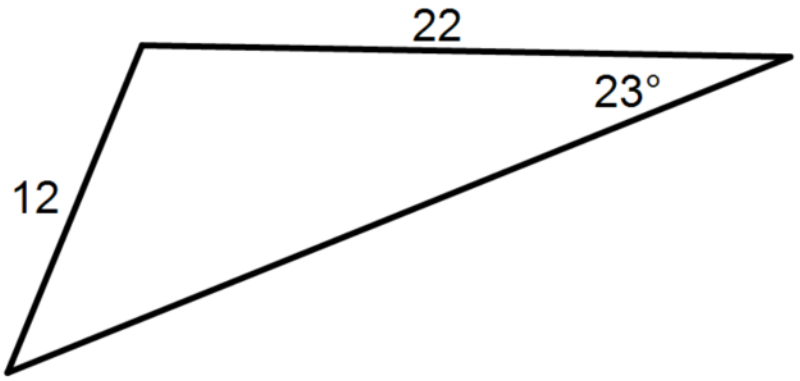
8.4 Law of Cosines

Monday, September 23, 2019 7:46 AM

Warm Up

Solve the following triangle.



Essential Question

How can the Law of Cosines be used to determine side lengths and angle measures of acute and obtuse triangles?

Needed Vocab:

- **Law of Cosines**

Goal: "I can. . .

Use the Law of Cosines to solve problems."

Recall the table

$m\angle A$	a	$\frac{\sin(A)}{a}$	$m\angle B$	b	$\frac{\sin(B)}{b}$	$m\angle C$	c	$\frac{\sin(C)}{c}$
26.6°	$\sqrt{5}$	$1/5$	90°	5	$1/5$	63.4°	$2\sqrt{5}$	$1/5$

Fill in the following table with the correct information. What do you notice?

c	c^2	a	a^2	b	b^2	$m\angle C$	$a^2 + b^2 - 2ab \cdot \cos(C)$

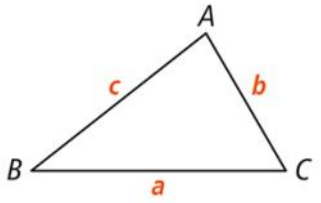
Law of Cosines

For any $\triangle ABC$, the **Law of Cosines** relates the cosine of each angle to the side lengths of the triangle.

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

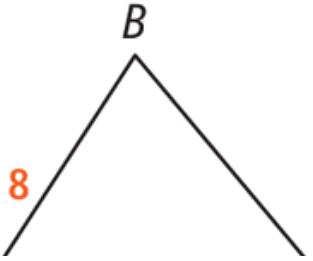
$b^2 = a^2 + c^2 - 2ac \cos B$

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



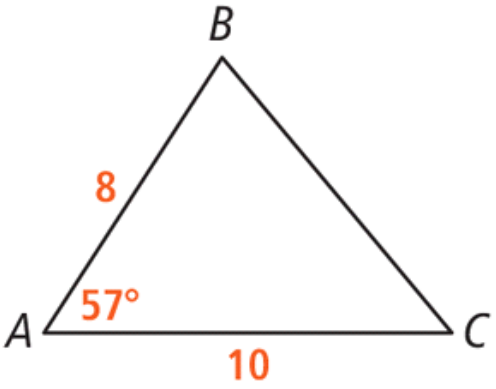
Example 1

What is *BC* to the nearest tenth?



EXAMPLE 1

What is *BC* to the nearest tenth?



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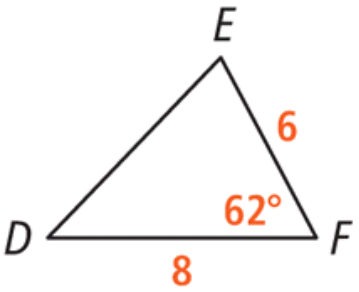
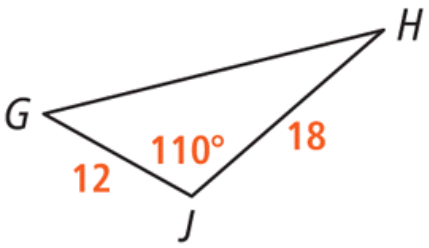
2. a. What is *DE*?

