

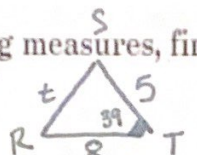
Key

Law of Sines and Cosines Extra Homework


Directions: Complete #1-6 on a separate sheet of paper using the Law of Cosines!

In $\triangle RST$, given the following measures, find the measure of the missing side.

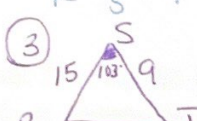
1. $r = 5, s = 8, m\angle T = 39$

①  $t^2 = 5^2 + 8^2 - 2 \cdot 5 \cdot 8 \cos 39$
 $t \approx 5.2$

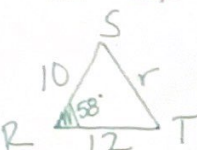
2. $r = 6, t = 11, m\angle S = 87$

②  $s^2 = 11^2 + 6^2 - 2 \cdot 11 \cdot 6 \cos 87$
 $s \approx 12.3$

3. $r = 9, t = 15, m\angle S = 103$

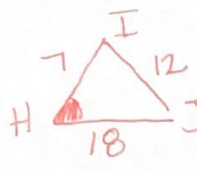
③  $s^2 = 15^2 + 9^2 - 2 \cdot 15 \cdot 9 \cos 103$
 $s \approx 19.2$

4. $s = 12, t = 10, m\angle R = 58$

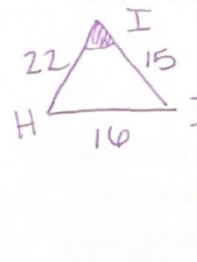
 $r^2 = 10^2 + 12^2 - 2 \cdot 10 \cdot 12 \cos 58$
 $r \approx 10.8$

In $\triangle HIJ$, given the lengths of the sides, find the measure of the stated angle to the nearest tenth.

5. $h = 12, i = 18, j = 7; m\angle H$

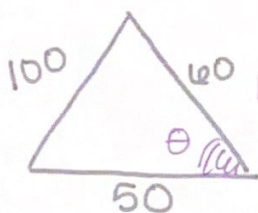
⑤  $12^2 = 18^2 + 7^2 - 2 \cdot 18 \cdot 7 \cos H$
 $144 = 324 + 49 - 252 \cos H$
 $144 = 373 - 252 \cos H$
 $-229 = -252 \cos H$
 $\frac{-229}{-252} = \cos H$
 $\angle H = \cos^{-1} \left(\frac{-229}{-252} \right)$
 $m\angle H \approx 24.7^\circ$

6. $h = 15, i = 16, j = 22; m\angle I$

 $16^2 = 22^2 + 15^2 - 2 \cdot 22 \cdot 15 \cos I$
 $256 = 484 + 225 - 660 \cos I$
 $256 = 709 - 660 \cos I$
 $-453 = -660 \cos I$
 $\angle I = \cos^{-1} \left(\frac{-453}{-660} \right)$
 $m\angle I \approx 46.7^\circ$

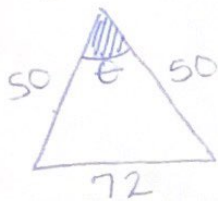
7. Mrs. Burge is planting a raspberry garden in the shape of a triangle to pay homage to her favorite subject in school. The side lengths are as follows: 50 feet, 60 feet, 100 feet. Mr.

Giannini wants to find the measure of the largest angle. Help him!!! ☺ op. the greatest angle is the greatest side.



$100^2 = 60^2 + 50^2 - 2 \cdot 60 \cdot 50 \cos \theta$
 $10000 = 3600 + 2500 - 6000 \cos \theta$
 $10,000 = 6100 - 6000 \cos \theta$
 $3900 = -6000 \cos \theta$
 $\theta = \cos^{-1} \left(\frac{3900}{-6000} \right)$
 $\theta \approx 130.5^\circ$

8. Ms. Schmidt, who lives behind Mrs. Burge, is constructing a tomato garden. The garden will connect to the smallest side of the raspberry garden. An adjacent side is congruent to the smallest side of the raspberry garden. The third side is 72 feet. Ms. Labadie is laughing at their farming skills. Find the measure of the angle between the two congruent sides.



$$72^2 = 50^2 + 50^2 - 2 \cdot 50 \cdot 50 \cos \theta$$

$$5184 = 2500 + 2500 - 5000 \cos \theta$$

$$5184 = 5000 - 5000 \cos \theta$$

$$\frac{-5000}{-5000} \quad \frac{-5000}{5000}$$

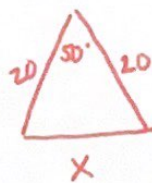
$$184 = -5000 \cos \theta$$

$$\theta = \cos^{-1} \left(\frac{184}{-5000} \right)$$

$$\theta \approx 92.1^\circ$$

9.

AIRCRAFT From the diagram of the airplane shown, determine the approximate exterior perimeter of each wing. Round to the nearest tenth meter.



$$x^2 = 20^2 + 20^2 - 2 \cdot 20 \cdot 20 \cos 50$$

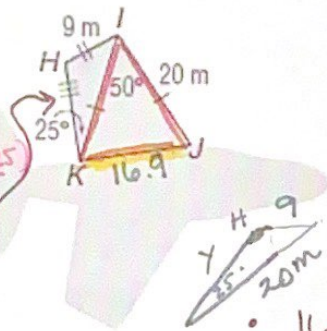
$$x \approx 16.9 \text{ m}$$

Find KJ and HK

Find Hk

$$\frac{\sin(85.1)}{y} = \frac{\sin(25)}{9}$$

$$y \approx 21.2$$



Find $\angle H$

$$\frac{\sin H}{20} = \frac{\sin(25)}{9}$$

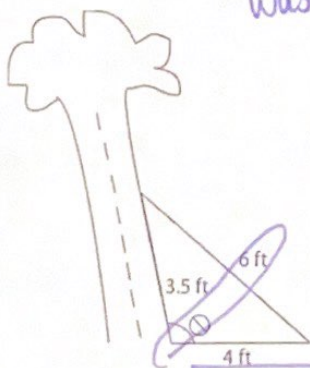
$$\angle H = \sin^{-1} \left(\frac{20 \cdot \sin(25)}{9} \right)$$

$$\angle H \approx 69.9^\circ$$

$$\therefore 16.9 + 20 + 9 + 21.2$$

$$P \approx 67.1 \text{ m}$$

10. After the hurricane, the small tree in Mrs. Gross' neighbor's yard was leaning as she was hunkered down in her house. To keep it from falling, she nailed a 6-foot strap into the ground 4 feet from the base of the tree. She attached the strap to the tree 3 1/2 feet above the ground. How far from vertical was the tree leaning?



How far from 90° was the tree leaning?

$$x = \theta - 90$$

$$6^2 = 3.5^2 + 4^2 - 2 \cdot 3.5 \cdot 4 \cos \theta$$

$$36 = 12.25 + 16 - 28 \cos \theta$$

$$36 = 28.25 - 28 \cos \theta$$

$$7.75 = -28 \cos \theta$$

$$\theta = \cos^{-1} \left(\frac{7.75}{-28} \right)$$

$$\theta \approx 106.1^\circ$$

* It is leaning 16.1° past vertical *