

## 2 Solving Problems Involving More Than One Right Triangle

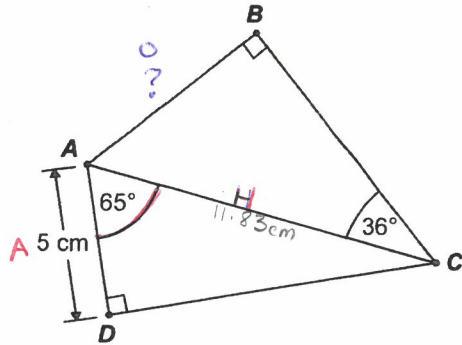


### Skill Builder

REVIEW

Answer Key

- 1 Determine the length of  $\overline{AB}$ .



My Calculations

$$\cos(65) = \frac{5}{x}$$

$$x = \frac{5}{\cos(65)}$$

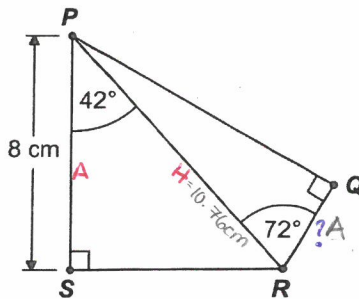
$$x \approx 11.83 \text{ cm}$$

$$\sin(36) = \frac{x}{11.83}$$

$$x = 11.83 \sin(36)$$

$$x = 6.95 \text{ cm}$$

- 2 Determine the length of  $\overline{QR}$ .



My Calculations

$$\cos(42) = \frac{8}{x}$$

$$x = \frac{8}{\cos(42)}$$

$$x = 10.76 \text{ cm}$$

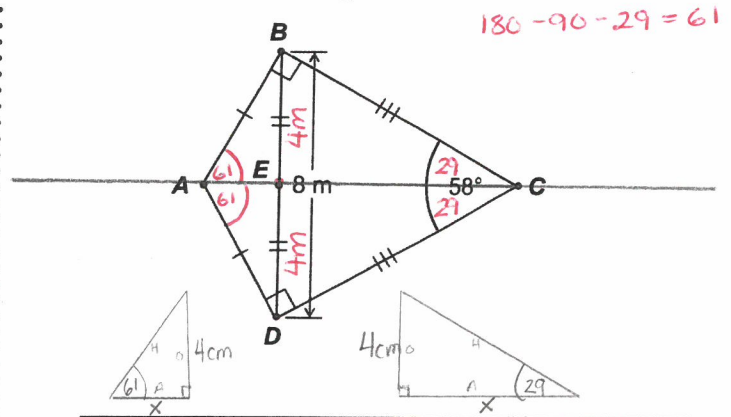
$$\cos(72) = \frac{x}{10.76}$$

$$x = 10.76 \cos(72)$$

$$x = 3.325$$

$$3.33 \text{ cm}$$

- 3 Determine the length of  $\overline{AC}$ .



My Calculations

$$\tan(61) = \frac{4}{x}$$

$$x = \frac{4}{\tan(61)}$$

$$x = 2.17 \text{ cm}$$

$$\tan(29) = \frac{4}{x}$$

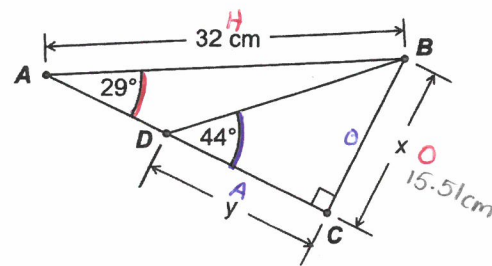
$$x = \frac{4}{\tan(29)}$$

$$x = 7.22 \text{ cm}$$

$$\overline{AB} = 2.17 + 7.22$$

$$\overline{AB} = 9.39 \text{ cm}$$

- 4 Determine the measure of every angle, then determine the lengths of side  $x$  and side  $y$ .



