

U2D11_T Trig Applications Updated

Wednesday, October 10, 2018 10:20 AM



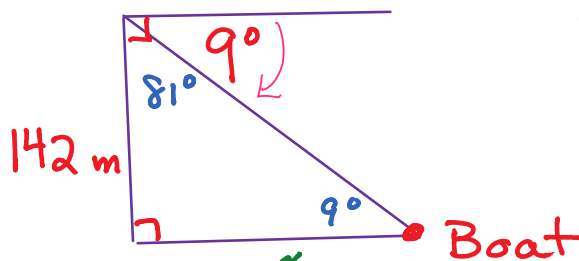
U2D11_T
Trig Appli...

* angle of depression is measured down from the HORIZONTAL.

MAP 4CI Unit 2 Day 11

Applications of Trigonometry

Ex. 1 From the top of a vertical cliff a person measures the angle of depression of a boat as 9° . The height of the cliff is 142 m. How far is the boat from the base of the cliff? Round your answer to the nearest m.



$$\frac{\tan 81^\circ}{1} \times \frac{x}{142}$$

$$x = 142 \tan 81^\circ$$

$$x = 896.55 \dots$$

$$x \approx 897 \text{ m}$$

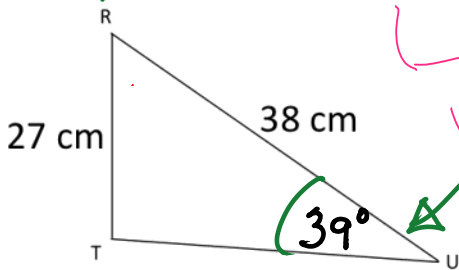
$$\frac{\tan 9^\circ}{1} \times \frac{142}{x}$$

$$\frac{(\tan 9^\circ) x = 142}{\cancel{\tan 9^\circ} \quad \cancel{\tan 9^\circ}}$$

$$x \approx 897 \text{ m}$$

two choices on how to solve, use either one

Ex. 2 Find the length of TU to the nearest tenth. ^{TYP0}
 Given: angle U is 39 degrees. ← this should be written in
 on your question paper



We have a complete side-angle pair so we use sine law.

$$\frac{\sin 39^\circ}{27} = \frac{\sin T}{38}$$

$$R = 180^\circ - 39^\circ - 62.3^\circ$$

$$R = 78.7^\circ$$

$$\sin T = 0.8857\dots$$

$$T \doteq 62.33\dots$$

$$T \doteq 62.3^\circ$$

$$\frac{r}{\sin 78.7^\circ} = \frac{27}{\sin 39^\circ}$$

$$r = 42.07\dots$$

$$r \doteq 42.1 \text{ cm}$$

$$r^2 = 27^2 + 38^2 - 2(27)(38)\cos 78.7$$

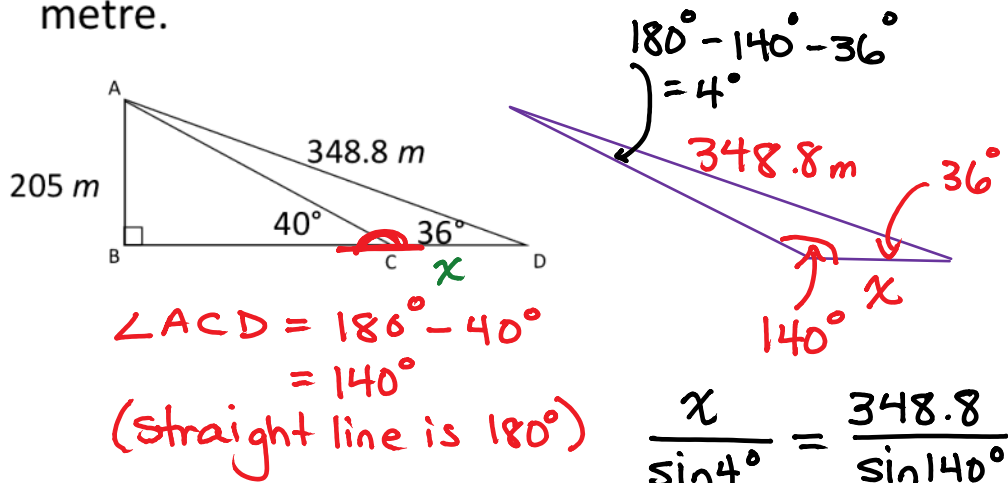
$$r^2 = 1770.91\dots$$

$$r = 42.08\dots$$

$$r \doteq 42.1 \text{ cm}$$

↖ ↗
 You may use either sine law or cosine law to solve for r.

Ex. 3 A smokestack, **AB**, is 205m high. From two points C and D on the **same side** of the smokestack's base B, the angles of elevation to the top of the smokestack are 40° and 36° respectively. The distance from the top of the smokestack to point D is 348.8 m. Find the distance between C and D to the nearest metre.

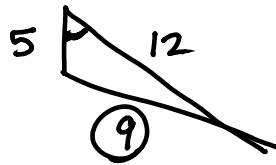
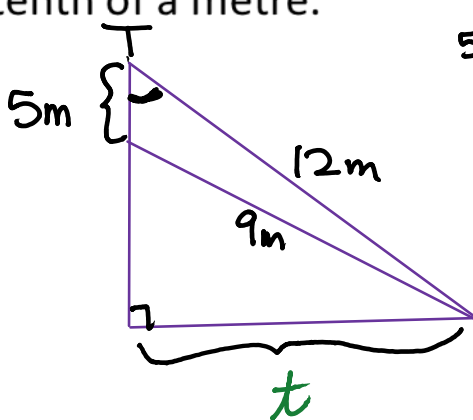


$$x = 37.85\dots$$

$$x \approx 38 \text{ m}$$

\therefore it is about 38m from C to D.

Ex. 4 Two guy-wires are anchored at the same point. The first guy-wire is 12 m in length and is attached to the top of a tower. The second guy-wire is 9 m in length and is attached to a point 5 m below the top of the tower. How far are the wires anchored from the base of the tower? Round your answer to the nearest tenth of a metre.



$$\cos T = \frac{5^2 + 12^2 - 9^2}{2(5)(12)}$$

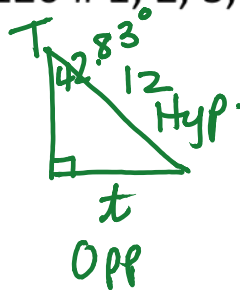
$$= \frac{88}{120}$$

$$T = \cos^{-1}(88 \div 120)$$

$$T \doteq 42.833 \dots$$

U2D11 Practice: Pg 126 # 1, 2, 3, 5, 7, 9, 11

✓ Answers Pg. 542



$$\sin T = \frac{t}{12}$$

$$t = 12 \sin 42.833^\circ$$

$$t \doteq 8.158 \dots$$

$$t \doteq 8.2$$

∴ the guy wires are 8.2 m from the base of the tower.