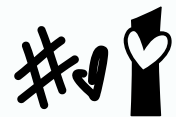


If you were given all three side lengths of a triangle... which Law would you use?



If you were given all three side lengths of a triangle... which Law would you use?

Law of cosines

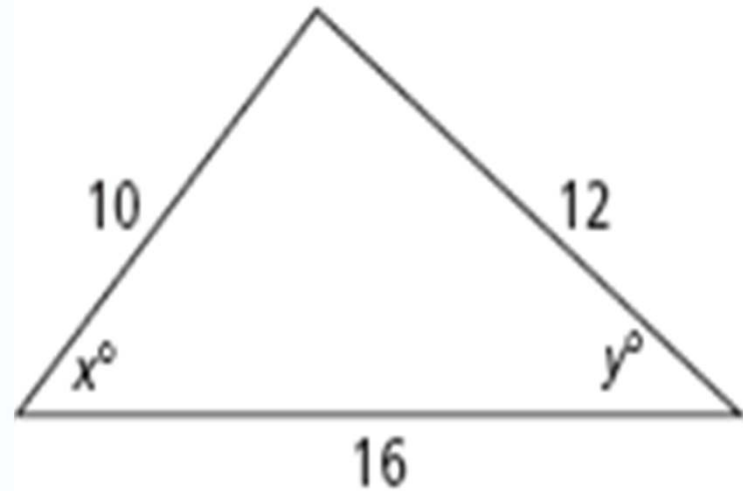


If you were given one angle not in between the two given side lengths of a triangle... which Law would you use?

If you were given one angle not in between the two given side lengths of a triangle... which Law would you use?

Law of Sines

Use the Law of Cosines to find angle x .



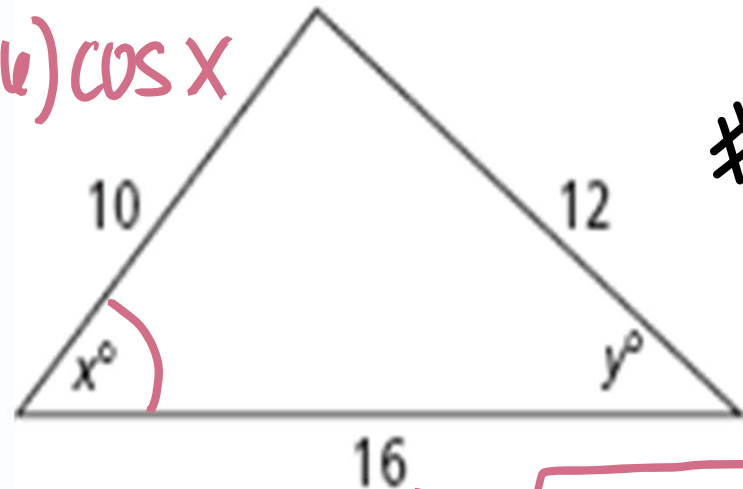
Use the Law of Cosines to find angle x.

$$12^2 = 10^2 + 16^2 - 2(10)(16)\cos X$$

$$144 = 356 - 320 \cdot \cos X$$

$$\frac{-212}{-320} = \frac{-320 \cdot \cos X}{-320}$$

$$0.6625 = \cos X \Rightarrow \cos^{-1}(0.6625) \approx \boxed{48.51^\circ}$$



#3

In $\triangle PQR$, $m\angle Q = 110$, $PQ = 8$, and $QR = 12$. To the nearest tenth, what is PR ?



In $\triangle PQR$, $m\angle Q = 110$, $PQ = 8$, and $QR = 12$. To the nearest tenth, what is PR ?