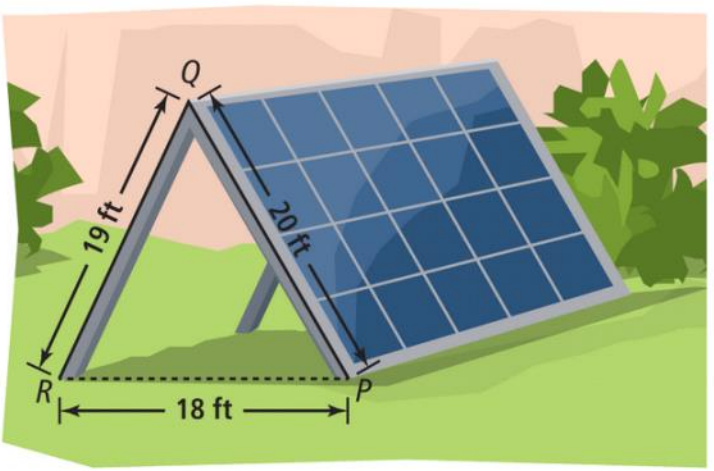


b. What is *GH*?



Example 2

The optimal tilt for Keenan's solar panel is between 58° and 60° to the horizontal. Has Keenan placed his solar panel at an optimal angle?



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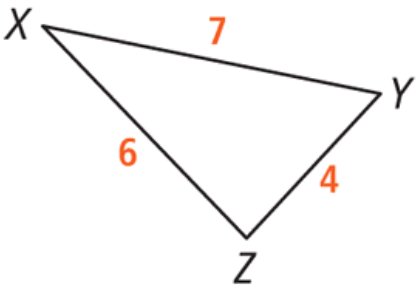
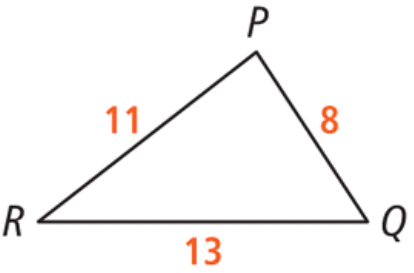
3. a. What is $m\angle X$?

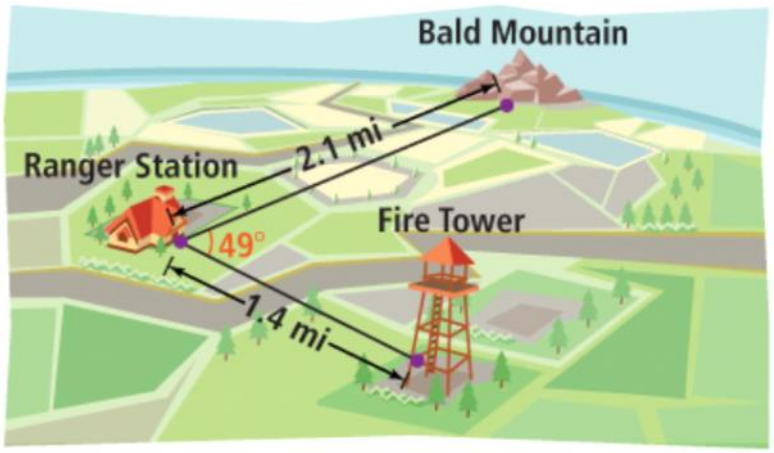


b. What is $m\angle P$?



Example 3

The district ranger wants to build a new ranger station at the location of the fire tower because it would be closer to Bald Mountain than the old station is. Is the district ranger correct? Explain.



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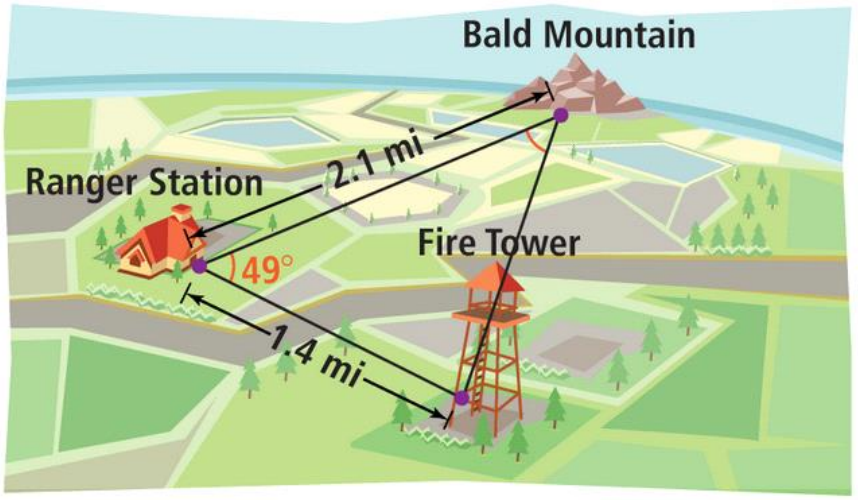
4. Assume a path is drawn from the fire tower to Bald Mountain. What is the angle the new path forms with the old path from Bald Mountain to the ranger station?



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https://tinyurl.com/wj53gzy

Homework

Pg. 371
14, 17-28, 30, 33