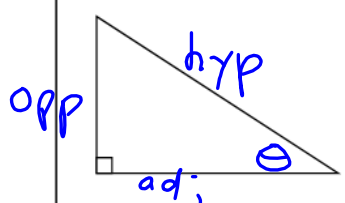


Solving Triangles – Choosing the Correct Tool

Formula Sheet

Right Triangles



SOH CAH TOA

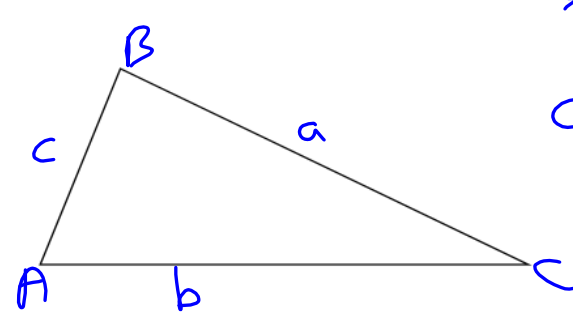
$$\sin \theta = \frac{\text{opp}}{\text{hyp}}$$

$$\cos \theta = \frac{\text{adj}}{\text{hyp}}$$

$$\tan \theta = \frac{\text{opp}}{\text{adj}}$$

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

Any Triangle



$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$c^2 = a^2 + b^2 - 2ab \cos C$$

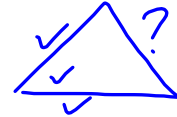
$$\cos C = \frac{a^2 + b^2 - c^2}{2ab}$$

$$A + B + C = 180^\circ$$

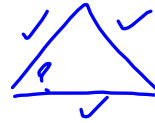
How do I decide what to use??

- Do you have a right triangle?
 - If so use SOH CAH TOA to find side/angle or use Pythagorean theorem to find a side if you already have two sides.

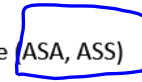
- Are you given side-angle-side (SAS - in that order) and looking for a third side?
 - Use Cosine Law.



- Are you given three sides (SSS) and looking for an angle?
 - Use Cosine Law – rearranged to find an angle.

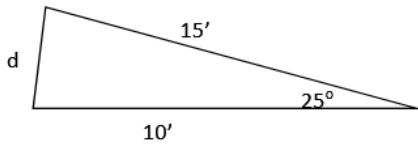


- None of the above, but still have three pieces of information about the triangle (ASA, ASS)
 - Use Sine Law to solve for a missing side or missing angle.



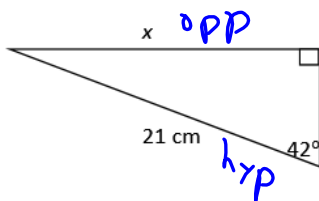
- If you do not have at least three measurements, or all of your measurements are angles (AAA) you are not able to proceed.

Examples – Find the unknown variable in each diagram.



$$d^2 = 15^2 + 10^2 - 2(15)(10)\cos 25^\circ$$

$$d \doteq 7.3'$$



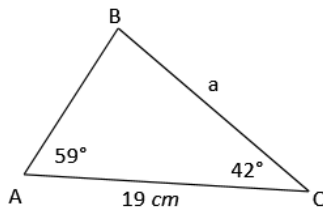
$$\sin 42^\circ = \frac{x}{21}$$

$$x = 21 \sin 42^\circ$$

$$x \doteq 14 \text{ cm}$$

MPM2D

Unit 6, Lesson 9



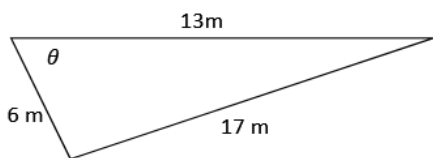
$$\frac{a}{\sin 59} = \frac{19}{\sin 79^\circ}$$

$$a = \frac{19 \sin 59^\circ}{\sin 79^\circ}$$

$$a \doteq 16.6 \text{ cm}$$

$$B = 180 - 59 - 42$$

$$B = 79^\circ$$

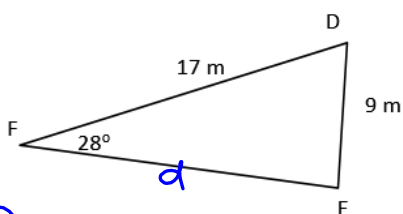


$$\cos \theta = \frac{6^2 + 13^2 - 17^2}{2(13)(6)}$$

$$\cos \theta = \frac{-84}{156}$$

$$\theta = \cos^{-1}\left(\frac{-84}{156}\right)$$

$$\theta \doteq 123^\circ$$

Solve the acute triangle below.

$$\frac{\sin E}{17} = \frac{\sin 28^\circ}{9}$$

$$\sin E = \frac{17 \sin 28^\circ}{9}$$

$$\sin E = 0.8867$$

$$E = \sin^{-1}(0.8867)$$

$$D = 180 - 28 - 62.5$$

$$D = 89.5^\circ$$

$$E \doteq 62.5^\circ$$

$$d^2 = 9^2 + 17^2 - 2(9)(17)\cos 89.5^\circ$$

$$d \doteq 19 \text{ m}$$

Text page 375 #13, 14, 17 and page 390 #6, 7