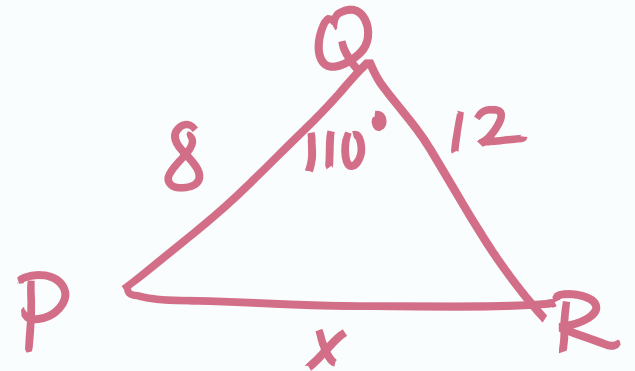
* use LOC *

$$x^2 = 8^2 + 12^2 - 2(8)(12)\cos 110$$

$$x^2 = 208 - 192\cos 110$$

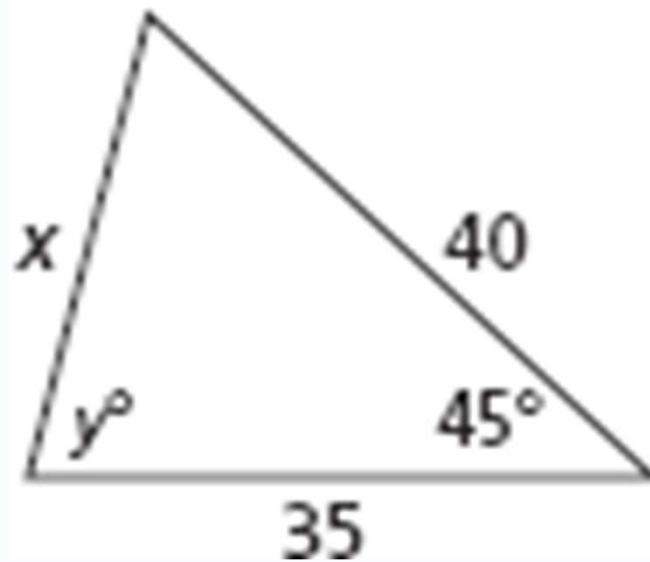
$$\sqrt{x^2} \approx \sqrt{273.667\dots}$$

$$\boxed{x \approx 16.54}$$



#4

Use the Law of Cosines to find x .



#5

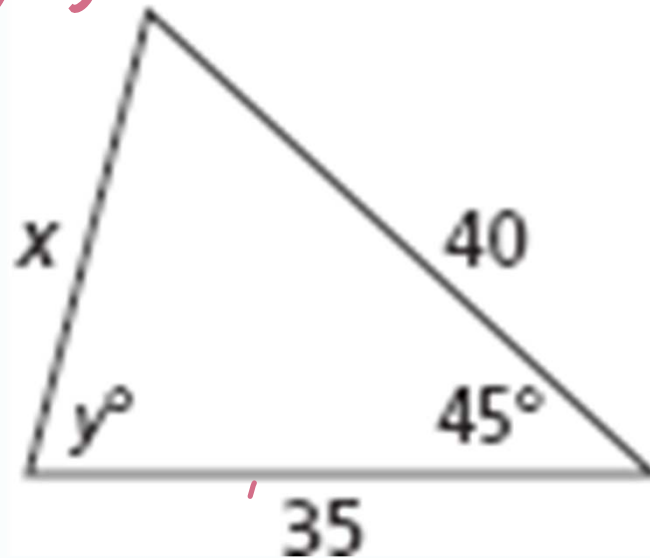
Use the Law of Cosines to find x.

