6 In triangle ABC, $AC = x$ cm, $AB = (x + 3)$ cm and $\angle ABC = 30°$

Given that $\angle ACB = \theta°$ where $0 < \theta < 90$

(a) show that

(i) $\sin\theta° = \dfrac{x + 3}{2x}$

(ii) $\cos\theta° = \dfrac{\sqrt{3x^2 - 6x - 9}}{2x}$

(5)

Given that the size of $\angle BAC$: the size of $\angle ABC = 7 : 2$

(b) find the exact value of x

Give your answer in the form $a + a\sqrt{b}$ where a and b are prime numbers.

(5)

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Question 6 continued

(Total for Question 6 is 10 marks)