

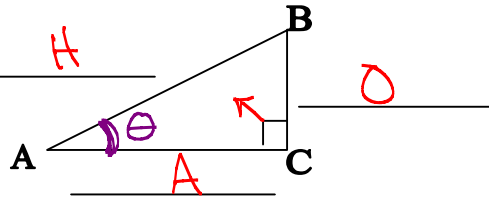
2.6/2.7 Applying the Trigonometric Ratios/Involving more than one triangle

Solving a triangle means to determine the measures of all the sides

and the angles in the triangle.

We can use any of the three primary trigonometric ratios to do this.

- useful:
- 1) $a^2 + b^2 = c^2$
 - 2) all angles in Δ add to 180°



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$$\left\{ \begin{aligned} \sin \theta &= \frac{O}{H} \\ \cos \theta &= \frac{A}{H} \\ \tan \theta &= \frac{O}{A} \end{aligned} \right.$$

Ex. #1: Solve this triangle. Give the measures to the nearest tenth where necessary.

$$\alpha: \tan \alpha = \frac{O}{A}$$

$$\tan \alpha = \frac{6}{10}$$

$$\alpha = \tan^{-1}\left(\frac{6}{10}\right)$$

$$\alpha = 31.0^\circ$$

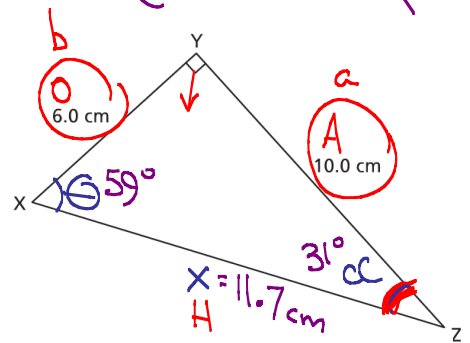
$$\theta: 180 - 90 - 31^\circ = 59^\circ$$

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

$$10^2 + 6^2 = x^2$$

$$\sqrt{136} = \sqrt{x^2}$$

$$11.7 = x$$



Ex. #2: Solve this triangle. Give the measures to the nearest tenth where necessary.

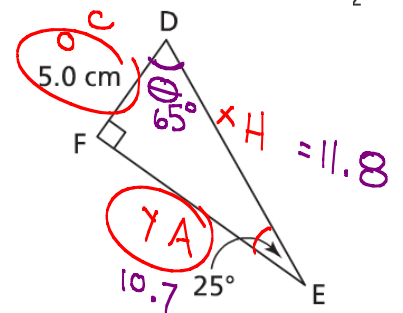
$$\frac{\sin 25^\circ}{1} = \frac{5}{x}$$

$$x = 11.8$$

$$\frac{\tan 25^\circ}{1} = \frac{5}{y}$$

$$y = 10.7$$

$$\theta: 180 - 90 - 25 = 65^\circ$$



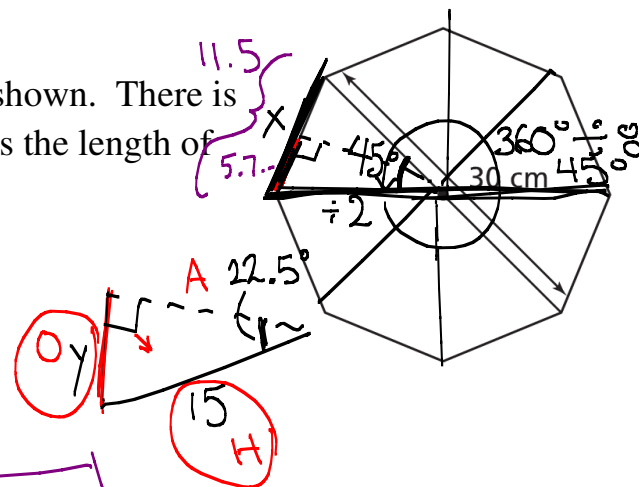
Ex. #3: A small table has the shape of a regular octagon as shown. There is a strip of wood veneer around the edge of the table. What is the length of this veneer to the nearest centimetre?

$$\sin \theta = \frac{O}{H}$$

$$\frac{\sin 22.5^\circ}{1} = \frac{y}{15}$$

$$y = 5.7 \dots \times 2 = 11.5 \dots \times 8 \text{ sides} = 92 \text{ cm}$$

approx.



