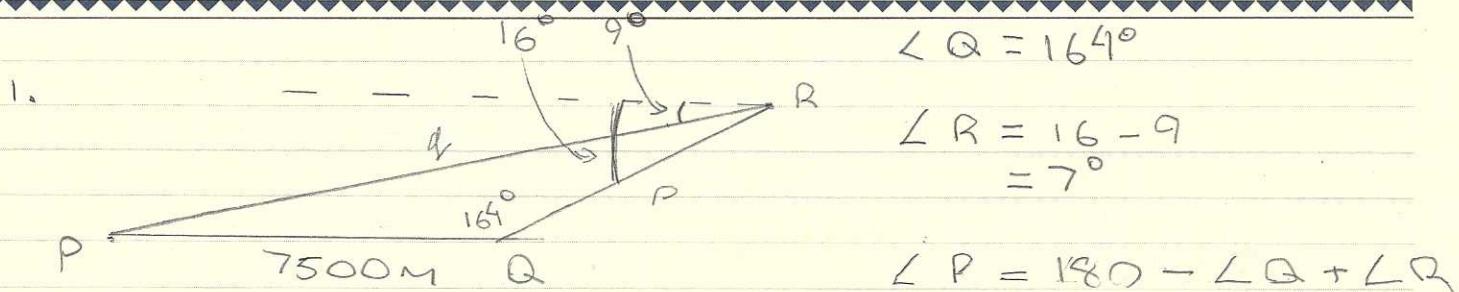


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$$\angle Q = 16^\circ$$

$$\begin{aligned}\angle R &= 16 - 9 \\ &= 7^\circ\end{aligned}$$

$$\angle P = 180 - \angle Q + \angle R$$

$$\angle P = 180 - 164 + 7$$

$$\frac{\sin R}{r} = \frac{\sin P}{P}$$

$$\angle P = 9^\circ$$

$$\frac{\sin 7^\circ}{7500} = \frac{\sin 9^\circ}{P}$$

$$\begin{aligned}P &=? \\ r &= 7500 \\ q &=?\end{aligned}$$

$$P = \sin 9^\circ \times \frac{7500}{\sin 7^\circ}$$

$$P \approx 9,627.18 \text{ m}$$

$$\frac{\sin R}{r} = \frac{\sin Q}{q}$$

$$\frac{\sin 7^\circ}{7500} = \frac{\sin 164^\circ}{q}$$

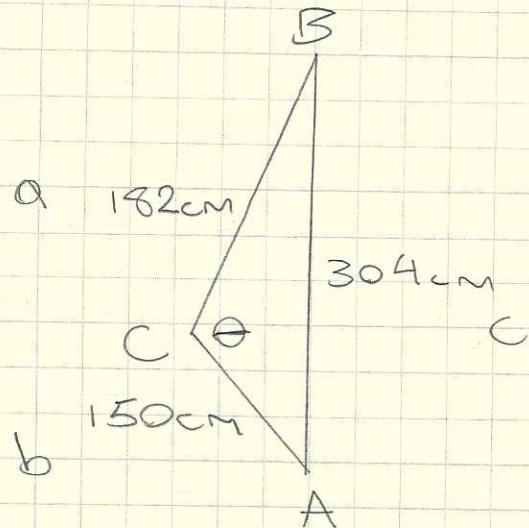
$$q = \sin 164^\circ \times \frac{7500}{\sin 7^\circ}$$

$$q \approx 16,963.09 \text{ m}$$

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2.



