



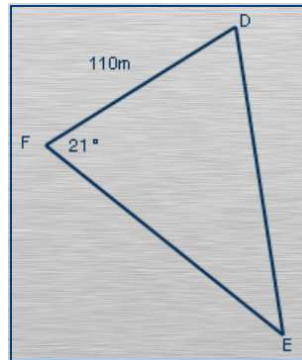
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12.9 Trigonometry

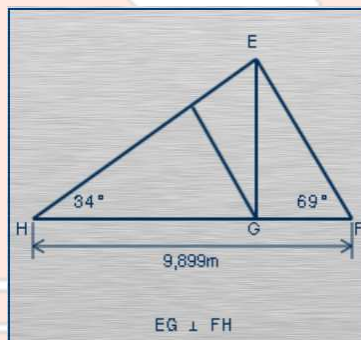
12.9 Problem in two dimensions

1. Practical problems in two dimensions.

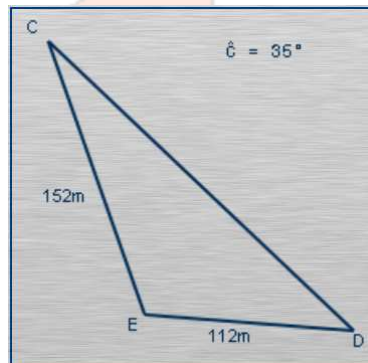
- (a) The figure shows the layout of a piece of land which covers 2880m^2 . Calculate the length of side EF.



- (b) The figure shows some dimensions of a roof truss. Determine the height (EG) of the truss.



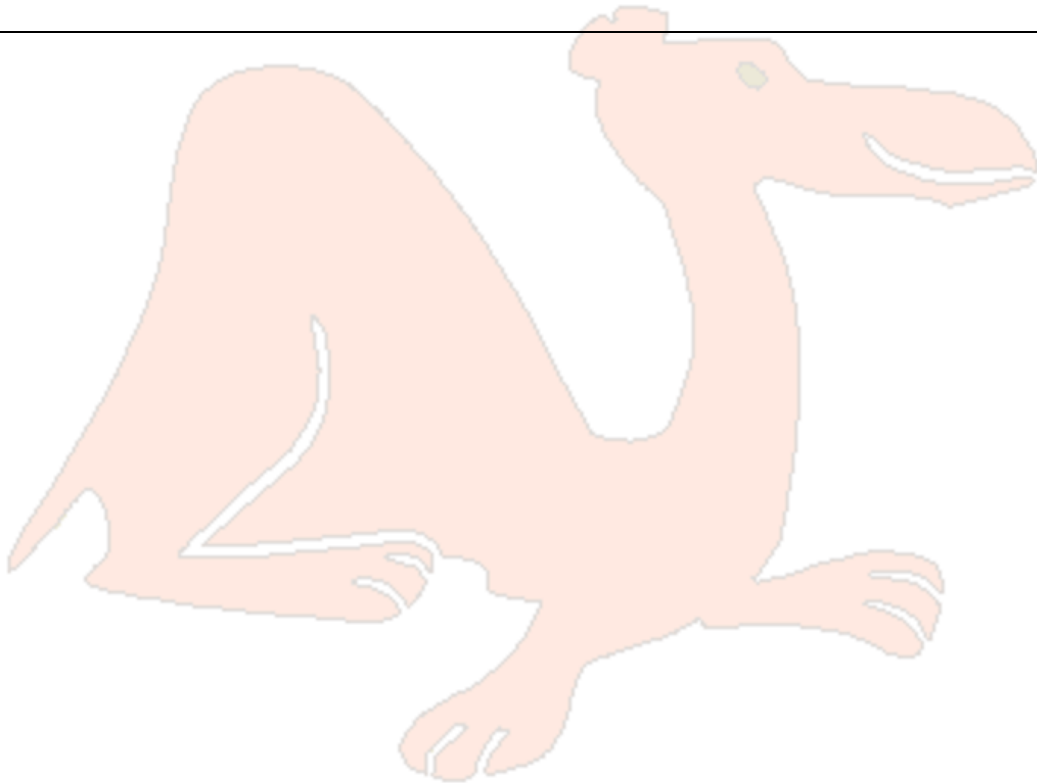
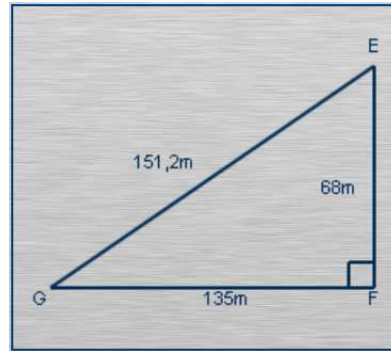
- (c) Calculate the area of the land represented by the triangle in the sketch.





