)

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Question 8 continued

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Question 8 continued

(Total for Question 8 is 10 marks)