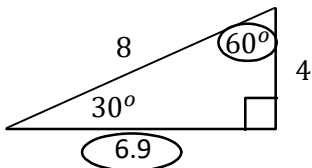
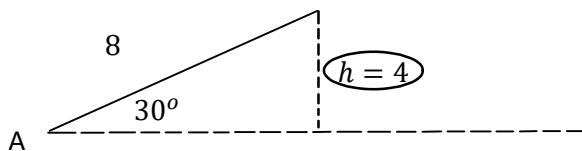


C11 - 2.12 - Ambiguous Case of Sine (ASS) Notes

How many triangles? Solve the triangles.

Remember: Always find the height first.

$$\angle A = 30^\circ, b = 8, a = 4$$



$$\sin \theta = \frac{O}{H} = \frac{h}{8}$$

$$\sin 30^\circ = \frac{h}{8}$$

$$8 \sin 30^\circ = h$$

$$4 = h$$

$$h = 4$$

$$\cos \theta = \frac{A}{H} = \frac{A}{8}$$

$$\cos 30^\circ = \frac{A}{8}$$

$$8 \cos 30^\circ = A$$

$$6.9 = A$$

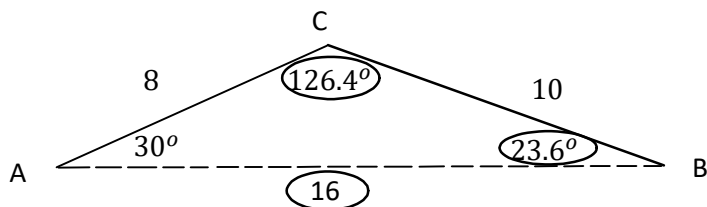
$$A = 6.9$$

$a = h$
One triangle

$$\theta = 180^\circ - 30^\circ - 90^\circ$$

$$\theta = 60^\circ$$

$$\angle A = 30^\circ, b = 8, a = 10$$



$10 > 8$
 $a > b$
One triangle

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

$$\frac{\sin B}{8} = \frac{\sin 30^\circ}{10}$$

$$\frac{\sin B}{8} = 0.05$$

$$8 \times \frac{\sin B}{8} = 0.05 \times 8$$

$$\sin B = 0.4$$

$$B = \sin^{-1} 0.4$$

$$B = 23.6^\circ$$

$$\theta = 180^\circ - 23.6^\circ - 30^\circ$$

$$\theta = 126.4^\circ$$

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

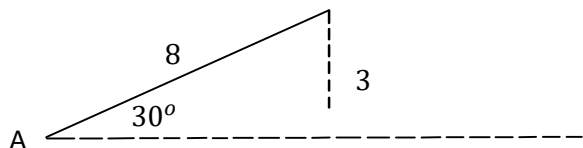
$$\frac{c}{\sin 126.4^\circ} = \frac{10}{\sin 30^\circ}$$

$$\frac{c}{0.8} = 20$$

$$0.8 \times \frac{c}{0.8} = 20 \times 0.8$$

$$c = 16$$

$$\angle A = 30^\circ, b = 8, a = 3$$



$3 < 4$
 $a < H$
no triangle

No triangle, can't solve.

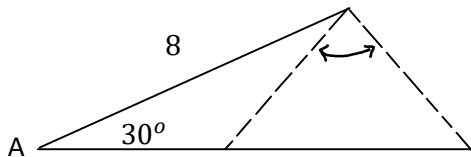
C11 - 2.12 - Ambiguous Case of Sine (ASS) Notes

How many triangles? Solve the triangles.

