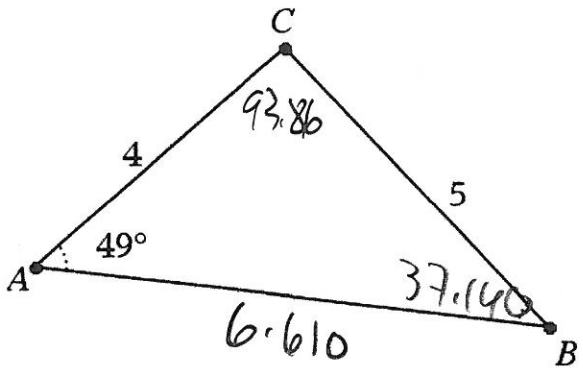
Name_____Summative Assessment Law of Sines and Cosines Period _____

SOLVE EACH TRIANGLE based on the GIVEN INFORMATION, if TWO triangles are present, then state BOTH Answers.

$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$ $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$ $\cos A = \frac{b^2+c^2-a^2}{2bc}$ $a^2 = b^2 + c^2 - 2bc \cdot cosA$

Show your work in a clear manner. Approximate to at least two decimal places



Triangle ABC (if angle B is acute)
Show work for Angle B

$\frac{\sin 49}{5} = \frac{\sin B}{4}$

$\sin B = \frac{4 \sin 49}{5}$

$B = \sin^{-1}\left(\frac{4 \sin 49}{5}\right) = 37.140$

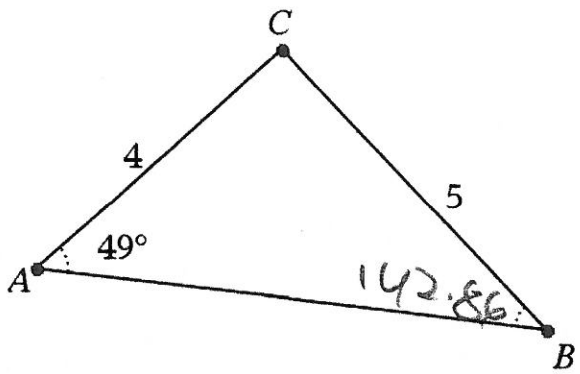
Angle B = 37.140 Angle C = 93.86

Show work for side c

$\frac{c}{\sin 93.86} = \frac{5}{\sin 49}$

$c = \frac{5 \sin 93.86}{\sin 49}$

$c = 6.610$



Triangle ABC (if angle B' is obtuse)
Show work for Angle B'

$180 - 37.140 = 142.86$

no 2nd

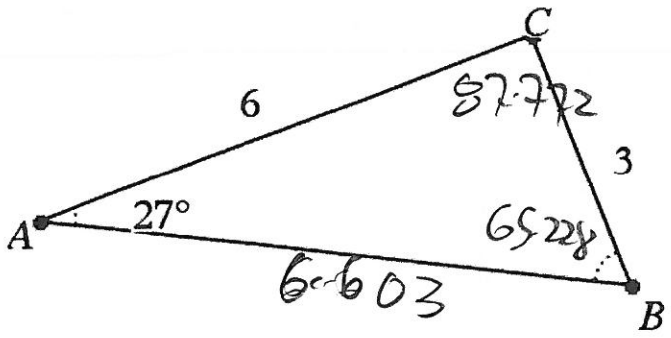
$142.86 + 49 > 180$

Angle B' =_____ Angle C' =_____

Show work for side c'

S 36

SOLVE EACH TRIANGLE based on the GIVEN INFORMATION, if TWO triangles are present, then state BOTH Answers.



Triangle ABC (if angle B is acute)
Show work for Angle B

$$\frac{\sin 27}{3} = \frac{\sin B}{6}$$

$$\sin B = \frac{6 \sin 27}{3}$$

$$B = \sin^{-1}\left(\frac{6 \sin 27}{3}\right) \approx 65.228$$

Angle B = 65.228 Angle C = 87.772

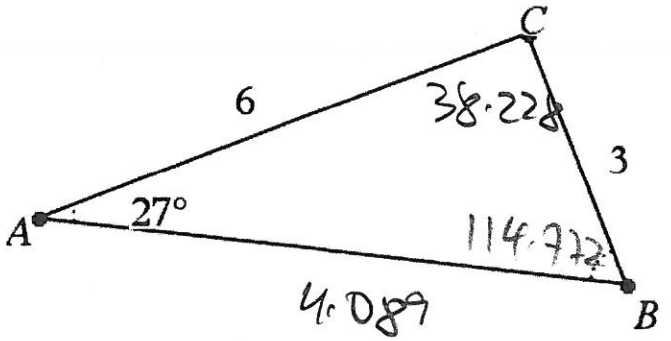
$180 - 65.228 - 27 = 87.772$

Show work for side c

$$\frac{c}{\sin 87.72} = \frac{3}{\sin 27}$$

$$c = \frac{3 \sin 87.72}{\sin 27}$$

$$c = 6.603$$



Triangle ABC (if angle B' is obtuse)
Show work for Angle B'

