BECA / IB Math 6 Geometry
1 April 2022

Name: SOLUTIONS

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

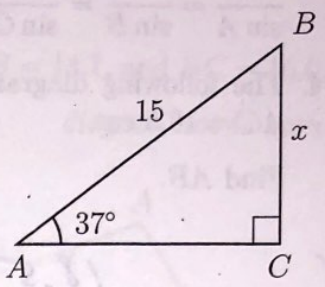
Round all values to three significant figures.

1. Right triangle ABC is shown with $AB = 15$, $m\angle A = 37°$. Find the value of $BC = x$.

$\sin 37 = \frac{x}{15}$

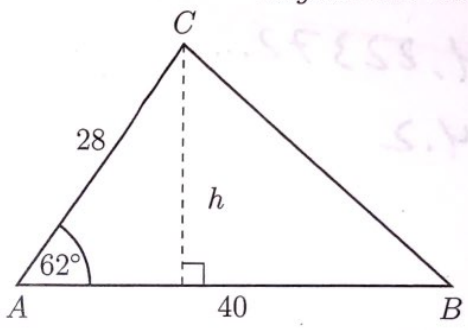
$x = 15 \sin 37 = 9.02722...$

≈ 9.03



2. Given $\triangle ABC$ with $AC = 28$ centimeters, base $AB = 40$, and $\hat{A} = 62°$.

diagram not to scale



(a) Find altitude h cm using $\sin \hat{A} = \frac{h}{28}$.

$h = 28 \sin 62$

$= 24.7225...$

≈ 24.7

(b) Find the area of the triangle

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

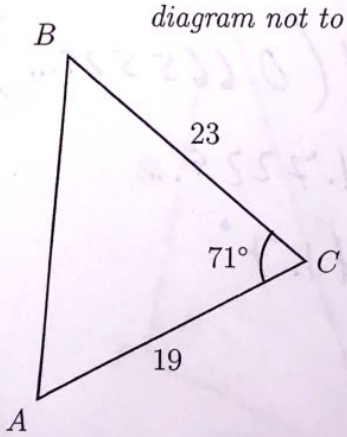
$= \frac{1}{2}(40)(24.72...)$

$= 494.4506...$

≈ 494

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

diagram not to scale



$A = \frac{1}{2}(19)(23)\sin 71$

$= 206.5558...$

≈ 207

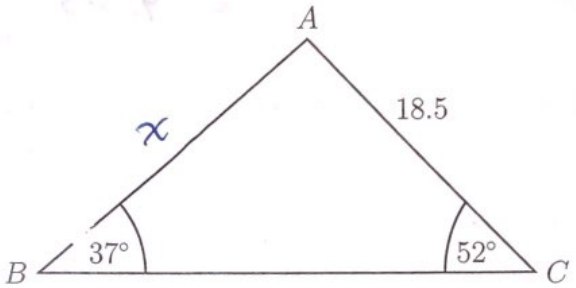
The sine rule

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

4. The following diagram shows triangle ABC, with $A\hat{B}C = 37°$, $A\hat{C}B = 52°$, and $AC = 18.5$ cm.

   Find AB.

diagram not to scale



$\frac{x}{\sin 52} = \frac{18.5}{\sin 37}$

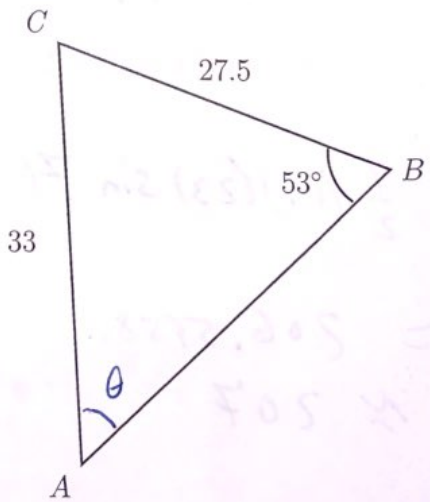
$x = 24.22372...$

≈ 24.2

5. Triangle ABC is drawn with $AC = 33$ cm, $BC = 27.5$ cm, and $A\hat{B}C = 53°$.

   Find $B\hat{A}C$.

