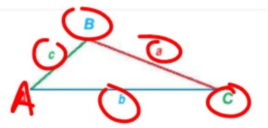
Geometry 8.6
Use the law of sines* to solve triangles
Use the law of cosines* to solve triangles

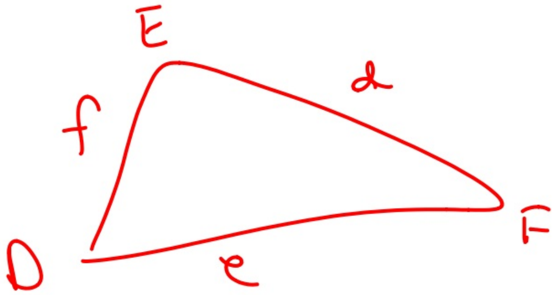
*memorize



right triangle
oblique triangle not rt.
sine Soh
cosine Cah RT Δ only
tangent Toa
proportion
triangle sum theorem 180
law of sines
law of cosines

whiteboards

Triangle naming rules:



Must know (or be able to get) a pair...

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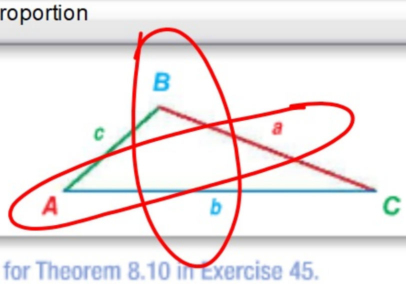
Theorem 8.10 Law of Sines Proportion

If $\triangle ABC$ has lengths a, b, and c, representing the lengths of the sides opposite the angles with measures A, B, and C, then

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



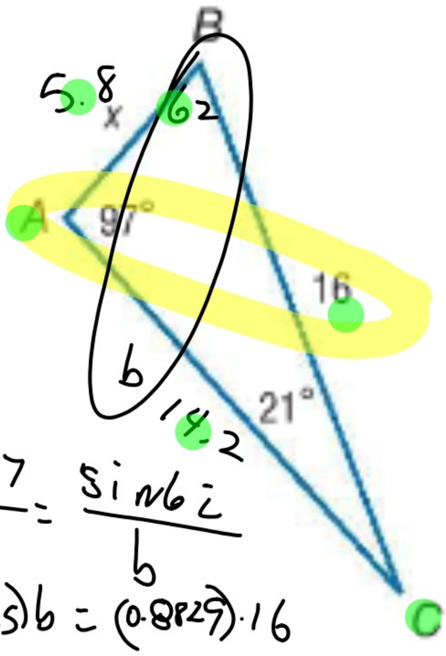
You will prove one of the proportions for Theorem 8.10 in Exercise 45.

You can use the Law of Sines to solve a triangle if you know the measures of two angles and any side (AAS or ASA).

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

Example 1 Law of Sines (AAS)

Find x. Round to the nearest tenth.



$$\frac{\sin 97}{16} = \frac{\sin 21}{x}$$

$$(0.9925)x = (\quad)16$$

$$0.99256x = 5.733887$$

$$x = 5.8$$

$$\frac{\sin 97}{16} = \frac{\sin 62}{b}$$

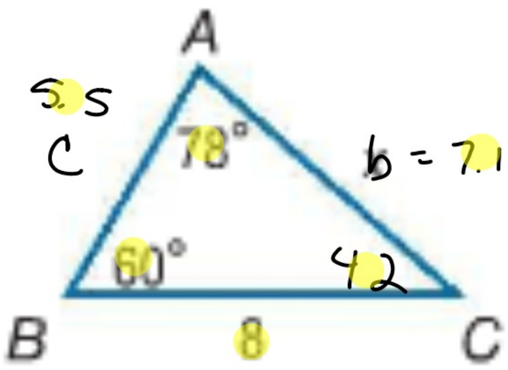
$$(0.9925)b = (0.8829)\cdot 16$$

nearest 10th

Guided Practice

Solve

1A.



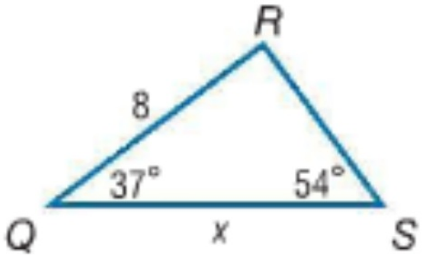
$$\frac{\sin 78}{8} = \frac{\sin 60}{b}$$

$b = 7.1$

$$\frac{\sin 78}{8} = \frac{\sin 42}{c}$$

$c = 5.5$

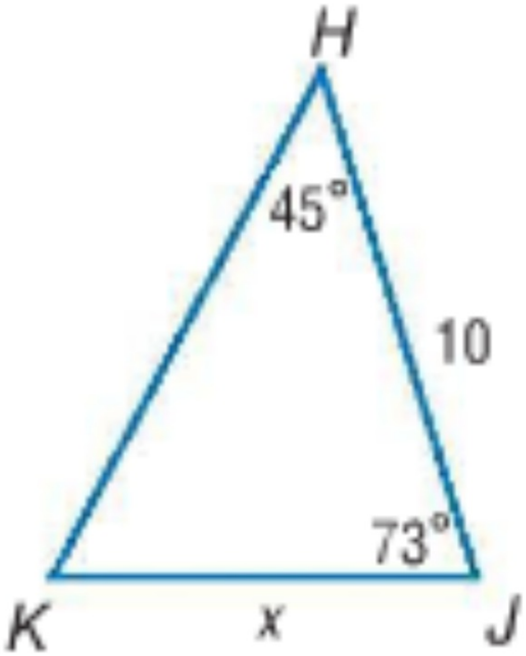
1B.



