

Key

**Notes: Day 4
Law of Sines**

In **ANY** triangle, if you know 2 angles and a side (**ASA** or **AAS**), then you can find the missing sides by using the **Law of Sines**.

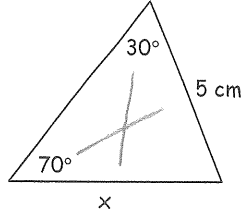
Law of Sines

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

a, b, and c are the sides opposite angles A, B, and C

1-4 Find the value of x.

1)

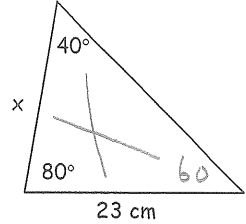


$$\frac{x}{\sin 30} = \frac{5}{\sin 70}$$

$$x = \frac{5(\sin 30)}{\sin 70}$$

$x = 2.660$

2)

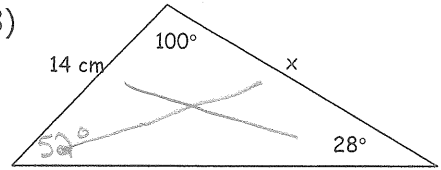


$$\frac{x}{\sin 60} = \frac{23}{\sin 40}$$

$$x = \frac{23(\sin 60)}{\sin 40}$$

$x = 30.988$

3)

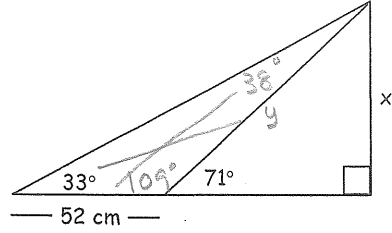


$$\frac{x}{\sin 52} = \frac{14}{\sin 28}$$

$$x = \frac{14(\sin 52)}{\sin 28}$$

$x = 23.499$

4)



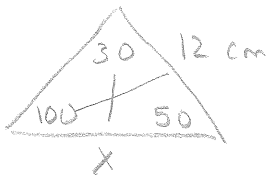
$$\frac{52}{\sin 38} = \frac{y}{\sin 33}$$

$$y = \frac{52(\sin 33)}{\sin 38} = 46.001$$

$$\sin 71 = \frac{x}{46.001}$$

$x = 43.495$

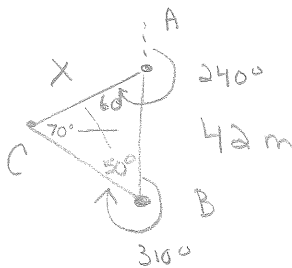
5) The measures of 2 angles of a triangle are 100° and 50° . The length of the longest side is 12 cm. Find the length of the shortest side.



$$\frac{X}{\sin 30} = \frac{12}{\sin 100}$$

$$X = 6.093 \text{ cm}$$

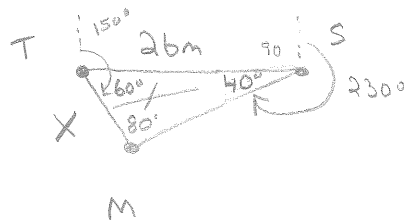
6) The bearing from A to C is 240° while the bearing from B to C is 310° . B is 42 m due south of A. Find the distance from A to C.



$$\frac{42}{\sin 70} = \frac{X}{\sin 50}$$

$$X = 34.239 \text{ m}$$

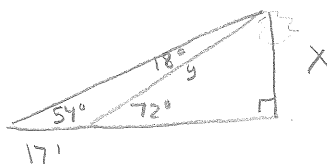
7) The bearing from Stephen to Morgan is 230° . Travis is 26m due west of Stephen. The bearing from Travis to Morgan is 150° . Find the distance from Travis to Morgan.



$$\frac{26}{\sin 80} = \frac{X}{\sin 40}$$

$$X = 16.970 \text{ m}$$

8) The \angle of elevation from Taylor's feet to the top of a tree is 72° . Taylor walks backwards 17 feet and now the \angle of elevation from Taylor's feet to the top of the tree is 54° . How tall is the tree?



$$\frac{y}{\sin 54} = \frac{17}{\sin 18}$$

$$y = 44.507$$

$$\sin 72 = \frac{X}{y}$$

$$42.328 \text{ feet} = X$$