$180 - 65.228 = 114.772$

$180 - 114.772 - 27 = 38.228$

Angle B' = 114.772 Angle C' = 38.228

Show work for side c'

$$\frac{c}{\sin 38.228} = \frac{3}{\sin 27}$$

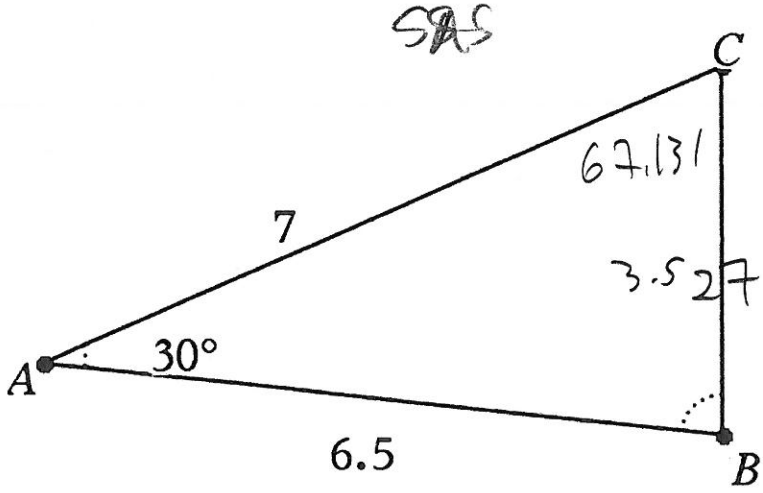
$$c = \frac{3 \sin 38.228}{\sin 27}$$

$$c = 4.089$$

544

Determine the missing angle or side lengths stated related to each triangle

SAS



$\cos C = \frac{7^2 + 3.527^2 - 6.5^2}{2(7)(3.527)}$

$CB = \sqrt{7^2 + 6.5^2 - 2(7)(6.5)\cos 30}$

$= 3.527$

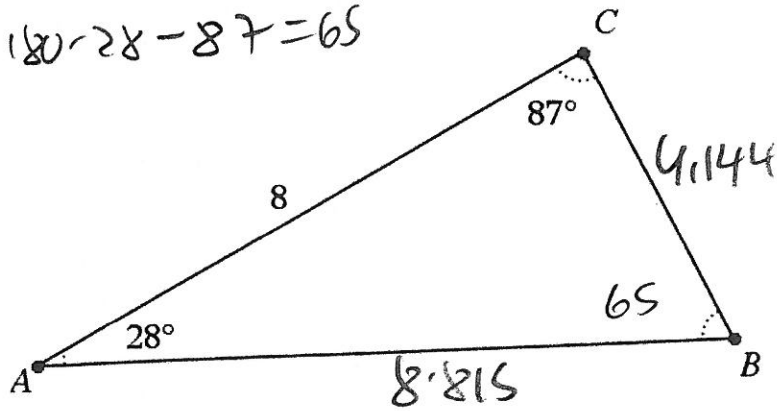
Find Angle C = 67.131 Find side BC = 3.527

