

Q1)

a) (i) $10(3x-1) = 2(x+8)$

$$30x - 10 = 2x + 16$$

$$30x - 2x = 16 + 10$$

$$28x = 26$$

$$x = \frac{26}{28} = 0.93$$

(ii) $\frac{4}{3x+1} = \frac{2}{7x+4}$

$$4(7x+4) = 2(3x+1)$$

$$28x + 16 = 6x + 2$$

$$28x - 6x = 2 - 16$$

$$22x = -14$$

$$x = -0.64$$

(iii) $(x+8)(x+1) = (x+3)(x+7)$

$$x^2 + 9x + 8 = x^2 + 10x + 21$$

$$9x + 8 = 10x + 21$$

$$8 - 21 = 10x - 9x$$

$$-13 = x$$

(iv) $6(x+2) - 1 = 0$

$$6x + 12 - 1 = 0$$

$$6x + 11 = 0$$

$$x = \frac{-11}{6} = -1.83$$

$$b) (i) x^{10} \times x^7 = x^{17} \text{ (add powers)}$$

$$(ii) \sqrt{x^5 \times x^2} = \sqrt{x^7} = x^{7/2}$$

$$(iii) \frac{x^6 \times x^8}{x^2} = \frac{x^{14}}{x^2} = x^{12} \text{ (subtract powers)}$$

$$(iv) 5x \times 2x^5 = 10x^6$$

$$c) (i) (x+3)(x+4) = 0$$

$$x+3=0 \quad x+4=0$$

$$x=-3 \quad x=-4$$

$$(ii) (x+5)(x+6) = 0$$

$$x=-5 \quad x=-6$$

$$(iii) (x+6)(x-1) = 0$$

$$x=-6 \quad x=1$$

$$(iv) (2x+1)(x+5) = 0$$

$$2x+1=0 \quad x+5=0$$

$$2x=-1 \quad x=-5$$

$$x=-1/2$$

$$(v) (x+8)(x+1) = 0$$

$$x=-8 \quad x=-1$$

$$d) 10x^2 + 7x - 1 = 0$$

$$\begin{matrix} \uparrow & \uparrow & \uparrow \\ a & b & c \end{matrix}$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

← in formula book!