My Calculations

$$\sin(29) = \frac{x}{32}$$

$$x = 32 \sin(29)$$

$$x = 15.51 \text{ cm}$$

$$\tan(44) = \frac{15.51}{y}$$

$$y = \frac{15.51}{\tan(44)}$$

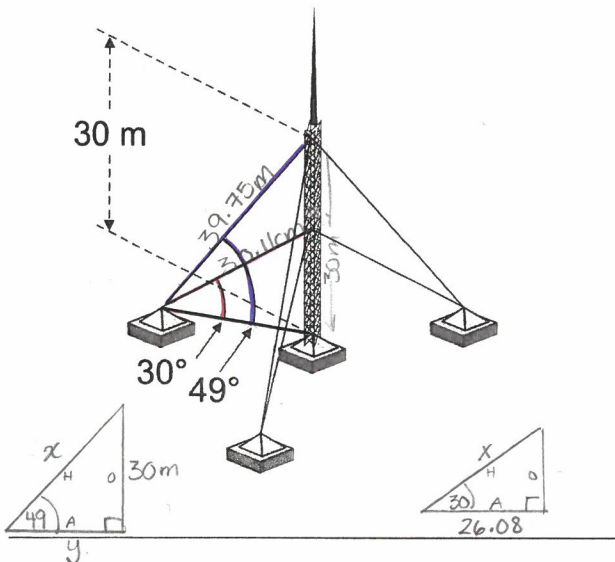
$$y = 16.06 \text{ cm}$$

# Skill Builder

- 5** Three sets of guy wires support an antenna. The higher guy wires are attached to the framework at a height of 30 m.

The higher guy wires have an angle of elevation equal to  $49^\circ$  and the lower guy wires have an angle of elevation equal to  $30^\circ$ .

How long are the guy wires?



**My Calculations**

$$\sin(49) = \frac{30}{x}$$

$$x \sin(49) = 30$$

$$x = \frac{30}{\sin(49)}$$

$$x = 39.75$$

$$\tan(49) = \frac{30}{y}$$

$$y = \frac{30}{\tan(49)}$$

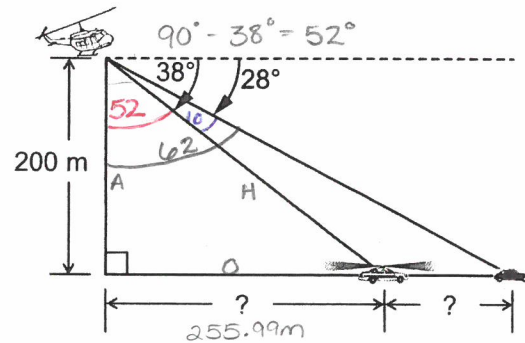
$$y = 26.08$$

$$\cos(30) = \frac{26.08}{x}$$

$$x = \frac{26.08}{\cos(30)}$$

$$x = 30.11 \text{ m}$$

- 6** A helicopter for a local TV station is following a police chase on the highway. The helicopter is 200 m above the highway. The angle of depression to the police car is  $28^\circ$  while the angle of depression to the car being chased is  $38^\circ$ . How far is the police car from the car that it's chasing?



**My Calculations**

$$\tan(52) = \frac{x}{200}$$

$$x = 200 \tan(52)$$

$$x = 255.99 \text{ m}$$

$$\tan(62) = \frac{x}{200}$$

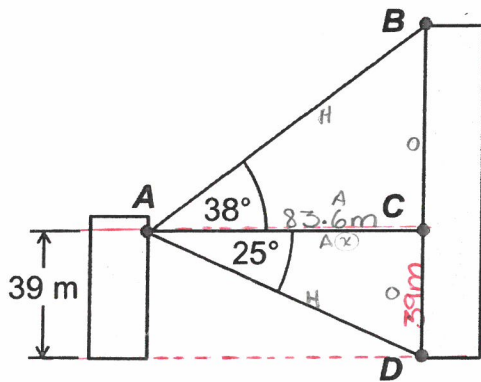
$$x = 200 \cdot \tan(62)$$

$$x = 376.15 \text{ m}$$

$$376.15 - 255.99 = 120.16$$



- 7 A surveyor stands at a window on the 9th floor of an office tower. She uses a clinometer to measure the angles of elevation and depression of the top and the base of a taller building. The surveyor sketches this plan of her measurements. Determine the height of the taller building to the nearest tenth of a metre.