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- (d) A person is 135m from the foot of a 68m high building. If the direct distance from the person to the top of the building is 151.2m, calculate the angle of elevation to the top of the building.





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MEMO

1. Practical problems in two dimensions [7.7.5.1]

(a)

$$\text{Area} = \frac{1}{2} de \sin \hat{F}$$

$$2880 = \frac{1}{2} d(110) \sin 21^\circ$$

$$d = \frac{2880 \times 2}{110 \times \sin 21^\circ}$$

$$d = 146.12m$$

(b)

In $\triangle EFH$:

$$\hat{E} = 180^\circ - 69^\circ - 34^\circ$$

$$\hat{E} = 77^\circ$$

In $\triangle EFH$:

$$\frac{EF}{\sin 34^\circ} = \frac{HF}{\sin 77^\circ}$$

$$EF = \frac{9.899 \times \sin 34^\circ}{\sin 77^\circ}$$

$$EF = 5.68m$$

In $\triangle EFG$:

$$\frac{EG}{EF} = \sin 69^\circ$$

$$EG = 5.68 \times \sin 69^\circ$$

$$EG = 5.30m$$

(c)

$$\frac{\sin \hat{D}}{CE} = \frac{\sin \hat{C}}{ED}$$

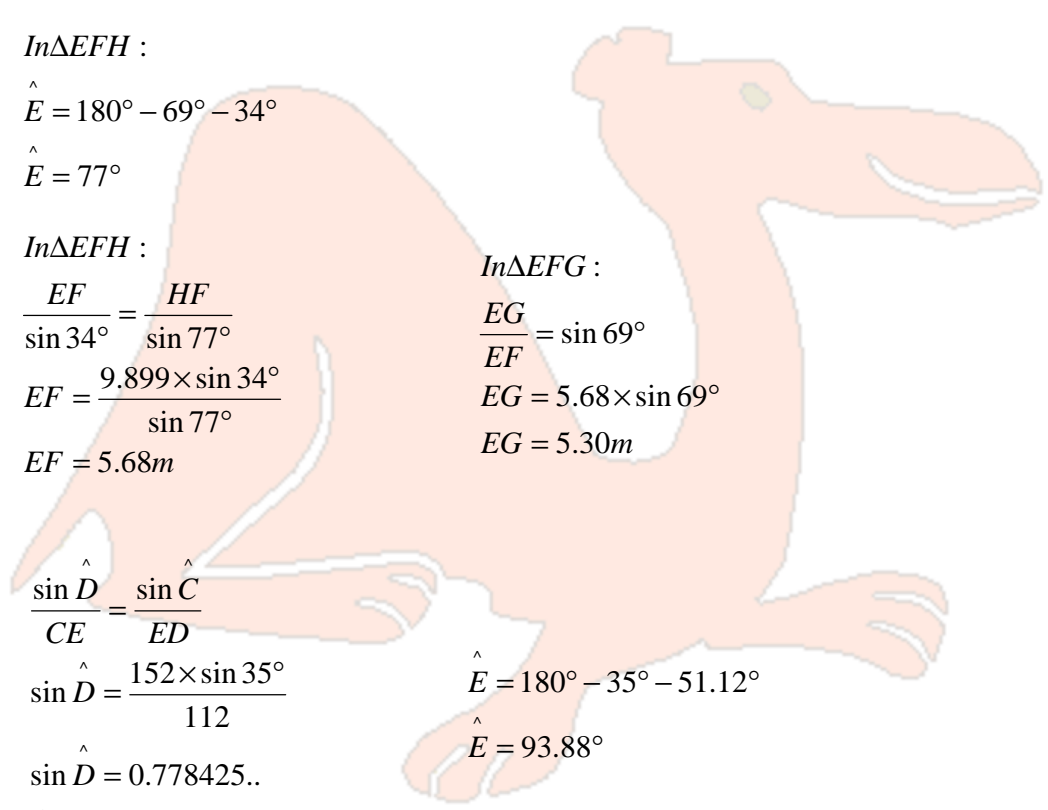
$$\sin \hat{D} = \frac{152 \times \sin 35^\circ}{112}$$

$$\sin \hat{D} = 0.778425..$$

$$\hat{D} = 51.12^\circ$$

$$\hat{E} = 180^\circ - 35^\circ - 51.12^\circ$$

$$\hat{E} = 93.88^\circ$$





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$$\text{Area} = \frac{1}{2}cd \sin 93.88^\circ$$

$$\text{Area} = \frac{1}{2}(112)(152) \sin 93.88^\circ$$

$$\text{Area} = 8492.48m^2$$

(d)

$$\cos \hat{G} = \frac{e^2 + f^2 - g^2}{2ef}$$

$$\cos \hat{G} = \frac{(135)^2 + (151.2)^2 - (68)^2}{2(135)(151.2)}$$

$$\therefore \hat{G} = 26.73^\circ$$