$$x = \frac{-7 \pm \sqrt{(7)^2 - 4(10)(-1)}}{2(10)}$$

$$x = \frac{-7 \pm \sqrt{89}}{20}$$

$$x = \frac{-7 \pm \sqrt{49 + 40}}{20}$$

$$x = \frac{-7 + \sqrt{89}}{20}$$

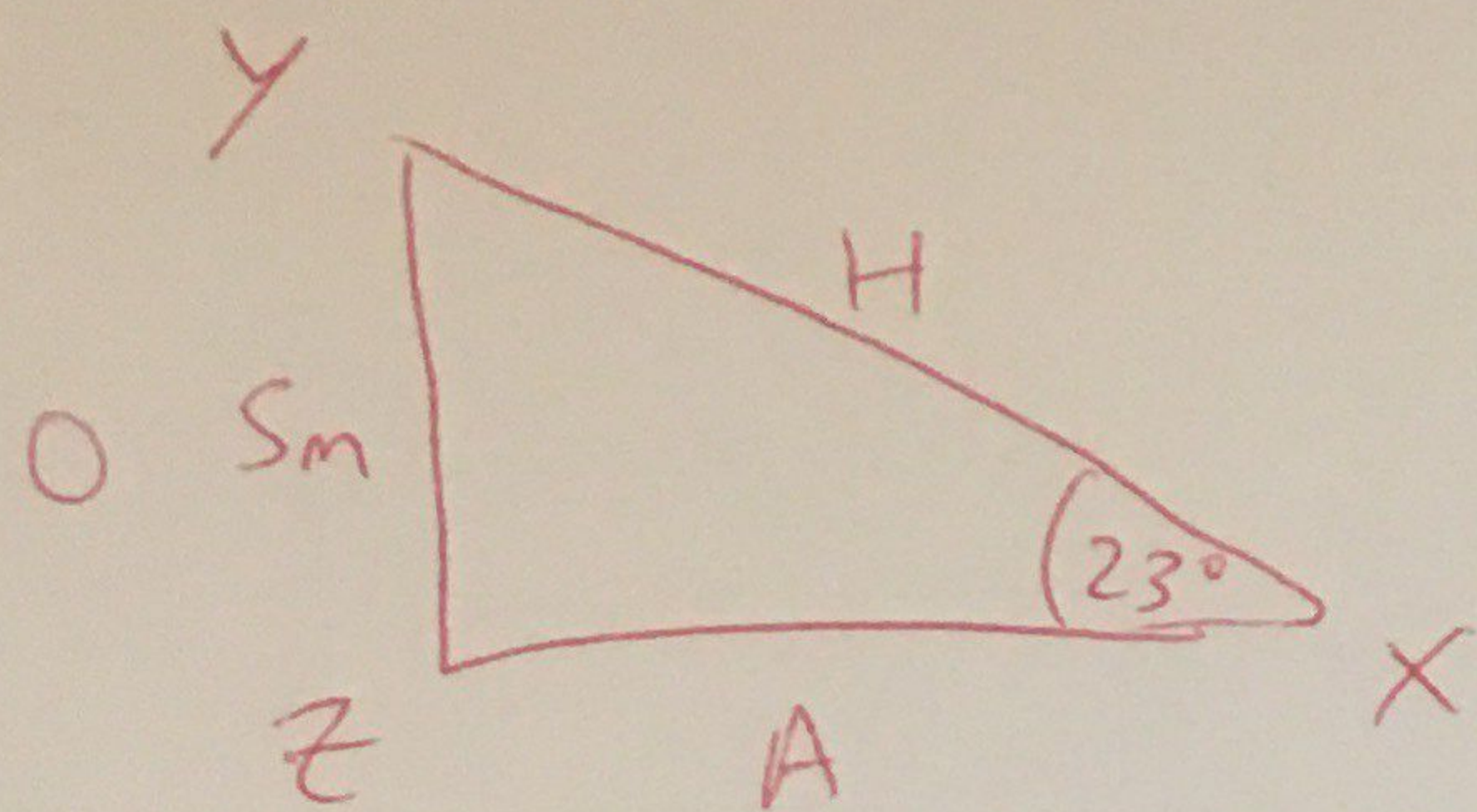
$$x = \frac{-7 - \sqrt{89}}{20}$$

$$x = 0.12$$

$$x = -0.82$$

Q2)

a)