$C = \cos^{-1}\left(\frac{7^2 + 3.527^2 - 6.5^2}{2(7)(3.527)}\right)$

≈ 67.131

Determine the missing angle or side lengths stated related to each triangle

$180 - 28 - 87 = 65$



$\frac{AB}{\sin 87} = \frac{8}{\sin 65}$

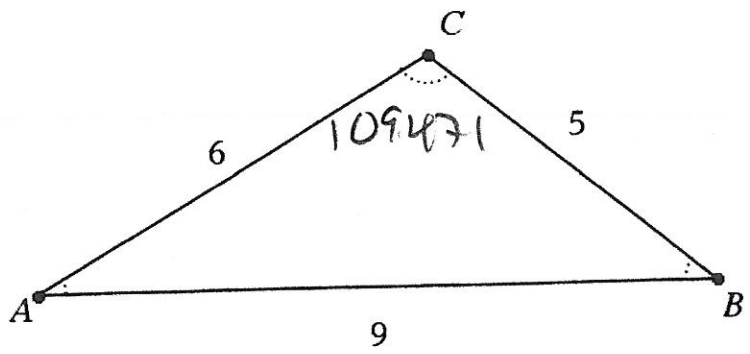
$AB = \frac{8 \sin 87}{\sin 65}$

Find Side AB = 8.815 Find side BC = 4.144

$\frac{BC}{\sin 28} = \frac{8}{\sin 65}$

$BC = \frac{8 \sin 28}{\sin 65} \approx 4.144$

Determine the missing angle or side lengths stated related to each triangle



$\cos C = \frac{6^2+5^2-9^2}{2(6)(5)}$

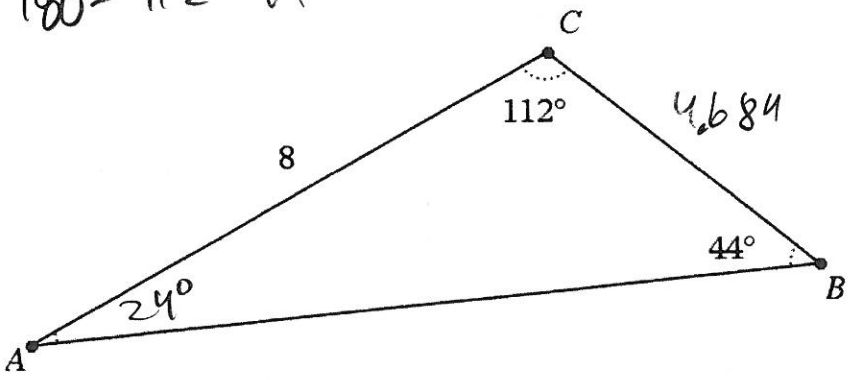
$\cos B = \frac{9^2+5^2-6^2}{2(9)(5)}$

Find Angle C = 109.471 Find Angle B = 38.942

$\cos^{-1}\left(\frac{6^2+5^2-9^2}{2(6)(5)}\right)$ $\cos^{-1}\left(\frac{9^2+5^2-6^2}{2(9)(5)}\right)$

Determine the missing angle or side lengths stated related to each triangle

$180 - 112 - 44$



$\frac{AB}{\sin 112} = \frac{8}{\sin 44}$

$AB = \frac{8 \sin 112}{\sin 44}$

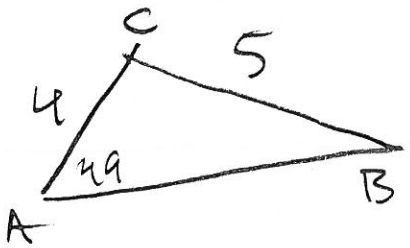
≈ 10.678

Find Side AB = 10.678 Find side BC = 4.684

$\frac{BC}{\sin 24} = \frac{8}{\sin 44}$

$BC = \frac{8 \sin 24}{\sin 44} \approx 4.684$

Solutions Version 44



SSA present

$$\frac{\sin B}{4} = \frac{\sin 49}{5}$$

$$\sin B = \frac{4\sin 49}{5}$$

$$B = \sin^{-1}\left(\frac{4\sin 49}{5}\right) \approx 37.140$$

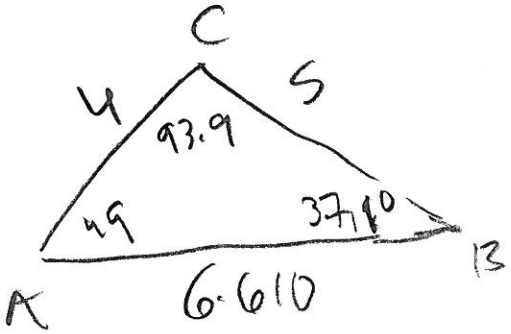
$$B' = 180 - \sin^{-1}\left(\frac{4\sin 49}{5}\right) \approx 142.860$$

