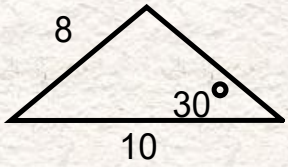
What to look for:

Jan. 7, 2016 Dec. 3, 2012

Mar. 9, 2020

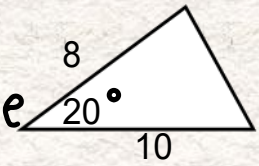
1. Is the triangle right-angled?
SOHCAHTOA

2. Can you use the **Law of Sines**?
Angle and opposite side



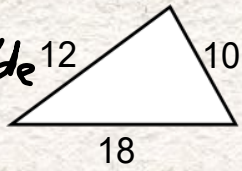
3. Can you use the **Law of Cosines**?
-- SAS

Side-angle-side



-- SSS

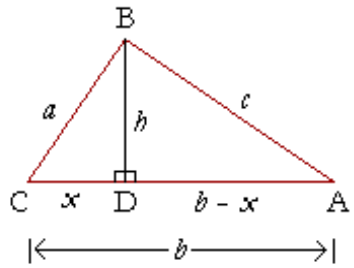
Side-side-side



Proving The Cosine Law:

Jan. 6, 2016 Nov. 30, 2012

Mar. 9, 2020



Let ABC be a triangle with sides a, b, c. We will show

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

(The trigonometric functions are defined in terms of a right-angled triangle.

$\frac{x}{a} = \cos C,$

$x = a \cos C \ldots\ldots\ldots (1)$

Now, in the right triangle BDC, according to the Pythagorean theorem,

$$h^2 + x^2 = a^2,$$

so that

$$h^2 = a^2 - x^2 \ldots\ldots\ldots (2)$$

In the right triangle BDA,

$$c^2 = h^2 + (b - x)^2$$
$$= h^2 + b^2 - 2bx + x^2.$$

(The square of a binomial)

For h^2, let us substitute line (2):

$$= a^2 - x^2 + b^2 - 2bx + x^2$$
$$= a^2 + b^2 - 2bx.$$

Finally, for x, let us substitute line (1):

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

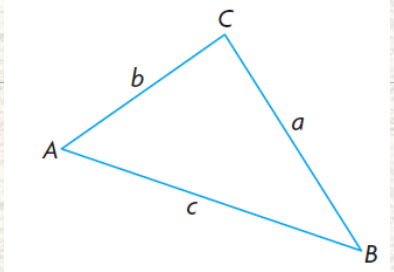
That is,

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

The Cosine Law

Nov. 30, 2012

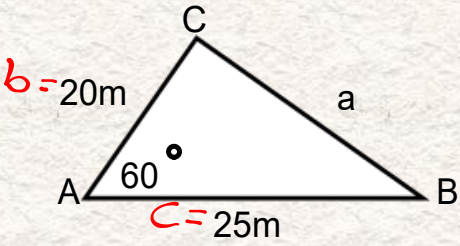
Mar. 9, 2020



$$a^2 = b^2 + c^2 - 2bc\cos A$$
$$b^2 = a^2 + c^2 - 2ac\cos B$$
$$c^2 = a^2 + b^2 - 2ab\cos C$$

Two conditions:

1. SAS - looking for a side (given a contained angle)



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

$a^2 = 20^2 + 25^2 - 2(20)(25)\cos 60°$

$a^2 = 400 + 625 - 500$

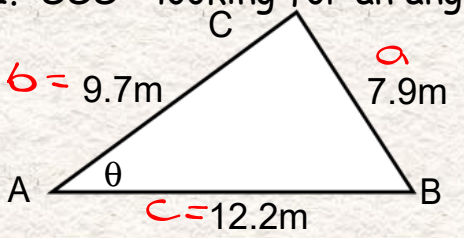
$a^2 = 525$

$a = \sqrt{525}$

$a = 22.9\text{ m}$

$a^2 = b^2 + c^2 - 2bc\cos A$ | $\cos A = \dfrac{b^2 + c^2 - a^2}{2bc}$

2. SSS - looking for an angle



$\cos A = \dfrac{(9.7)^2 + (12.2)^2 - (7.9)^2}{2(9.7)(12.2)}$

$\cos A = \dfrac{180.5}{236.7}$

$\angle A = \cos^{-1}(0.76\ldots)$

$\angle A = 40°$

Page 137 #4,5,8

Attachments

PM11-3s2.gsp