diagram not to scale



$\frac{\sin\theta}{27.5} = \frac{\sin 53}{33}$

$\theta = \sin^{-1}(0.665529...)$

$= 41.7229...$

$\approx 41.7°$

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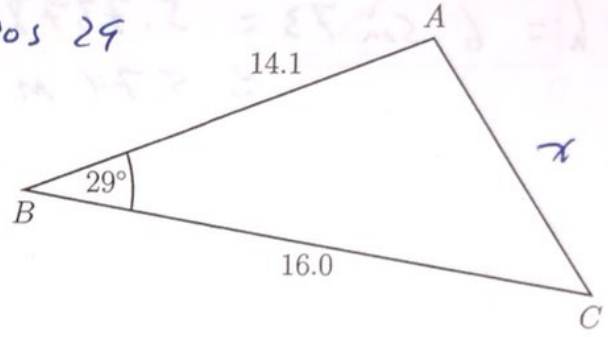
The cosine rule

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

6. As shown in the diagram, triangle ABC has $A\hat{B}C = 29°$, $AB = 14.1$, and $BC = 16.0$.
Find AC.

diagram not to scale



$x^2 = 14.1^2 + 16.0^2 - 2(14.1)(16.0)\cos 29$

$x^2 = 60.1815.8\ldots$

$x = 7.75767\ldots$

$\approx$ 7.76

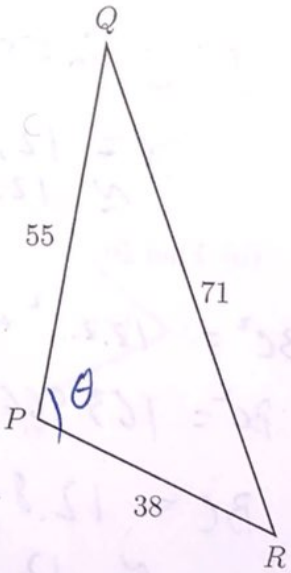
7. The following diagram shows triangle PQR. (*not to scale*)
$PQ = 55$ meters, $QR = 71$ m., and $PR = 38$ m.
Find $Q\hat{P}R$.

$\cos\theta = \dfrac{55^2 + 38^2 - 71^2}{2(55)(38)}$

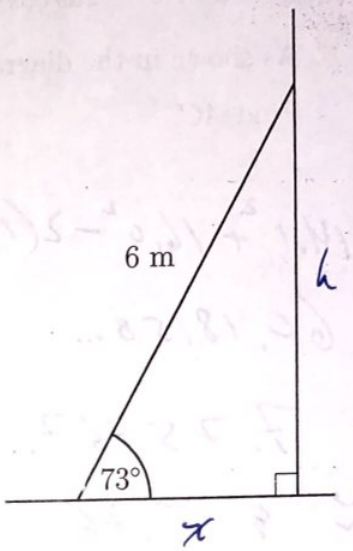
$= -0.13684$

$\theta = 97.8651\ldots$

$\approx 97.9°$



8. A ladder that is 6 meters long leans against a wall making an angle to the ground of 73°, as shown in the diagram. (not drawn to scale)



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

$\sin 73 = \frac{h}{6}$

$h = 6 \sin 73 = 5.73782\ldots$

≈ 5.74 m

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

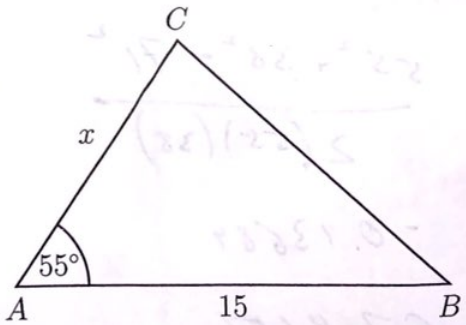
$\cos 73 = \frac{x}{6}$

$x = 6 \cos 73 = 1.75423\ldots$

≈ 1.75 m

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

The area of the triangle ABC is 75 cm^2, $AB = 15$ cm, $AC = x$ cm, and $B\hat{A}C = 55°$.



(a) Find x.

$A = \frac{1}{2}(\sin 55)(15)x = 75$

$x = 12.2077\ldots$

≈ 12.2

(b) Find BC.

$BC^2 = 12.2\ldots^2 + 15^2 - 2(12.2\ldots)(15)\cos 55$

$BC^2 = 163.9667\ldots$

$BC = 12.80495\ldots$

≈ 12.8