$$a = 182 \text{ cm}$$

$$b = 150 \text{ cm}$$

$$c = 304 \text{ cm}$$

$$\angle A = ?$$

$$\angle B = ?$$

$$\angle C = ?$$

$$c^2 = a^2 + b^2 - 2ab \cos(C)$$

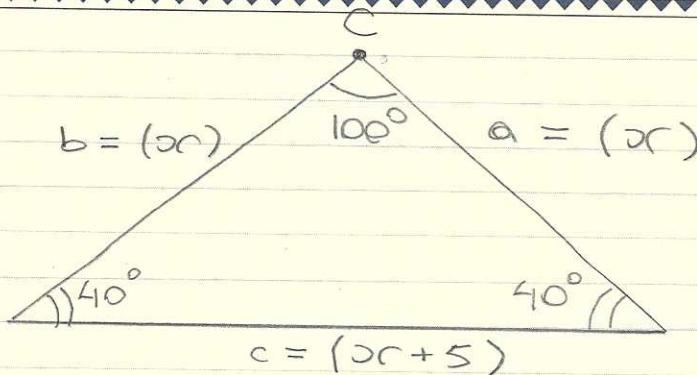
$$\cos(C) = \frac{c^2 - a^2 - b^2}{-2ab}$$

$$\cos \theta = \frac{304^2 - 182^2 - 150^2}{-2(182)(150)}$$

$$\theta \approx 132.36^\circ$$

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3.



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

$$x^2 = x^2 + (x+5)^2 - 2x(x+5) \cos 40^\circ$$

$$x^2 = x^2 + (x+5)(x+5) - 2x^2 - 10x \cos 40^\circ$$

$$x^2 = x^2 + x^2 + 5x + 5x + 25 - 2x^2 - 10x \cos 40^\circ$$

$$x^2 = x^2 + x^2 - 2x^2 + 5x + 5x - 10x + 25 \cos 40^\circ$$

$$x^2 = 25 \cos 40^\circ$$

$$x = \sqrt{25 \cos 40^\circ}$$

$$x \approx 4.38 \text{ cm}$$

a)

$$P = x + x + (x+5)$$

$$P \approx 4.38 + 4.38 + (4.38 + 5)$$

$$P \approx 18.14 \text{ cm}$$

b)

$$\text{Area} = \frac{\sin 50^\circ}{\frac{1}{2}(x+5)} = \frac{\sin 40^\circ}{h}$$

$$\sin 40^\circ \left( \frac{\frac{1}{2}(x+5)}{\sin 50^\circ} \right) = h$$

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$$h = s \sin 40^\circ \left( \frac{1}{2} (4.38 + 5) \right) / \sin 50^\circ$$

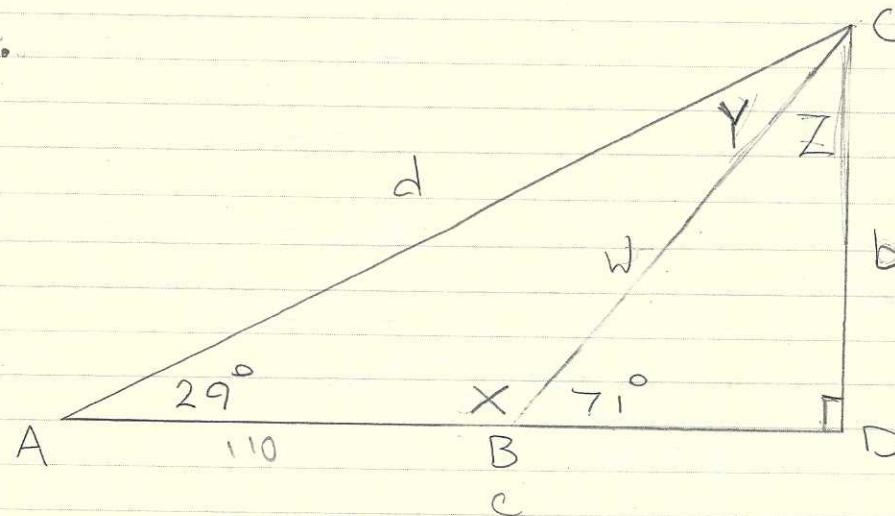
$$h \approx 3.94 \text{ cm}$$

$$\text{area} = \frac{\text{base} \times \text{height}}{2}$$

$$\begin{aligned}\text{area} &= \frac{(x+5)}{2} (3.94) \\ &= \frac{(4.38+5)}{2} (3.94) \\ &\approx 18.48 \text{ cm}^2\end{aligned}$$

