BECA / IB Math 6 Geometry
29 March 2022

Name:

6.6 Pre-Quiz: Non-right triangle trigonometry **HSG.SRT.D.11**

Round all values to three significant figures.

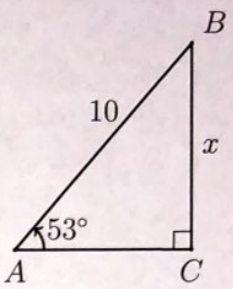
1. Do Now: Given right $\triangle ABC$ with $AB = 10$, $m\angle A = 53°$. Find the value of $BC = x$.

$\sin(\theta) = \frac{opp}{hyp}$

$\sin(53) = \frac{opp}{10}$

$10\sin(53) = opp$

7.99



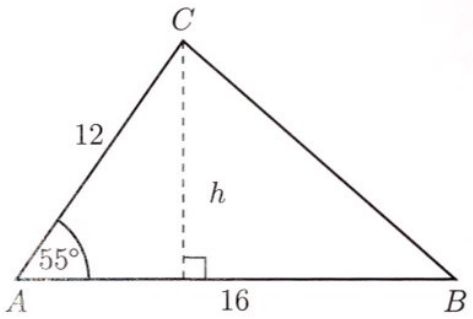
Area of a triangle sine formula **HSG.SRT.D.9**

2. Given $\triangle ABC$ with $AC = 12$ centimeters, base $AB = 16$, and the base $\hat{A} = 55°$. (diagram not to scale)

(a) Find altitude h cm using $\sin\hat{A} = \frac{h}{12}$.

$12\sin(55) = \frac{h}{12} \cdot 12$

$12\sin(55) = h$ (h: 9.83)



(b) Find the area of the triangle

$Area = \frac{1}{2}bh$

$Area = \frac{1}{2}(9.83)(16)$

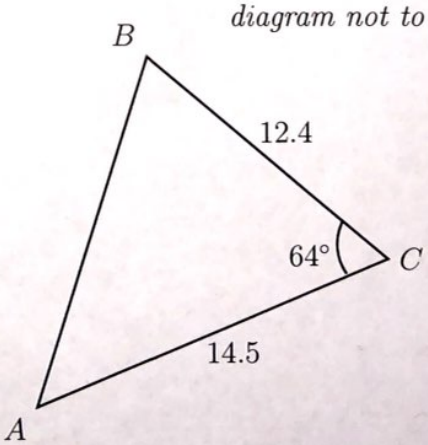
78.64

3. Find the area of the given triangle. Triangle area using sine formula: $A = \frac{1}{2}ab\sin C$

$\frac{1}{2}(12.4)(14.5)(\sin(64))$

80.80

diagram not to scale



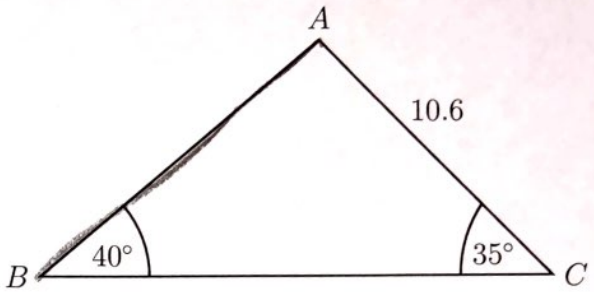
The sine rule **HSG.SRT.D.11**

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

4. The following diagram shows triangle ABC, with $A\hat{B}C = 40°$, $A\hat{C}B = 35°$, and $AC = 10.6$ cm.

   Find AB.

diagram not to scale



$\frac{c}{\sin(C)} = \frac{b}{\sin B}$

$\frac{c}{\sin(35)} = \frac{10.6}{\sin(40)}$

$c\sin(40) = 10.6\sin(35)$

$\frac{c\sin(40)}{\sin(40)} = \frac{6.08}{\sin(40)}$

$c = 9.40$

5. Triangle ABC is drawn with $AC = 102$ cm, $BC = 86$ cm, and $A\hat{B}C = 71°$.

   Find $B\hat{A}C$.

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

$\frac{86}{\sin(A)} = \frac{102}{\sin(71)}$

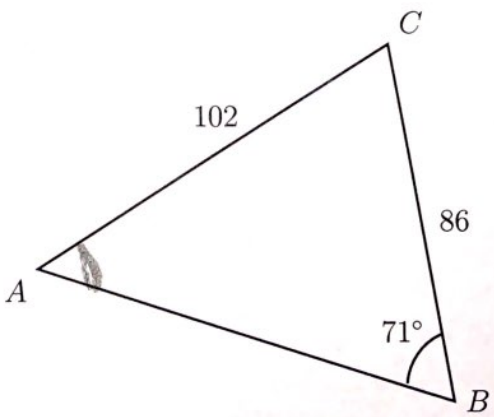
$86\sin(71) = 102\sin(A)$

$81.31 = 102\sin(A)$

$.797 = \sin(A)$

$A = 52.84$

diagram not to scale



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The cosine rule **HSG.SRT.D.11**

