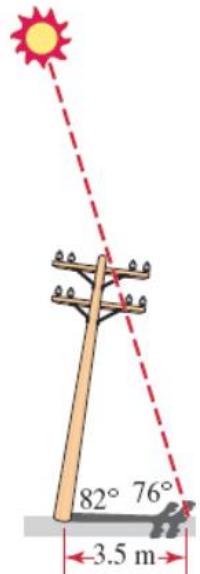


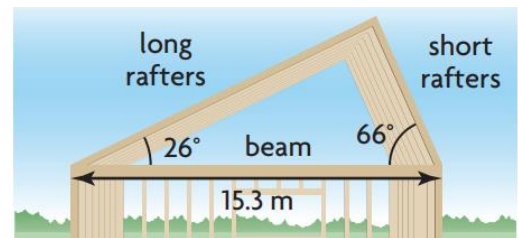
## 8.4 Solve Problems using Trigonometry

### A Applications

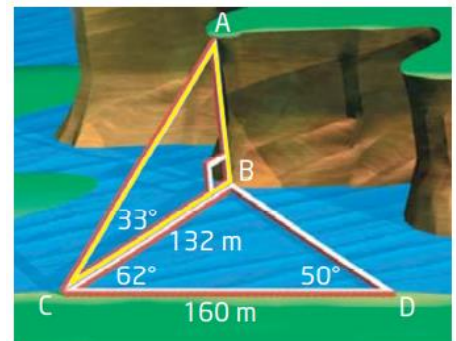
Example 1. A telephone pole makes an angle of  $82^\circ$  with the level ground. The angle of elevation of the Sun is  $76^\circ$ . Find the length of the telephone pole if its shadow is 3.5 m. (Assume that the tilt of the pole is away from the Sun and in the same plane as the pole and the Sun.)



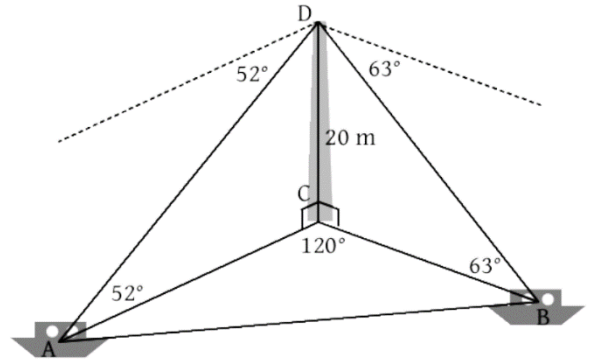
Example 2. The roof of a new house must be built to exact specifications so that solar panels can be installed. The long rafters at the front of the house must be inclined at an angle of  $26^\circ$  to the horizontal beam. The short rafters at the back of the house must be inclined at an angle of  $66^\circ$ . The house is 15.3 m wide. Determine the length of the long rafters.



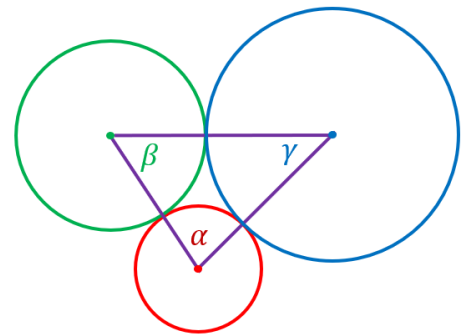
Example 3. Use the information provided on the diagram to find the angle of elevation of the cliff from the point  $D$ .



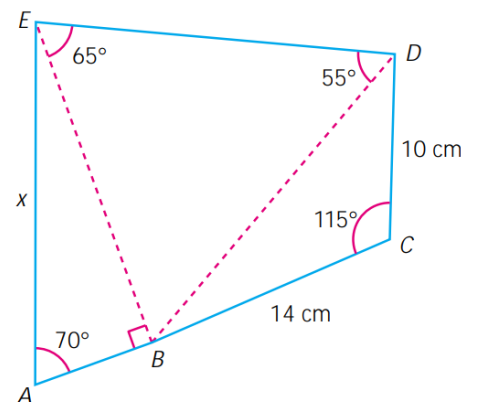
Example 4. Find the distance  $AB$  between the ships knowing the angles of elevation from each ship to the top of the lighthouse (see the diagram).



Example 5. Three circles of radius 2, 3, and 4 are tangent to each other. A triangle is formed by joining their centres. Find the angles of this triangle (see the diagram).

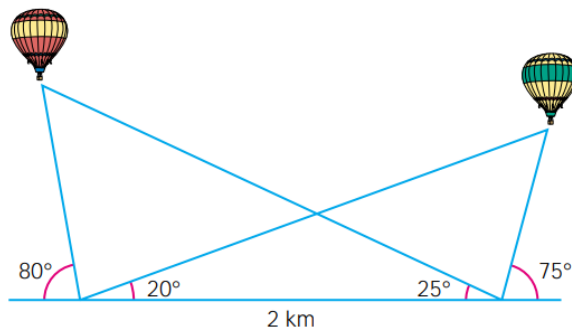


Example 6. Use the diagram below and find  $x$ .



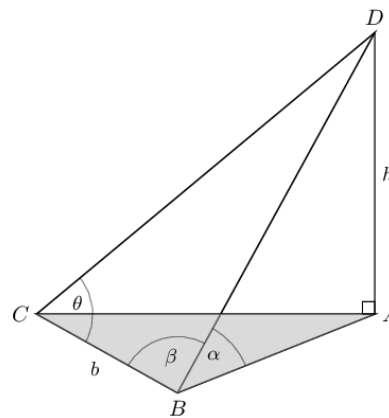
Example 7. Two hot air balloons are moored directly over a level road. The diagram shows the angle of elevation of the balloons from two observers 2 km apart.

(a) To the nearest tenth of a kilometre, how far apart are the balloons?



(b) Which balloon is higher, and by how many metres?

Example 8.  $D$  is the top of a building of height  $h$ . The base of the building is at  $A$  and  $\triangle ABC$  lies on the ground (a horizontal plane). Write  $h$  in terms of  $b = CB$ ,  $\alpha = \angle ABD$ ,  $\beta = \angle CBD$ , and  $\theta = \angle BCD$ .



Notes: Textbook Pages 424-427

Homework: Textbook Pages 427-429 # 2, 3, 4, 6, 16