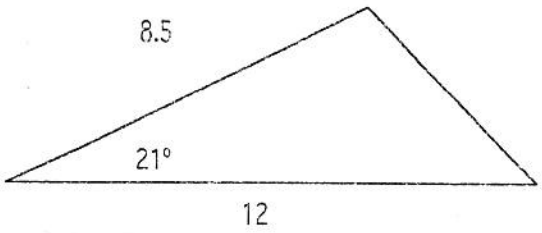
REVIEW: LAW OF SINES, LAW OF COSINES AND AREA OF A TRIANGLE

1. Find the area of each triangle.



$\text{Area} = \frac{1}{2}bc\sin\alpha$

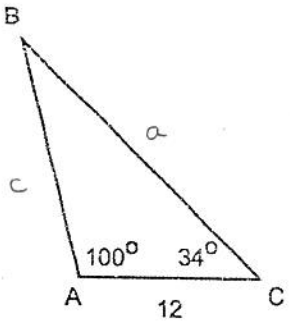
$= \frac{1}{2}(12)(8.5)\sin 21°$

Area = 18.277

Solve each triangle (find all missing sides and angles).
the nearest degree.

2.

ASA



$\angle B = 180 - (34 + 100)$

$\angle B = 46°$

$\frac{\sin 46°}{12} = \frac{\sin 34°}{c}$

$c\sin 46° = 12\sin 34°$

$c = \frac{12\sin 34°}{\sin 46°}$

c = 9.328

$\frac{\sin 46°}{12} = \frac{\sin 100°}{a}$

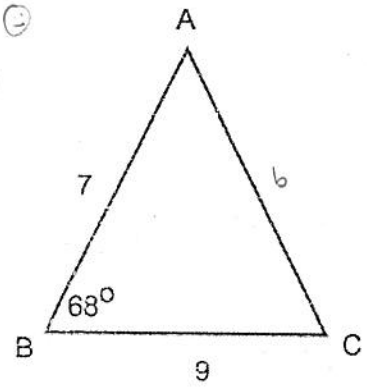
$a\sin 46° = 12\sin 100°$

$a = \frac{12\sin 100°}{\sin 46°}$

a = 16.429

3.

SAS



$b^2 = 9^2 + 7^2 - 2(9)(7)\cos 68°$

b = 9.099

$\frac{\sin 68°}{9.099} = \frac{\sin C}{7}$

$\sin C = \frac{7\sin 68}{9.099}$

$C = \sin^{-1}\left(\frac{7\sin 68°}{9.099}\right)$

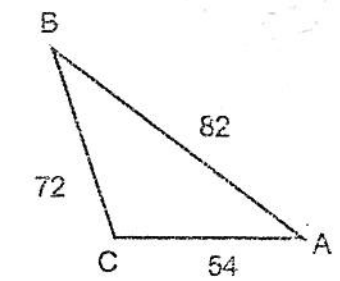
$\angle C = 45.501°$

$\angle A = 180 - (\angle B + \angle C)$

$\angle A = 66.499°$

Find all of the missing sides and angles in the triangle.

SSS



$72^2 = 54^2 + 82^2 - 2(54)(82)\cos A$

$\frac{72^2 - 54^2 - 82^2}{-2(54)(82)} = \cos A$

$A = \cos^{-1}\left(\frac{72^2 - 54^2 - 82^2}{-2(54)(82)}\right)$

$\angle A = 59.791°$

$\angle C = 180 - (\angle A + \angle B)$

$\angle C = 79.808°$

$\frac{\sin 59.791}{72} = \frac{\sin B}{54}$

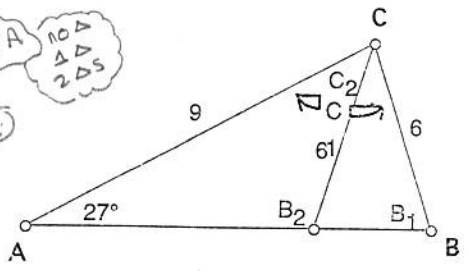
$\sin B = \frac{54\sin 59.791}{72}$

$B = \sin^{-1}\left(\frac{54\sin 59.791}{72}\right)$

$\angle B = 40.402°$

Find the two $\angle$Bs and the two $\angle$Cs in the two triangles formed in ΔABC: $\angle A = 27°$, a = 6 and b = 9.