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

6. As shown in the diagram, triangle ABC has $A\hat{B}C = 47°$, $AB = 7.3$, and $BC = 15.2$.
Find AC. *diagram not to scale*

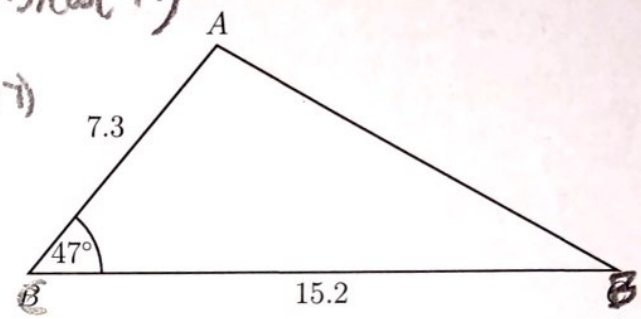
$c^2 = (15.2)^2 + (7.3)^2 - 2(15.2)(7.3)\cos(47)$

$284.33 - 221.92\cos(47)$

$284.33 - 151.35$

$c^2 = 132.98$

$c = 11.53$



7. The following diagram shows triangle PQR. (*not to scale*)
$PQ = 17$ meters, $QR = 23$ m., and $PR = 12$ m.
Find $P\hat{Q}R$.

$12^2 = 23^2 + 17^2 - 2(23)(17)\cos(Q)$

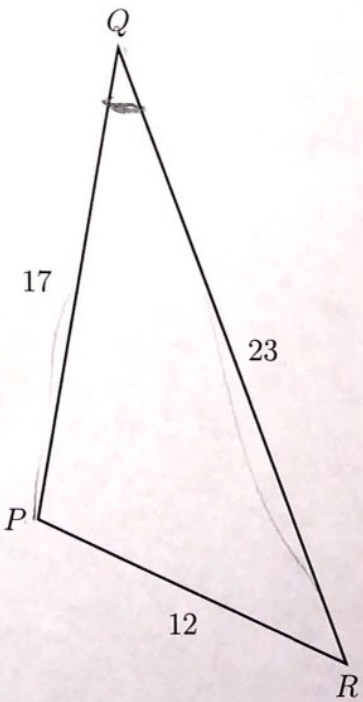
$144 = 818 - 782\cos(Q)$

$-818 \quad -818$

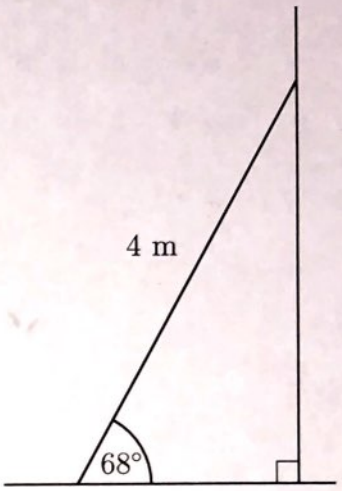
$\frac{-674}{-782} = \frac{-782\cos(Q)}{-782}$

$.862 = \cos(Q)$

$Q = 30.46$



8. A ladder that is 4 meters long leans against a wall making an angle to the ground of 68°, as shown in the diagram. (not drawn to scale)



(a) Find the height of the top of the ladder above the ground.

$\sin(68) = \frac{opp}{4}$

$opp = 3.71\text{m}$

(b) Find the distance of the bottom of the ladder to the base of the wall.

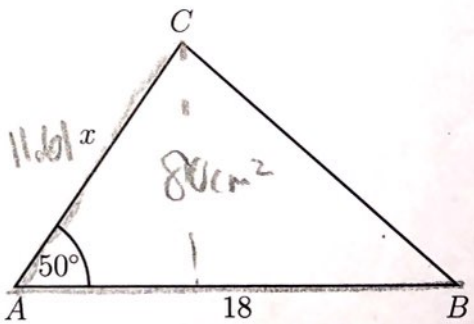
$\cos(68) = \frac{adj}{hyp}$

$\cos(68) = \frac{adj}{4}$

1.50m

9. The following diagram shows a triangle ABC. (diagram not to scale)

The area of the triangle ABC is 80 cm^2, $AB = 18$ cm, $AC = x$ cm, and $B\hat{A}C = 50°$.



(a) Find x.

$80 = \frac{1}{2} x \cdot 18 \sin(50)$

$80 = 9\sin(50)x$

$80 = 6.89x$

$x = 11.61$

(b) Find BC.

cosine law

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

$c^2 = 11.61^2 + 18^2 - 2(11.61)(18)\cos(50)$

$\sqrt{c^2} = \sqrt{190.13}$

$c = 13.79$