* hint: find the side (or angle) that both Δ 's share!

Example #1: Calculate the length of \overline{CD} to the nearest tenth of a centimetre

$$\sin \theta = \frac{O}{H}$$

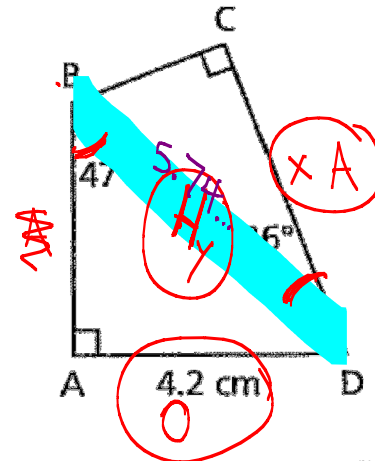
$$\sin 47^\circ = \frac{4.2}{y}$$

$$y = 5.74\dots$$

$$\cos \theta = \frac{A}{H}$$

$$\cos 26^\circ = \frac{x}{5.74\dots}$$

$$x = 5.2 \text{ cm}$$

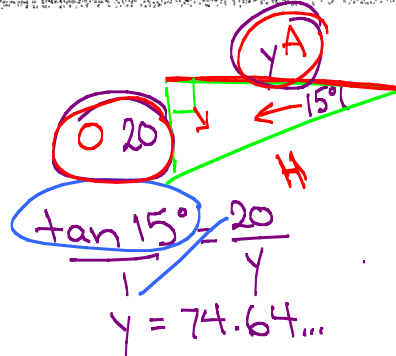
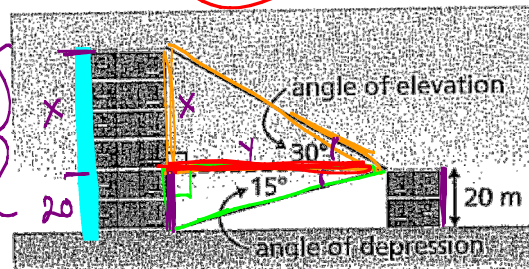
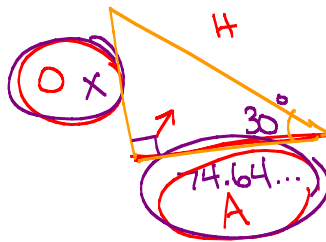


Example #2: Determine the height of the taller building to the nearest tenth of a meter.

building height = $x + 20$
 $= 43.09 + 20$
 $= 63.1 \text{ m}$

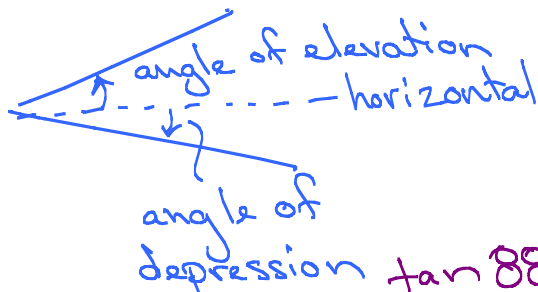
$$\tan 30^\circ = \frac{x}{74.64x + 20}$$

$$x = 43.09\dots$$



Example #3: How far apart are the fires to the nearest foot?

Tower is 10m tall.



$$\tan 85^\circ = \frac{y}{10}$$

$$y = 114.30 \text{ m}$$

$$\tan 88^\circ = \frac{z}{10}$$

$$z = 286.36$$

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

$$114.3^2 + 286.36^2 = x^2$$

$$308 \text{ m} = x$$

