

Ways to solve for all angles and sides of a triangle:

****For any triangle, ALL angles of a triangle add to 180°

*If it is a right triangle and you are given 2 sides use Pythagorean Theorem to find the missing side.

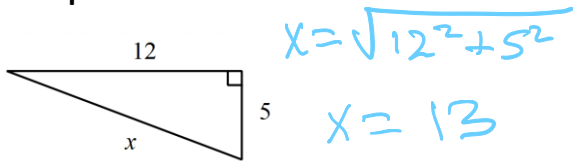
$$a^2 + b^2 = c^2 \quad c = \sqrt{a^2 + b^2} \quad a = \sqrt{c^2 - b^2}$$

*If it is a right triangle and you are given a side and an angle use right triangle trig to find the missing side.

****Way to remember: SOH - CAH - TOA

*If it is a right triangle and you are given 2 sides use inverse trig to find the missing angle.

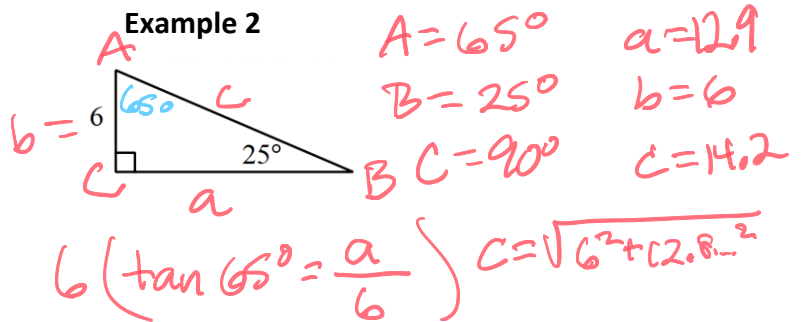
Example 1



$$x = \sqrt{12^2 + 5^2}$$

$$x = 13$$

Example 2



$$A = 65^\circ \quad a = 12.9$$

$$B = 25^\circ \quad b = 6$$

$$C = 90^\circ \quad c = 14.2$$

$$6 \left(\tan 65^\circ = \frac{a}{6} \right) \quad c = \sqrt{6^2 + (2.8)^2}$$

Ways to solve for all angles and sides of a triangle:

****For any triangle, ALL angles of a triangle add to _____

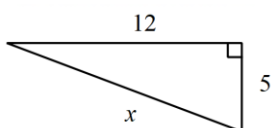
*If it is a right triangle and you are given 2 sides use _____ to find the missing side.

*If it is a right triangle and you are given a side and an angle use _____ to find the missing side.

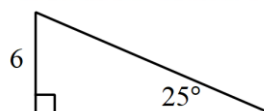
****Way to remember:

*If it is a right triangle and you are given 2 sides use _____ to find the missing angle.

Example 1



Example 2



*If the triangle is an oblique triangle, but follows SSA, ASA, or AAS pattern, use Law of Sines.

FORMULA:

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

****Remember: If it is SSA, then it is ambiguous and could have 0, 1, or 2 triangles.

*To find how many triangles: ① error = no triangle

② found angle < given angle = 1 Δ

③ found angle > given angle = 2 Δ's

Example 1:

$a = 15, c = 13, \angle C = 35^\circ$

$$\left(\frac{\sin A}{15} = \frac{\sin 35^\circ}{13}\right) 15$$

$$B_1 = 180^\circ - 35^\circ - 41.4^\circ \approx 103.6^\circ$$

$$\left(\frac{b}{\sin 103.6^\circ} = \frac{13}{\sin 35^\circ}\right) \sin 103.6^\circ$$

$$b_1 = 22.0$$

$$\sin^{-1}\left(\frac{15 \sin 35^\circ}{13}\right) = A_1 = 41.4^\circ$$

To find second triangle:

① $180^\circ - 13^\circ$ found \angle = new angle

② $180^\circ - \text{given angle} - \rightarrow = 3rd \angle$

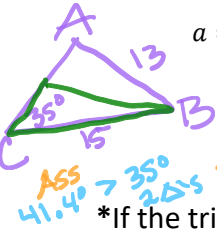
③ law of sines to find side

$$180^\circ - 41.4^\circ = A_2 = 138.6^\circ$$

$$180^\circ - 35^\circ - 138.6^\circ = B_2 = 6.4^\circ$$

$$\left(\frac{b}{\sin 6.4^\circ} = \frac{13}{\sin 35^\circ}\right) \sin 6.4^\circ$$

$$b_2 = 2.5$$

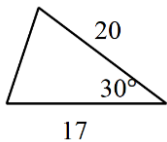


*If the triangle is an oblique triangle, but follows SSS or SAS pattern, use Law of Cosines.

FORMULA:

$$a^2 = b^2 + c^2 - 2bc \cos A$$

Example 1:



*If the triangle is an oblique triangle, but follows _____, _____, or _____ pattern, use Law of Sines.

FORMULA:

****Remember: If it is _____, then it is ambiguous and could have 0, 1, or 2 triangles.

*To find how many triangles:

To find second triangle:

Example 1:

$a = 15, c = 13, \angle C = 35^\circ$

*If the triangle is an oblique triangle, but follows _____ or _____ pattern, use Law of Cosines.

FORMULA:

Example 1:

