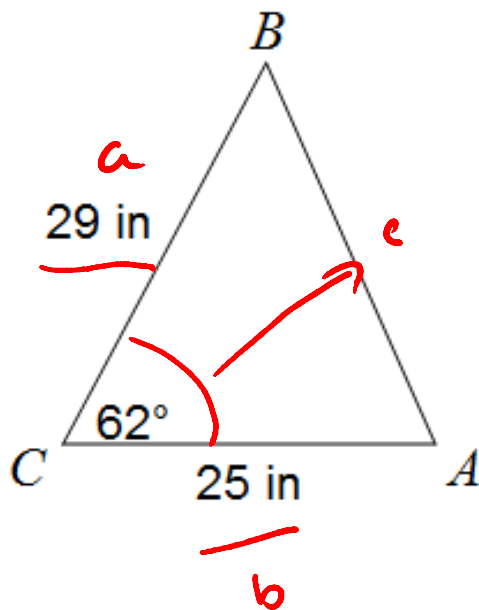


Mathematics 10D

8.4 – Cosine Law

Mr. D. Hagen

1) Find AB



$$c^2 = a^2 + b^2 - 2ab \cos C \quad \leftarrow \checkmark$$

$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$b^2 = a^2 + c^2 - 2ac \cos B$$

$$c^2 = 29^2 + 25^2 - 2(29)(25) \cos 62 \quad \checkmark$$

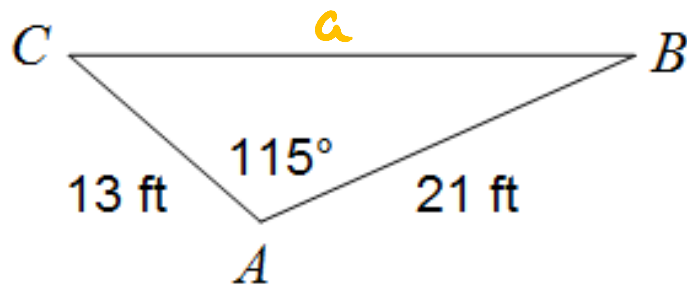
$$c^2 = 841 + 625 - 680.7338$$

$$c^2 = 785.2662 \quad \checkmark$$

$$c = \sqrt{785.2662}$$

$$c = 28 \text{ in} \quad \checkmark$$

2) Find BC



$$a^2 = b^2 + c^2 - 2bc \cos A$$

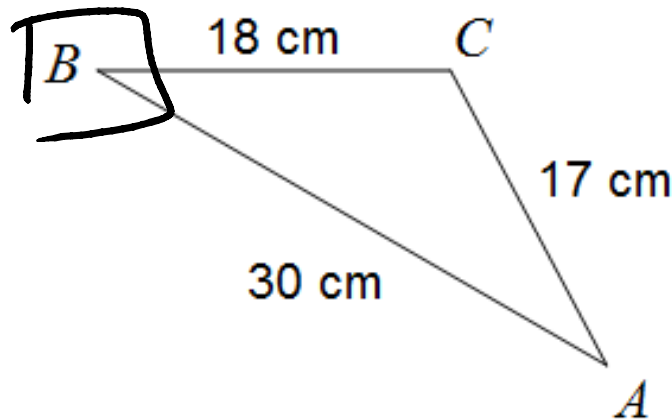
$$a^2 = 13^2 + 21^2 - 2(13)(21)\cos 115$$

$$a^2 = 169 + 441 - 230.7196$$

$$a^2 = 840.7496$$

$$a = 29 \text{ ft}$$

3) Find $m\angle B$



$$B = \cos^{-1} \left(\frac{b^2 - a^2 - c^2}{-2ac} \right)$$

$$b^2 = a^2 + c^2 - 2ac \cos B$$

$$17^2 = 18^2 + 30^2 - 2(18)(30) \cos B$$

$$289 = 324 + 900 - 1080 \cos B$$

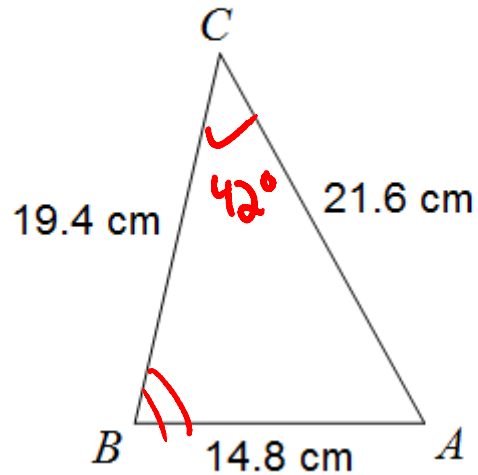
$$\frac{-935}{-1080} = \frac{-1080 \cos B}{-1080}$$

$$0.86574 = \cos B$$

$$\cos^{-1}(0.86574) = B$$

$$30^\circ = B$$

4) Find $m\angle C$



$$C = \cos^{-1} \left(\frac{c^2 - a^2 - b^2}{-2ab} \right)$$

$$C = \cos^{-1} \left(\frac{14.8^2 - 19.4^2 - 21.6^2}{-2(19.4)(21.6)} \right)$$

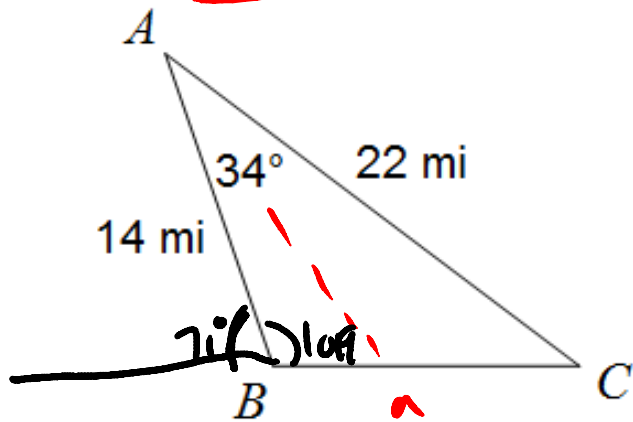
$$C = \cos^{-1} \left(\frac{+623.88}{+838.08} \right)$$

$$C = 42^\circ$$

$$\cos \theta = \frac{a}{h}$$

5) Solve

Sine law does not work on obtuse angles



$$\angle A = 34^\circ \quad a = 13$$

$$\angle B = 109^\circ \quad b = 22$$

$$\angle C = 37^\circ \quad c = 14$$

$$(1) a^2 = b^2 + c^2 - 2bc \cos A$$

$$a^2 = 22^2 + 14^2 - 2(22)(14) \cos 34$$

$$a^2 = 169.31$$

$$a = 13.01$$

$$a = 13 \text{ miles}$$

$$(2) \frac{\sin C}{c} = \frac{\sin A}{a}$$

$$\frac{\sin C}{14} = \frac{\sin 34}{13}$$

$$C = \sin^{-1}\left(\frac{14 \sin 34}{13}\right)$$

$$C = 37^\circ$$

(3)

$$\angle B = 180 - \angle A - \angle C$$

$$\angle B = 109^\circ$$

$$71^\circ$$