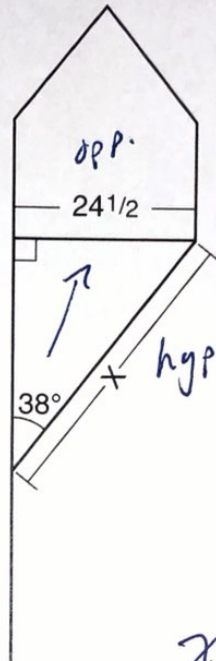


- 26 Diego needs to install a support beam to hold up his new birdhouse, as modeled below. The base of the birdhouse is $24\frac{1}{2}$ inches long. The support beam will form an angle of 38° with the vertical post. Determine and state the approximate length of the support beam, x , to the nearest inch.



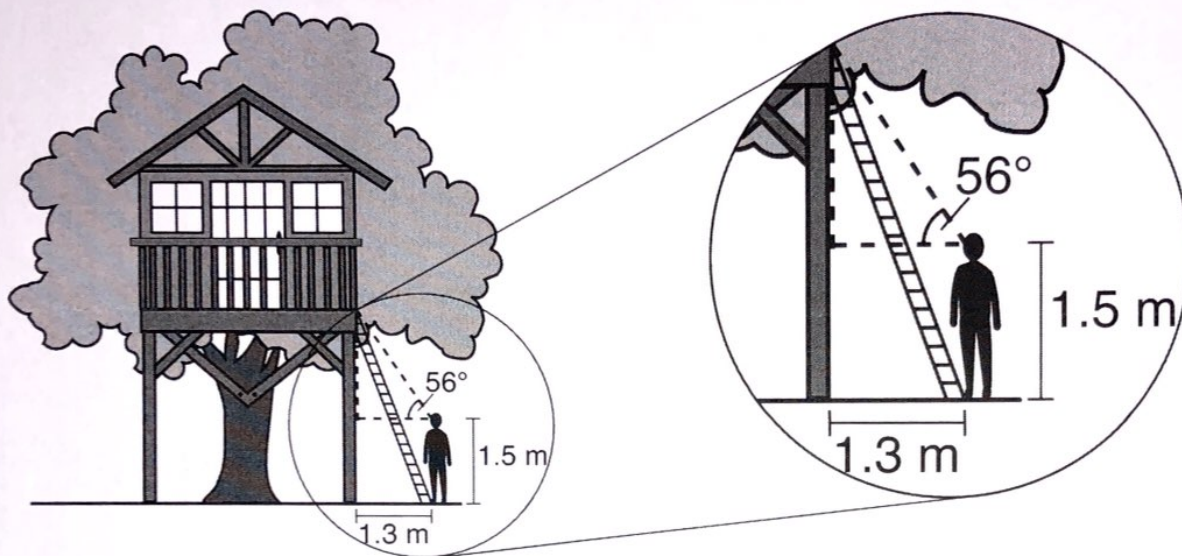
$$\sin 38 = \frac{24\frac{1}{2}}{x}$$

$$x = \frac{24\frac{1}{2}}{\sin 38}$$

$$= 39.7945\dots$$

$$\approx 40 \text{ inches}$$

- 33 David has just finished building his treehouse and still needs to buy a ladder to be attached to the ledge of the treehouse and anchored at a point on the ground, as modeled below. David is standing 1.3 meters from the stilt supporting the treehouse. This is the point on the ground where he has decided to anchor the ladder. The angle of elevation from his eye level to the bottom of the treehouse is 56 degrees. David's eye level is 1.5 meters above the ground.

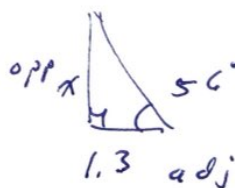


Determine and state the minimum length of a ladder, to the nearest tenth of a meter, that David will need to buy for his treehouse.

$$\tan 56 = \frac{x}{1.3}$$

$$x = 1.3 \sin 56$$

$$= 1.0777...$$



$$l = \sqrt{1.3^2 + (1.5 + 1.0777...)^2}$$

$$= \sqrt{8.3347...}$$

$$= 2.8870...$$

$$\approx 2.9 \text{ meters}$$