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4.



$$\angle x = 180 - \angle B$$

$$\angle x = 180 - 71$$

$$\angle x = 109^\circ$$

$$\angle y = 180 - (\angle A + \angle x)$$

$$\angle y = 180 - (29 + 109)$$

$$\angle y = 42^\circ$$

$$\angle z = 180 - (\angle B + \angle D)$$

$$\angle z = 180 - (71 + 90)$$

$$\frac{\sin 110^\circ}{42} = \frac{\sin w}{29}$$

$$29 \left( \frac{\sin 110^\circ}{42} \right) = \sin w$$

$$w \approx 40.45 \text{ m}$$

$$\angle z = 19^\circ$$

$$\angle c = \angle y + \angle z$$

$$\angle c = 42 + 19$$

$$\frac{\sin \angle D}{w} = \frac{\sin \angle B}{b}$$

$$\angle c = 61^\circ$$

$$\frac{\sin 90^\circ}{40.45} = \frac{\sin 71}{b}$$

$$\sin 71^\circ \left( \frac{40.45}{\sin 90^\circ} \right) = b$$

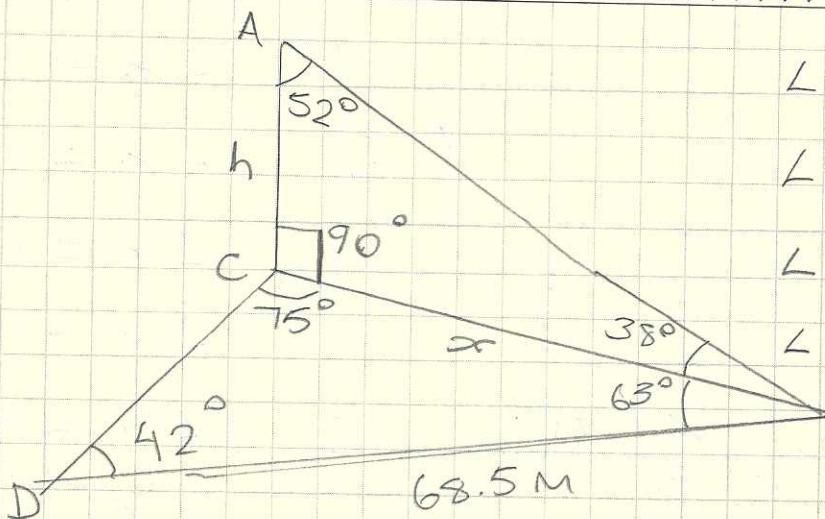
$$b \approx 38.25 \text{ m}$$

∴ the light house is approximately 38.25 meters tall.

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CORRESPONDENCE/NOTES

5.



$$\angle A = 180 - (90 + 38)$$

$$\angle A \approx 52^\circ$$

$$\angle C = 180 - (42 + 63)$$

$$\angle C = 75^\circ$$

$$\frac{\sin 75^\circ}{68.5} = \frac{\sin 42}{x}$$

$$\sin 42^\circ \left( \frac{68.5}{\sin 75^\circ} \right) = x$$

$$x \approx 47.45 \text{ m}$$

$$\frac{\sin 52^\circ}{47.45} = \frac{\sin 38^\circ}{h}$$

$$\sin 38^\circ \left( \frac{47.45}{\sin 52^\circ} \right) = h$$

$$h \approx 37.07 \text{ m}$$

∴ the cliff's height is 37.07 m.

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CORRESPONDENCE/NOTES

6.

$$\csc \theta = \frac{h}{o} = \frac{12.5}{9.3}$$

$$\csc \theta = \frac{1}{\sin \theta}$$

$$\sin \theta = \frac{1}{\csc \theta}$$

$$= 1 \times \frac{9.3}{12.5}$$

$$= \frac{9.3}{12.5}$$

$$\theta \approx 48.07^\circ$$

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