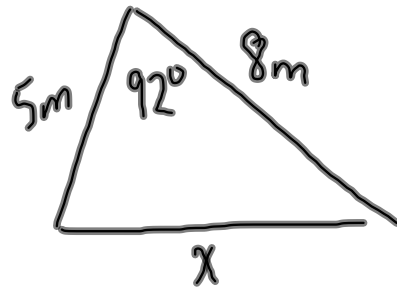
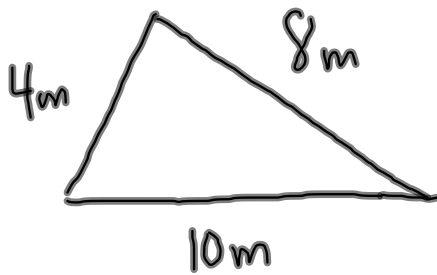
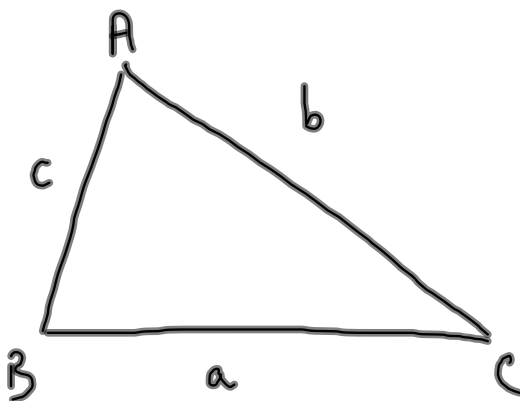


Law of Cosines



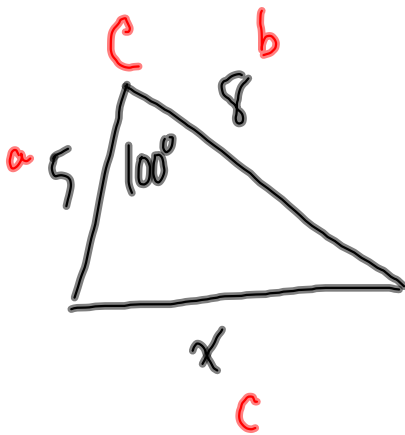
When you have a non-right triangle and you know: 3 sides and no angles or two sides and the angle between them the law of sines is not helpful.



Law of Cosines

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

opposite

Example 1

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

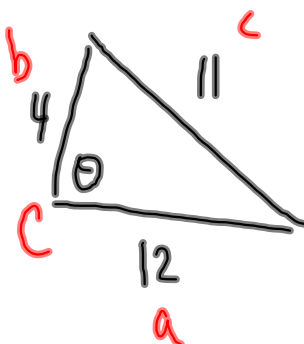
$$x^2 = 5^2 + 8^2 - [2(5)(8) \cos 100^\circ]$$

$$x^2 = 25 + 64 - (-13.89)$$

$$x^2 = 102.89$$

$$x = 10.1$$

↑
cosines of
angles $> 90^\circ$
are neg.
be careful!

Example 2

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

$$11^2 = 4^2 + 12^2 - 2(4)(12) \cos \theta$$

$$121 = 16 + 144 - 96 \cos \theta$$

$$121 = 160 - 96 \cos \theta$$

$$121 - 160 = -96 \cos \theta$$

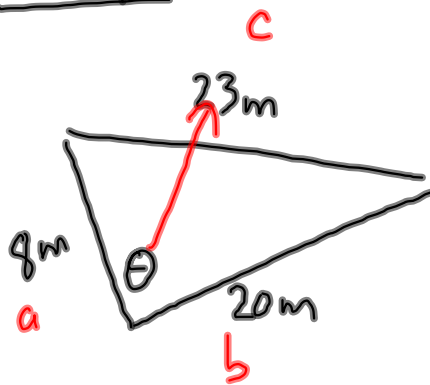
$$-39 = -96 \cos \theta$$

$$\cos \theta = \frac{-39}{-96}$$

$$\theta = \cos^{-1} \left(\frac{-39}{-96} \right)$$

$$\theta = 66^\circ$$

Example 3



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

$$23^2 = 8^2 + 20^2 - 2(8)(20) \cos \theta$$

$$529 = 64 + 400 - 320 \cos \theta$$

$$529 = 464 - 320 \cos \theta$$

$$529 - 464 = -320 \cos \theta$$

$$65 = -320 \cos \theta$$

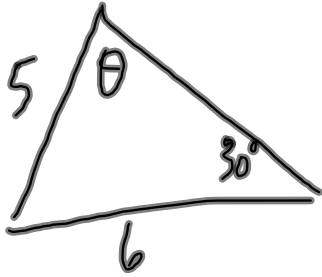
$$\cos \theta = \frac{65}{-320}$$

TO DO

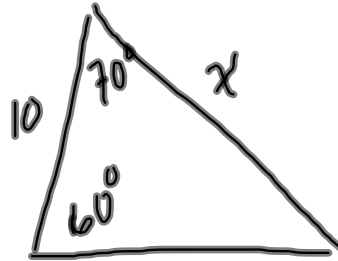
p259/8,9,10a,b,11,12,13

$$\theta = \cos^{-1} \left(\frac{65}{-320} \right)$$

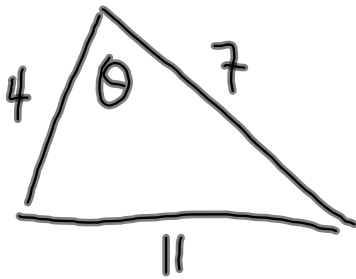
$$\theta = 102^\circ$$



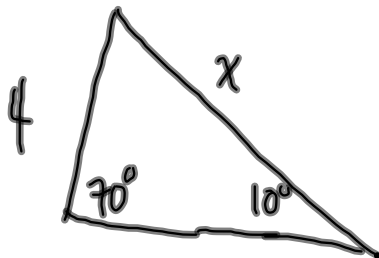
Law of Sines.



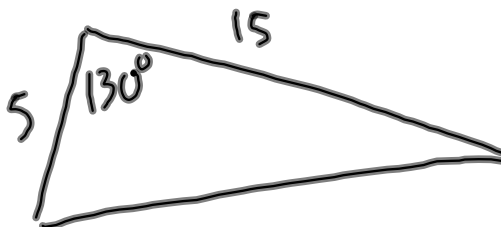
Law of Sines



Law of Cosines



Law of Sines



Law of Cosines