$$x^2 = 40^2 + 35^2 - 2(40)(35) \cdot \cos 45$$

$$x^2 = 2825 - 2800 \cdot \cos 45$$

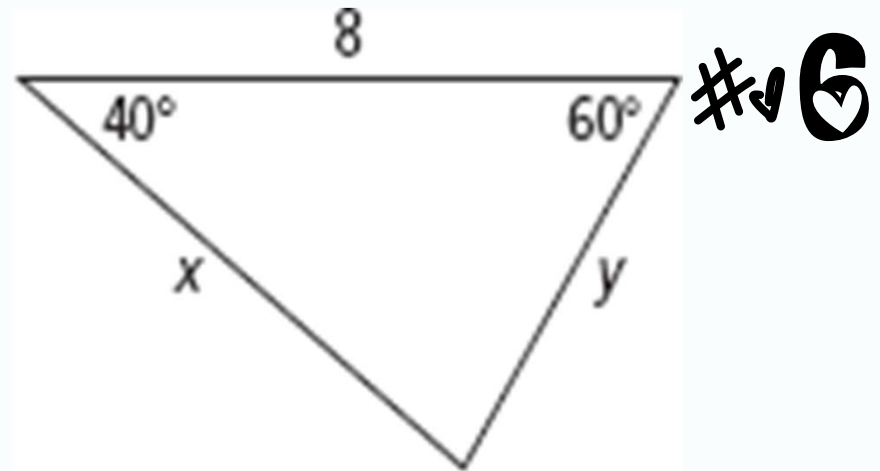
$$\sqrt{x^2} \approx \sqrt{845.10 \dots}$$

$$x \approx 29.07$$



#5

Use the Law of Sines to find x .



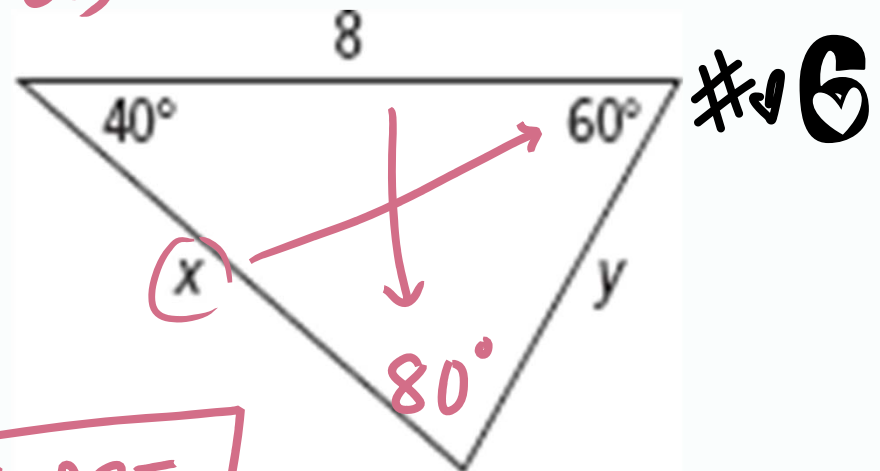
Use the Law of Sines to find x.

1st Find missing $\angle \Rightarrow 180 - (40 + 60)$

$180 - 100$
 80°

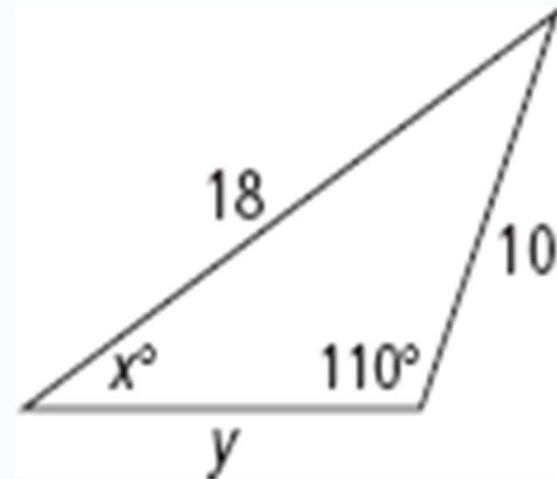
2nd
$$\frac{\sin 80}{8} = \frac{\sin 60}{x}$$

$$\frac{x \cdot \sin 80}{\sin 80} = \frac{8 \cdot \sin 60}{\sin 80} \Rightarrow \boxed{7.035}$$



#7

Use the Law of Sines to find x .



