11
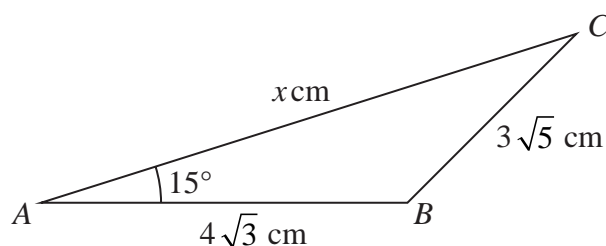

Figure 3

Figure 3 shows triangle ABC

$$AB = 4\sqrt{3} \text{ cm} \qquad BC = 3\sqrt{5} \text{ cm} \qquad AC = x\,\text{cm} \qquad \angle BAC = 15°$$

Given that the exact value of $\cos 15° = \dfrac{\sqrt{6} + \sqrt{2}}{4}$

(a) show that x is a solution of the equation

$$x^2 - \left(6\sqrt{2} + 2\sqrt{6}\right)x + 3 = 0$$

(3)

(b) Write the equation given in part (a) in the form $(x - k)^2 = 21 + 12\sqrt{3}$
where k is a constant that should be stated as a simplified surd.

(2)

(c) Show that $\left(3 + 2\sqrt{3}\right)^2 = 21 + 12\sqrt{3}$

(2)

Given that $\angle ABC$ is obtuse

(d) use parts (b) and (c) to find the exact value of x
Give your answer in the form $a + b\sqrt{2} + c\sqrt{3} + \sqrt{d}$ where a, b, c and d
are integers.

(3)

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$$\left[\text{Cosine rule: } a^2 = b^2 + c^2 - 2bc\cos A\right]$$

Question 11 continued

Question 11 continued

P 7 2 9 1 9 A 0 3 6 4 0

Question 11 continued

Turn over

Question 11 continued

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(Total for Question 11 is 10 marks)

TOTAL FOR PAPER IS 100 MARKS

P 7 2 9 1 9 A 0 3 8 4 0