ASA: Must have a pair...

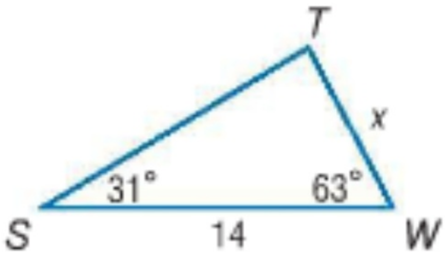
Example 2 Law of Sines (ASA)

Find x. Round to the nearest tenth.

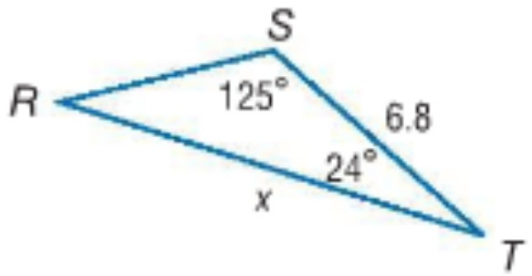


GuidedPractice

2A.



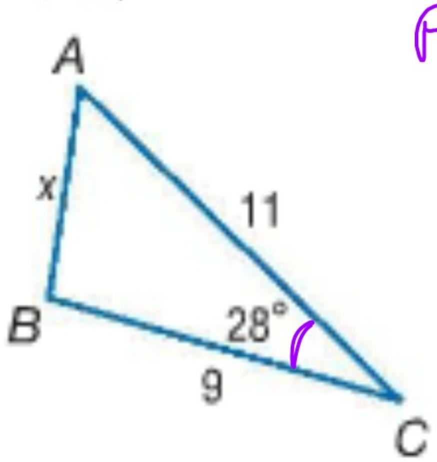
2B.



Example 3 Law of Cosines (SAS)

Find x. Round to the nearest tenth.

L.O.C.



What if you don't have a pair S-A?

p592

1-4, 8, 9,

12-20

SAS: Don't need a pair

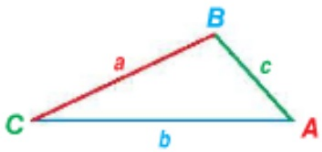
Theorem 8.11 Law of Cosines Jeremiah was a bullfrog...

If $\triangle ABC$ has lengths a, b, and c, representing the lengths of the sides opposite the angles with measures A, B, and C, then

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

$b^2 = a^2 + c^2 - 2ac \cos B$, and

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

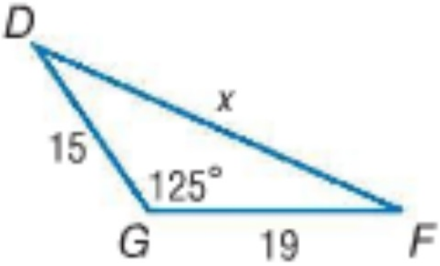


You will prove one of the equations for Theorem 8.11 in Exercise 46.

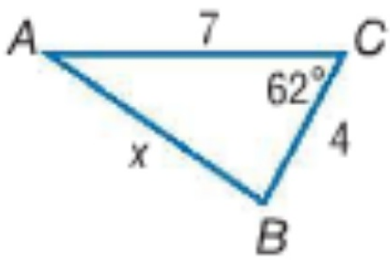
You can use the **Law of Cosines** to solve a triangle if you know the measures of two sides and the included angle (SAS).

Find x. Round to the nearest tenth.

3A.



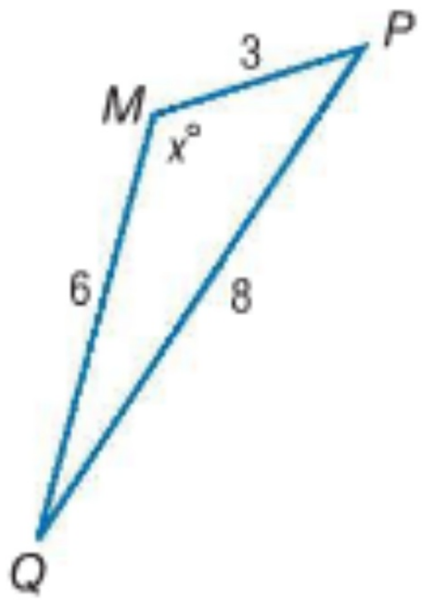
3B.



Example 4 Law of Cosines (SSS)

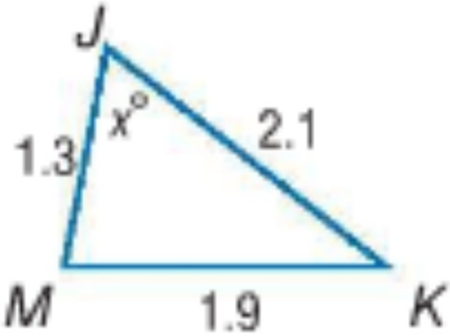
Find x. Round to the nearest degree.

Be careful with order of operations.



GuidedPractice

4A.



4B.