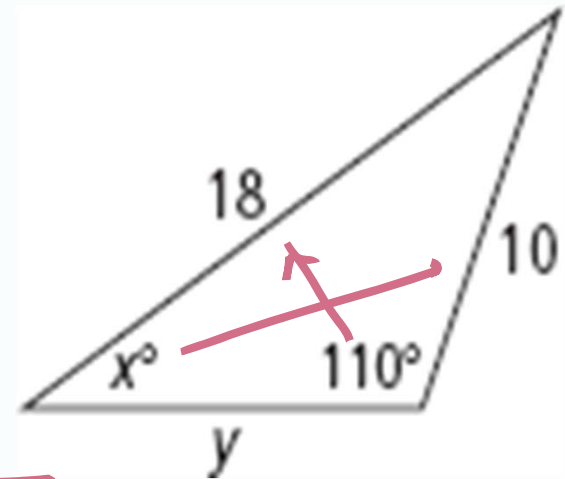
#7

Use the Law of Sines to find x .

$$\frac{\sin 110}{18} = \frac{\sin x}{10}$$

$$\frac{10 \cdot \sin 110}{18} = \frac{18 \cdot \sin x}{18}$$

$$\sin^{-1}\left(\frac{10 \cdot \sin 110}{18}\right) = x \Rightarrow \boxed{31.47^\circ}$$



In $\triangle XYZ$, $m\angle Y = 100$, $z = 10$, and $y = 24$.
To the nearest tenth, what is $m\angle Z$?



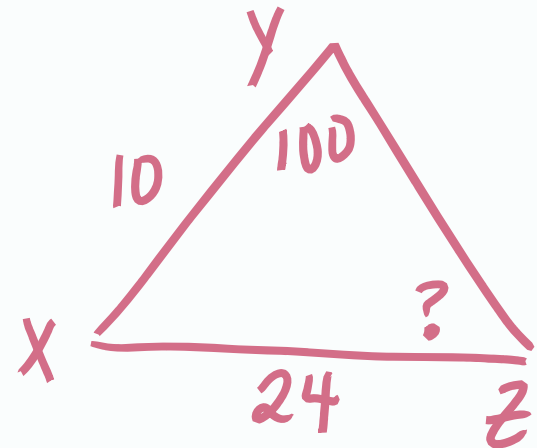
In $\triangle XYZ$, $m\angle Y = 100$, $z = 10$, and $y = 24$.
To the nearest tenth, what is $m\angle Z$?

★ Use Law of Sines!

$$\frac{\sin 100}{24} = \frac{\sin z}{10}$$


$$\frac{10 \cdot \sin 100}{24} = \frac{24 \cdot \sin z}{24}$$

$$\sin^{-1}\left(\frac{10 \cdot \sin 100}{24}\right) = m\angle z \Rightarrow$$



$$\boxed{24.23^\circ}$$

#28



If a given triangle has side lengths
 $a = 8$, $b = 11$, and $c = 13$...

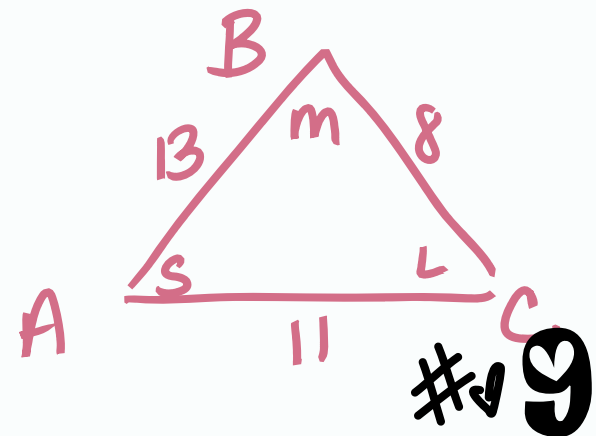
- List the angles from smallest to largest.

#9

If a given triangle has side lengths $a = 8$, $b = 11$, and $c = 13$...

– List the angles from smallest to largest.

$m\angle A$, $m\angle B$, $m\angle C$



If a given triangle has side lengths
 $a = 8$, $b = 11$, and $c = 13$...

– Find the $m\angle C$ using the Law of Cosines



If a given triangle has side lengths $a = 8$, $b = 11$, and $c = 13$...