Since $A' + B' = 49 + 142.860$

$49 + 142.860 > 180$

no 2nd $\triangle$ exists

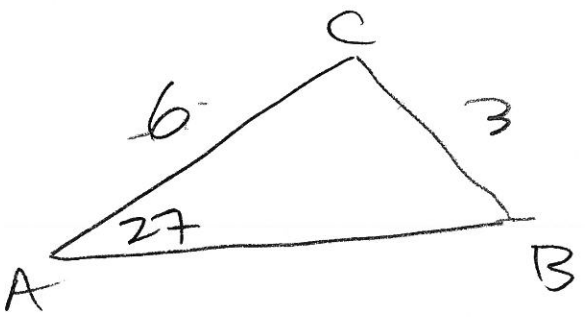
$$C = 180 - 49 - \sin^{-1}\left(\frac{4\sin 49}{5}\right) \approx 93.860$$

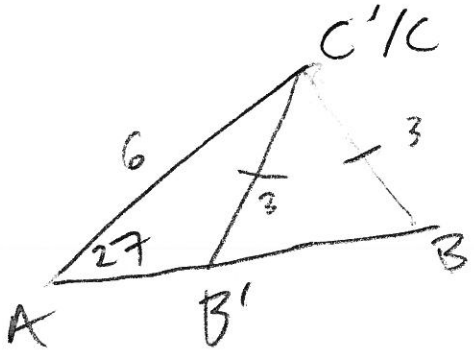


$$\frac{c}{\sin 93.9} = \frac{5}{\sin 49}$$

$$c = \frac{5\sin 93.9}{\sin 49}$$

$$c \approx 6.610$$





$$\frac{\sin 27}{3} = \frac{\sin B}{6}$$

$$\sin B = \frac{6 \sin 27}{3}$$

$$B = \sin^{-1}\left(\frac{6 \sin 27}{3}\right)$$

$$\approx 65.228$$

$$B' = 180 - \sin^{-1}\left(\frac{6 \sin 27}{3}\right)$$

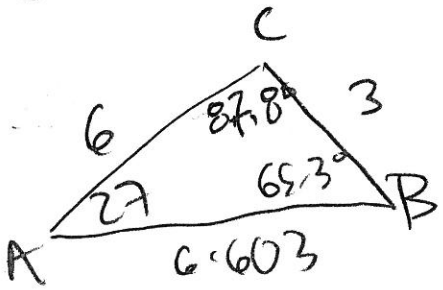
$$\approx 114.772$$

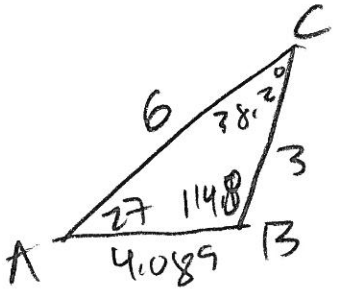
$$C = 180 - 27 - \sin^{-1}\left(\frac{6 \sin 27}{3}\right)$$