My Calculations

$$\tan(25) = \frac{39}{x}$$

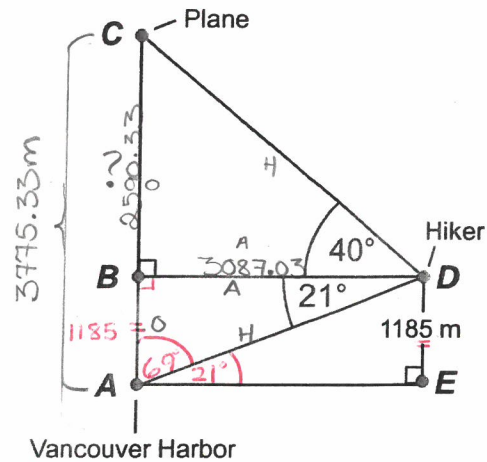
$$x = \frac{39}{\tan(25)}$$

$$x = 83.6 \text{ m}$$

$$\tan(38) = \frac{x}{83.6}$$

- 8 A hiker is at the top of Mt. Fromme near Vancouver. The angle of depression to the centre of the city is  $21^\circ$  and the angle of elevation to a plane overhead is  $40^\circ$ .

If Mt. Fromme has an elevation of 1185 m, what is the altitude of the plane?



My Calculations

$$\tan(21) = \frac{1185}{x}$$

$$x = \frac{1185}{\tan(21)}$$

$$x = 3087.03 \text{ m}$$

$$\tan(40) = \frac{x}{3087.03}$$

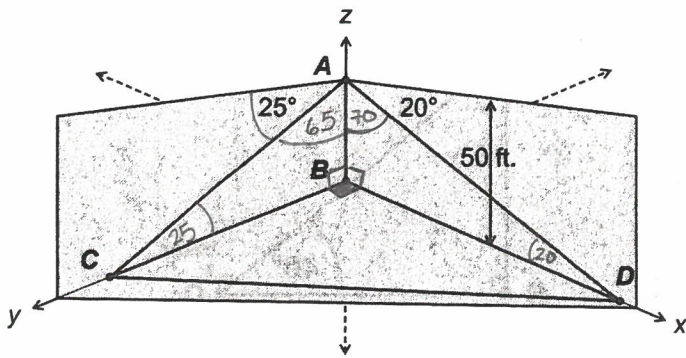
$$x = 3087.03 \tan(40)$$

$$x = 2590.325734$$

$$\text{Altitude } 2590.33 \text{ m} + 1185 \text{ m} \\ = 3775.33 \text{ m}$$

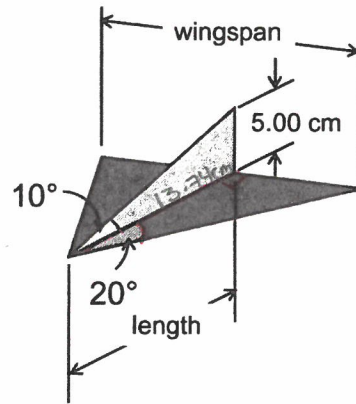
# Skill Builder

- 9** A search boat (A), spots two shipwrecks at positions (C) and (D) on the lake bottom. The angle of depression is  $25^\circ$  to C, and  $20^\circ$  to D. If the water is 50 ft. deep, how far apart are the shipwrecks to the nearest foot?



- 10** Nathan made a paper airplane similar to the one in the diagram below.

Given the dimensions shown in the diagram, calculate the length and wingspan.



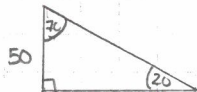
### My Calculations



$$\tan(65) = \frac{x}{50}$$

$$x = 50 \tan(65)$$

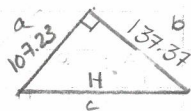
$$x = 107.23 \text{ ft}$$



$$\tan(70) = \frac{x}{50}$$

$$x = 50 \tan(70)$$

$$x = 137.37 \text{ ft}$$



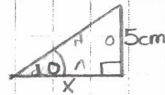
$$a^2 + b^2 = c^2$$

$$(107.23)^2 + (137.37)^2 = c^2$$

$$c = \sqrt{30368.7898}$$

$$c = 174.27 \text{ ft}$$

### My Calculations



$$\tan(10) = \frac{5}{x}$$

$$x = \frac{5}{\tan(10)}$$

$$x = 28.35 \text{ cm}$$



$$\tan(20) = \frac{x}{28.35}$$

$$x = 28.35 \tan(20)$$

$$x = 10.32 \text{ cm}$$

$$\text{Both Sides: } 2(10.32)$$

$$20.64 \text{ cm}$$