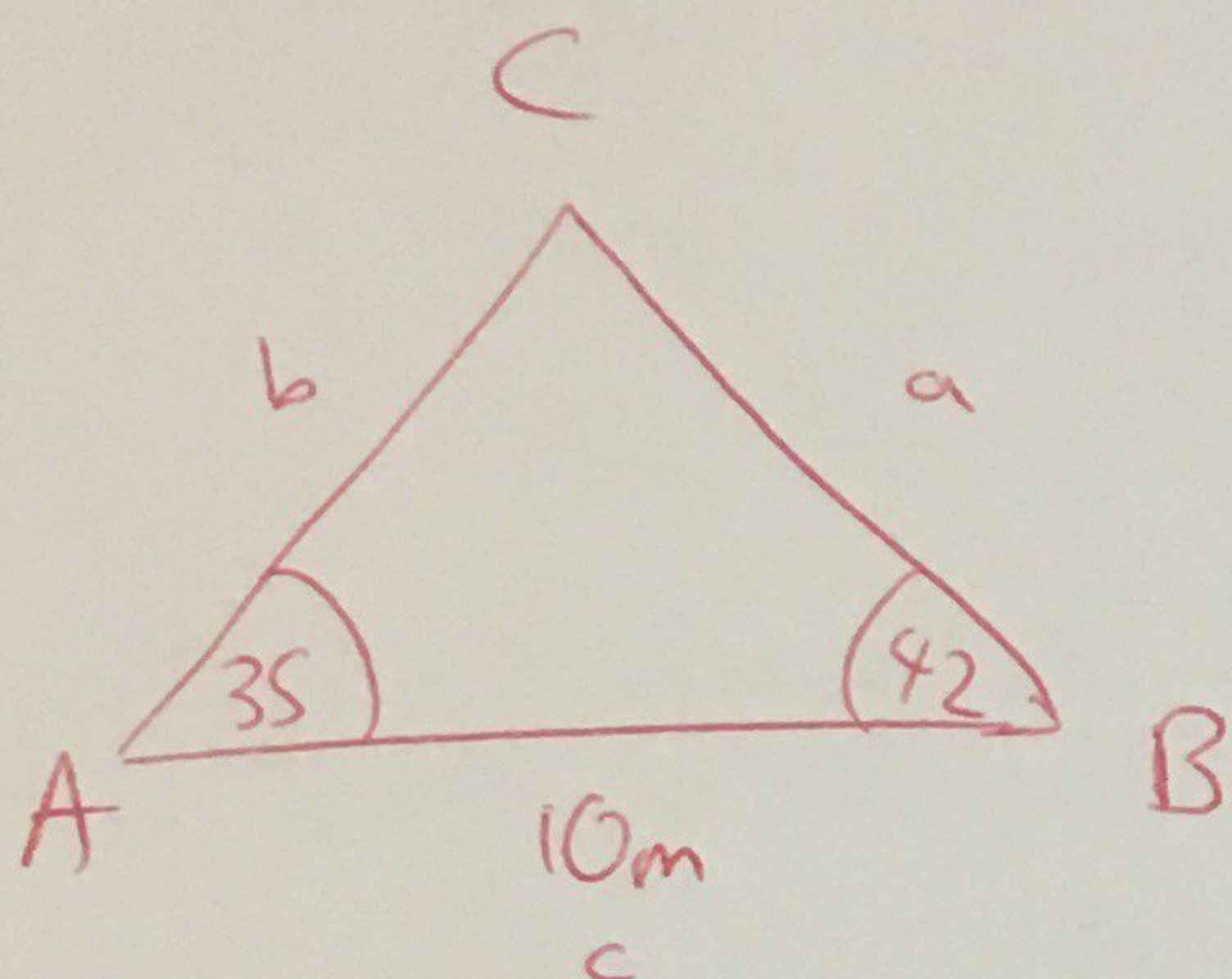
$$\tan 23 = \frac{5}{xz}$$

$$xz = \frac{5}{\tan 23}$$

$$xz = \frac{5}{0.42}$$

$$xz = 11.9 \text{ m}$$

b)



$$\hat{C} = 180 - 35 - 42$$

$$\hat{C} = 103^\circ$$

Sine Rule

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

← in formula book!

$$\frac{BC}{\sin 35} = \frac{AC}{\sin 42} = \frac{10}{\sin 103}$$

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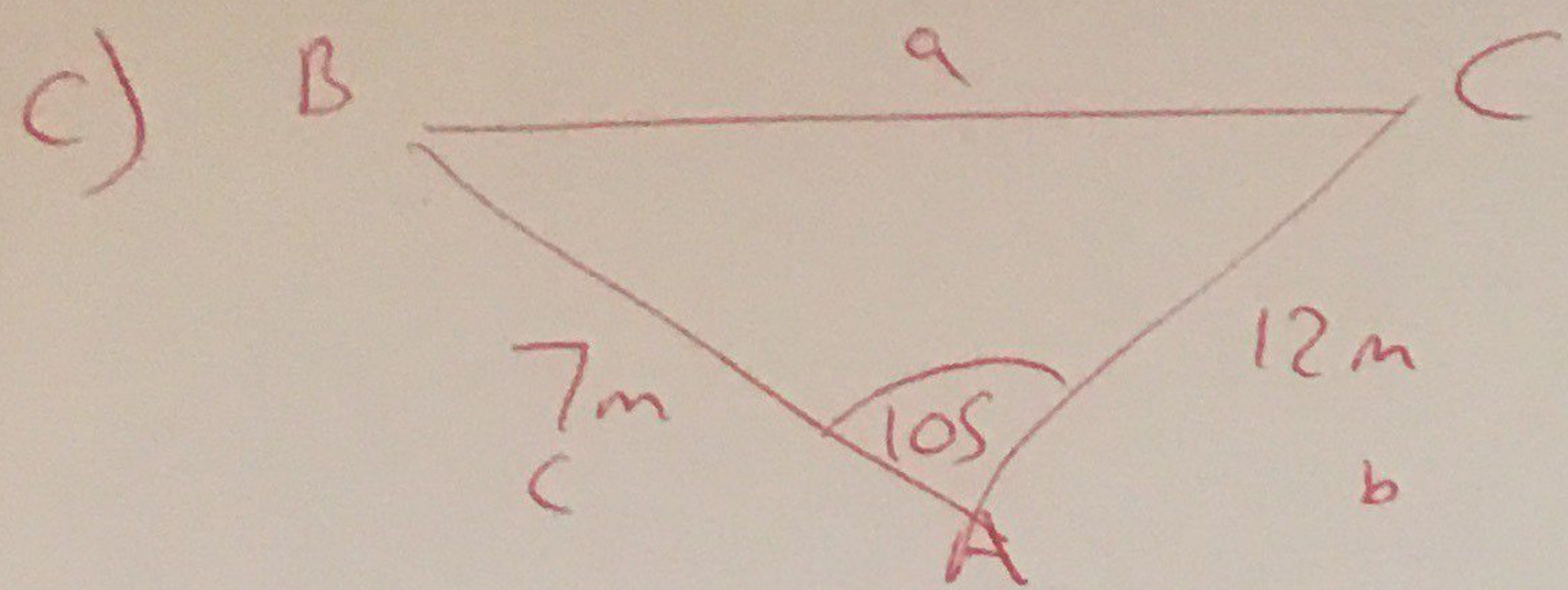
$$AC = \frac{10 \sin 42}{\sin 103}$$

$$AC = 6.87 \text{ m}$$

$$\frac{BC}{\sin 35} = \frac{10}{\sin 103}$$

$$BC = \frac{10 \sin 35}{\sin 103}$$

$$BC = 5.89 \text{ m}$$



Cosine Rule

$$a^2 = b^2 + c^2 - 2bc \cos A \quad \leftarrow \text{in formula book!}$$

$$(BC)^2 = (12)^2 + (7)^2 - 2(12)(7) \cos 105$$

$$(BC)^2 = 144 + 49 + 43.48$$

$$BC = \sqrt{236.48}$$

$$BC = 15.38 \text{ m}$$