$$C \approx 87.772$$

$$C' = 180 - 27 - 114.772$$

$$= 38.228°$$





$$\frac{c}{\sin 87.772} = \frac{3}{\sin 27}$$

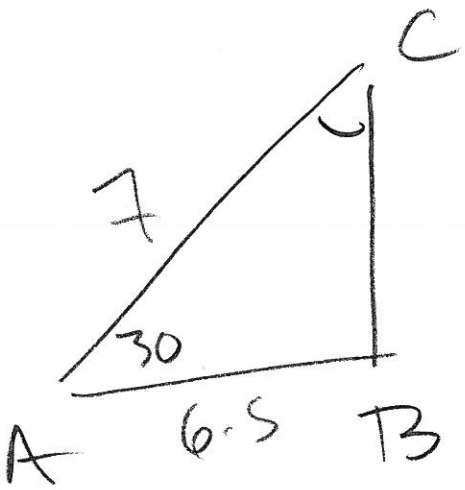
$$c = \frac{3 \sin 87.772}{\sin 27}$$

$$c \approx 6.603$$

$$\frac{c}{\sin 38.228} = \frac{3}{\sin 27}$$

$$c = \frac{3 \sin 38.228}{\sin 27}$$

$$c' \approx 4.089$$

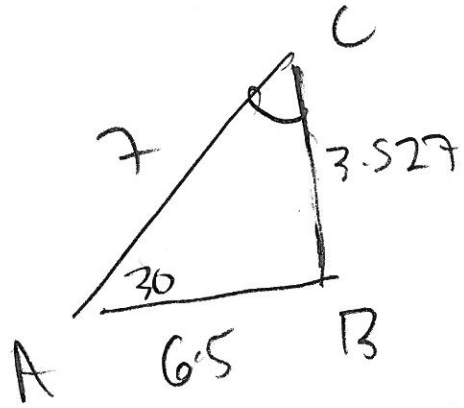


SAS law of cosines

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

$a = \sqrt{7^2 + 6.5^2 - 2(7)(6.5)\cos 30}$

≈ 3.527



$\cos C = \dfrac{7^2 + 3.527^2 - 6.5^2}{2(7)(3.527)}$

$C = \cos^{-1}\left(\dfrac{7^2 + (3.527)^2 - 6.5^2}{2(7)(3.527)}\right)$

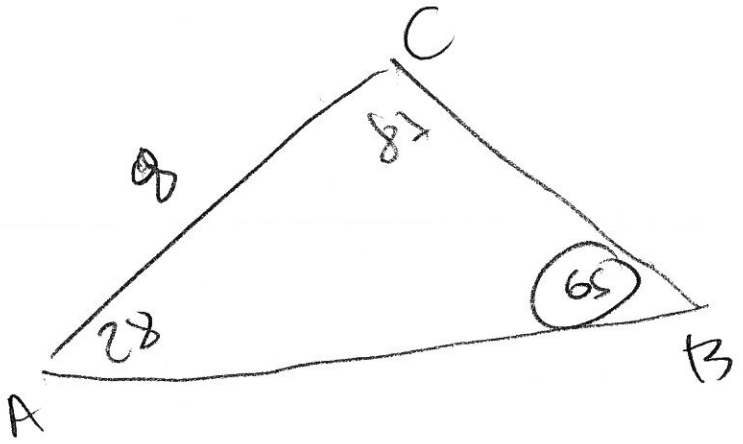
$\approx 67.131°$

OR

$\dfrac{\sin C}{6.5} = \dfrac{\sin 30}{3.527}$

$\sin C = \dfrac{6.5\sin 30}{3.527}$

$C = \sin^{-1}\left(\dfrac{6.5\sin 30}{3.527}\right) \approx 67.141°$



$m\angle B = 180 - 87 - 28$

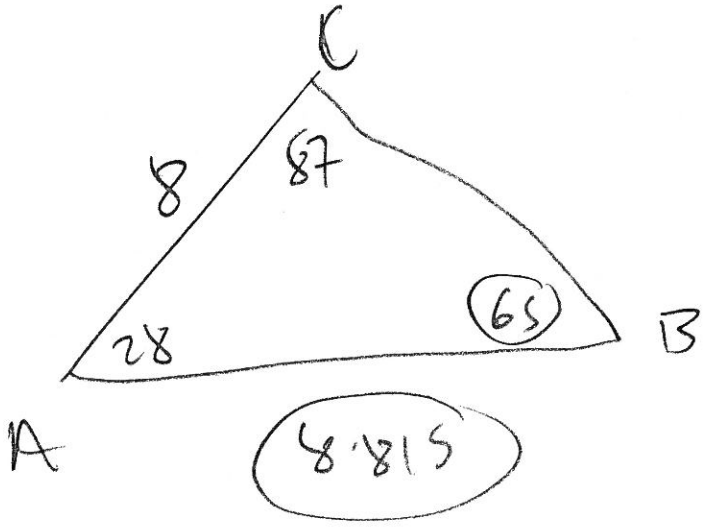
$= 65°$

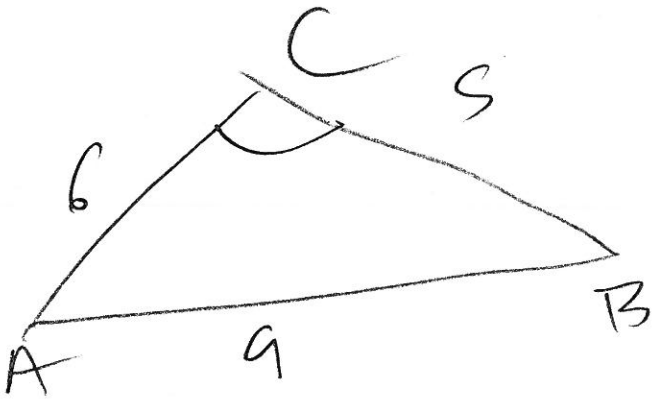
AAAS

law of sines

$$\frac{c}{\sin 87} = \frac{8}{\sin 65}$$

$$c = \frac{8 \sin 87}{\sin 65} \approx 8.815$$





SSS

law of cosines

$$\cos C = \frac{6^2 + 5^2 - 9^2}{2(6)(5)}$$

$$C = \cos^{-1}\left(\frac{6^2+5^2-9^2}{2(6)(5)}\right) = 109.471^\circ$$