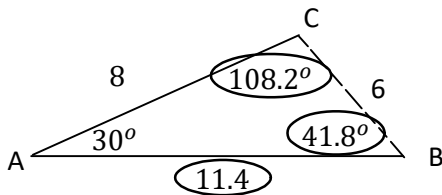
Remember: Always find the height first.

$$\angle A = 30^\circ, b = 8, a = 6$$

$4 < 6 < 8$ $H < a < B$ Two triangles



Draw both triangles together and separately.



$$\frac{\sin 30^\circ}{6} = \frac{\sin B}{8}$$

$$0.08\bar{3} = \frac{\sin B}{8}$$

$$8 \times 0.08\bar{3} = \frac{\sin B}{8} \times 8$$

$$0.\bar{6} = \sin B$$

$$\sin B = 0.\bar{6}$$

$$B = \sin^{-1} 0.\bar{6}$$

$$B = 41.8^\circ$$

$$\theta = 180^\circ - 30^\circ - 41.8^\circ$$

$$\theta = 108.2^\circ$$

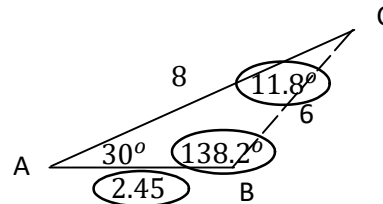
$$\frac{c}{\sin C} = \frac{a}{\sin A}$$

$$\frac{c}{\sin 108.2^\circ} = \frac{6}{\sin 30^\circ}$$

$$\frac{0.95}{c} = 12$$

$$0.95 \times \frac{c}{0.95} = 12 \times 0.95$$

$$c = 11.4$$



$$\theta = 180^\circ - 41.8^\circ$$

$$\theta = 138.2^\circ$$

$$\theta = 180^\circ - 30^\circ - 138.2^\circ$$

$$\theta = 11.8^\circ$$

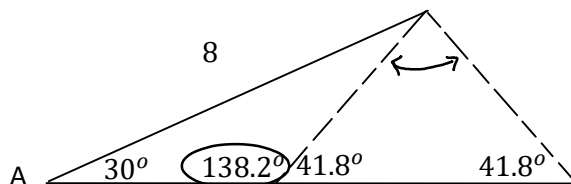
$$\frac{c}{\sin C} = \frac{a}{\sin A}$$

$$\frac{\sin 11.8^\circ}{c} = \frac{6}{\sin 30^\circ}$$

$$\frac{0.204}{c} = 12$$

$$0.204 \times \frac{c}{0.204} = 12 \times 0.204$$

$$c = 2.45$$



Notice: Both triangles have an angle of 30° , a side going up of 8, and a side opposite to 30° of 6.

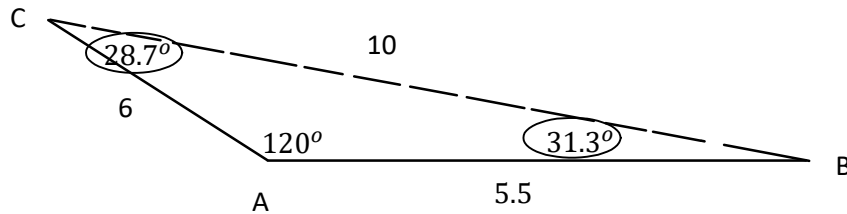
Notice: The isosceles triangle.

C11 - 2.12 - Ambiguous Case of Sine (ASS) Notes

How many triangles? Solve the triangles.

$10 > 6$
 $a > b$
One triangle

$\angle A = 120^\circ, b = 6, a = 10$



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

$$\frac{\sin B}{6} = \frac{\sin 120^\circ}{10}$$

$$\frac{\sin B}{6} = 0.0866$$

$$6 \times \frac{\sin B}{6} = 0.0866 \times 6$$

$$\sin B = 0.52$$

$$B = \sin^{-1} 0.52$$

$B = 31.3^\circ$

$$\theta = 180^\circ - 31.3^\circ - 120^\circ$$

$\theta = 28.7^\circ$

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

$$\frac{c}{\sin 28.7^\circ} = \frac{10}{\sin 120^\circ}$$

$$\frac{0.48}{c} = 11.55$$

$$0.48 \times \frac{c}{0.48} = 11.55 \times 0.48$$

$c = 5.5$

$\angle A = 120^\circ, b = 6, a = 4$

$4 < 6$
 $a < b$
No triangle

No triangle. Can't solve.

