Advanced Math

6-1

Law of Sines

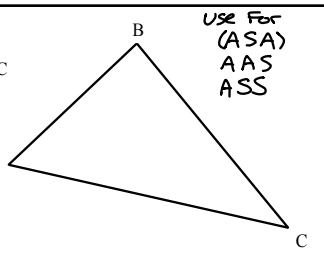
Law of Sines -

Given a general triangle ΔABC

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

or

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



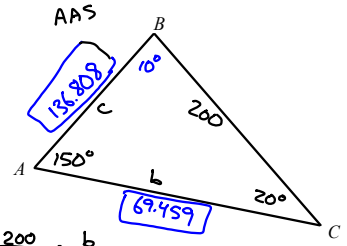
Solve the Triangle

5) $a = 200$
$\angle A = 150°$
$\angle C = 20°$

$\frac{200}{\sin 150°} = \frac{c}{\sin 20°}$

$\frac{200 \sin 20°}{\sin 150°} = c$

$136.808 = c$

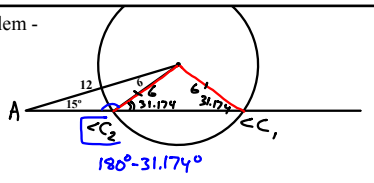


$\frac{200}{\sin 150°} = \frac{b}{\sin 10°}$

$b = 69.459$

The Angle Side Side problem -

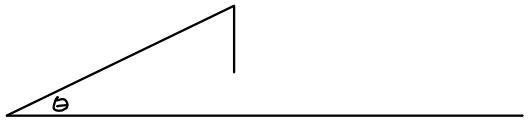
$a = 6$
$c = 12$
$A = 15°$
$\angle C_1 =$ 31.174°
$\angle C_2 =$ 148.826°



$\frac{\sin C}{12} = \frac{\sin 15°}{6}$

$\sin C = .517638...$

$C = \sin^{-1}(.517638...) = 31.174°$



The ASS problem -

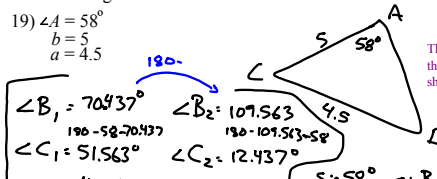
If the side opposite is shorter than the side adjacent,

a) No Solution (calculator error)
b) One Solution (right angle)
c) Two Solutions (calculator gives one, you find the other)

Solve the triangle.

19) $\angle A = 58°$
$b = 5$
$a = 4.5$

ASS



This is a bad A.S.S. because the side opposite (4.5) is shorter than the adjacent (5).

$\angle B_1 = 70.437°$ (180 - 58 - 70.437)
$\angle B_2 = 109.563$ (180 - 109.563 - 58)
$\angle C_1 = 51.563°$
$\angle C_2 = 12.437°$
$c_1 = 4.156$
$c_2 = 1.143$

$\frac{\sin 58°}{4.5} = \frac{\sin B}{5}$

$70.437° = B$

Since we get an answer for angle B, there has to be a second, 180° - B.

$\frac{c_1}{\sin 51.563°} = \frac{4.5}{\sin 58°}$ $\frac{c_2}{\sin 12.437°} = \frac{4.5}{\sin 58°}$

Solve for each individual side *c*.

Area of a Triangle:

$A = \frac{1}{2}ab\sin C = \frac{1}{2}bc\sin A = \frac{1}{2}ac\sin B$

Find the area of the triangle having the indicated sides and angle.

39) $C = 120°$, $a = 4$, $b = 6$.

$A = \frac{1}{2}(4)(6)\sin(120°)$

$A = 12\left(\frac{\sqrt{3}}{2}\right)$

$= 6\sqrt{3}$ square units

Assignment:
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2-22 even,
25-36 all,
40,42,44.