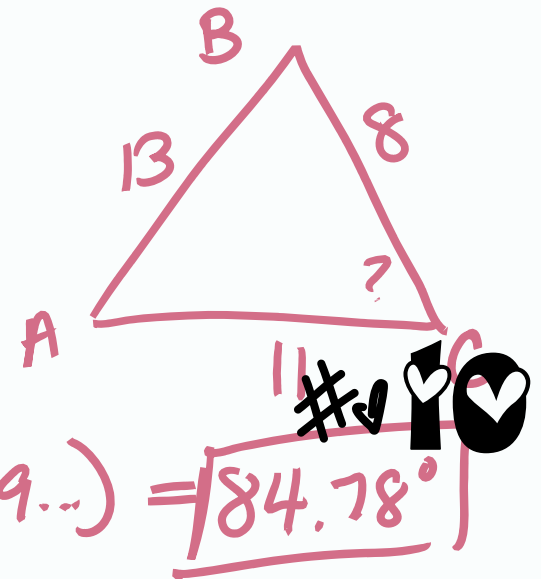
– Find the $m\angle C$ using the Law of Cosines

$$13^2 = 11^2 + 8^2 - 2(11)(8) \cdot \cos C$$

$$169 = 185 - 176 \cos C$$

$$\frac{-16}{-176} = \frac{-176 \cos C}{-176}$$

$$.0909... = \cos C \Rightarrow \cos^{-1}(.0909...) = \boxed{84.78^\circ}$$



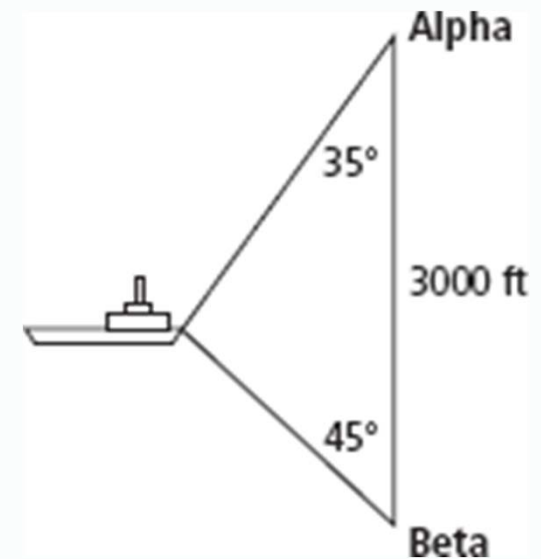


Use the Law of Sines to solve below.

Two Coast Guard ships, the Alpha and the Beta, are 3000 ft apart. The angles from a line between the Coast Guard ships to a disabled ship are shown in the diagram at the right.

How far is the disabled ship from the Alpha ship?

Round your answers to the nearest foot.



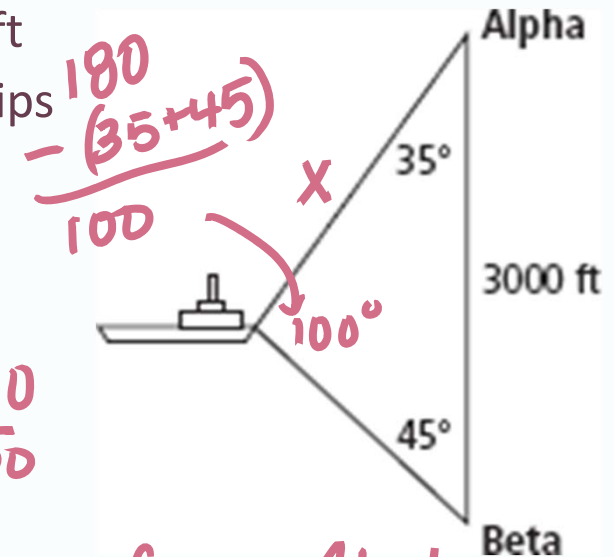


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Round your answers to the nearest foot.



$$\frac{\sin 45}{X} = \frac{\sin 100}{3000} \Rightarrow \frac{3000 \cdot \sin 45}{\sin 100} = \frac{X \cdot \sin 100}{\sin 100}$$

$$X \approx 2154 \text{ feet from Alpha}$$