SSA — no Δs, 2 Δs



$\sin 27° = \frac{h}{9}$

$9 \sin 27° = h$

$4.086 = h$

$6 > 4.086$ and $6 < 9$ } so 2 Δs can be made

$\frac{\sin 27°}{6} = \frac{\sin B}{9}$

$\sin B = \frac{9 \sin 27°}{6}$

$B = \sin^{-1}\left(\frac{9 \sin 27°}{6}\right)$

$\angle B = 42.921°$

or $\angle B' = 180 - 42.921°$

$= 137.079°$

$\angle A = 27°$ $\angle A = 27°$

$\angle B_1 = 42.921°$ $\angle B_2 = 137.079°$

$\angle C_1 = 110.079°$ $\angle C_2 = 15.921°$

$\angle C = 180 - (\angle A + \angle B)$

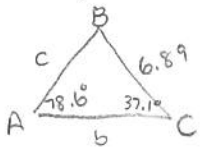
$\angle C = 110.079$

$\angle C' = 180 - (\angle A + \angle B)$

$\angle C' = 15.921°$

In ΔABC, $\angle A = 78.6°$, $\angle C = 37.1°$ = and a = 6.89 feet. Find b and c

AAS



$\frac{\sin 37.1°}{c} = \frac{\sin 78.6°}{6.89}$

$c \sin 78.6° = 6.89 \sin 37.1°$

$c = \frac{6.89 \sin 37.1°}{\sin 78.6}$

$c = 4.240$ ft

$\angle B = 180 - (78.6 + 37.1)$

$\angle B = 64.3°$

$\frac{\sin 64.3°}{b} = \frac{\sin 78.6°}{6.89}$

$b \sin 78.6° = 6.89 \sin 64.3°$

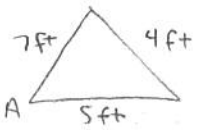
$b = \frac{6.89 \sin 64.3°}{\sin 78.6°}$

$b = 6.333$ ft

. A triangular garden has sides of 7 feet, 5 feet and 4 feet. Find, to the nearest degree, the angle between the sides measuring 7 feet and 5 feet.

∴ nearest whole #

SSS



$4^2 = 7^2 + 5^2 - 2(7)(5) \cos A$

$\frac{4^2 - 7^2 - 5^2}{-2(7)(5)} = \cos A$

$A = \cos^{-1}\left(\frac{4^2 - 7^2 - 5^2}{-2(7)(5)}\right)$

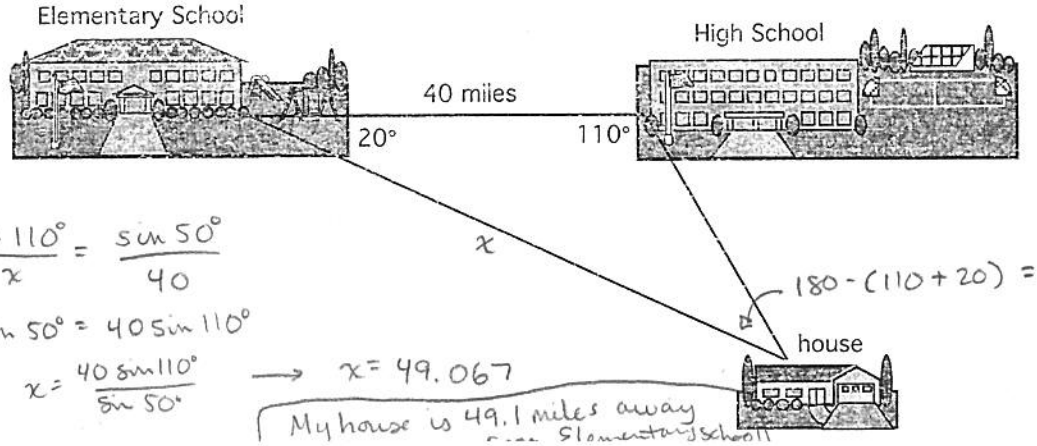
$\angle A = 34.048$

The angle btn the sides 5ft and 7ft is 34°.

An Elementary School and a High School are 40 miles apart. How far to the nearest tenth of a mile is my house from the Elementary School?

∴ to one decimal place

ASA



$180 - (110 + 20) = 50°$

$\frac{\sin 110°}{x} = \frac{\sin 50°}{40}$

$x \sin 50° = 40 \sin 110°$

$x = \frac{40 \sin 110°}{\sin 50°}$ → $x = 49.067$

My house is 49.1 miles away from Elementary School