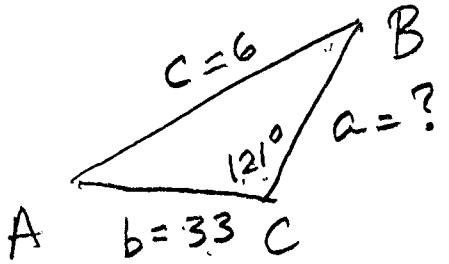
Geometry | Thurs. 5-2-13 | Class Notes

(121) $m\angle C = 121°$, $b = 33$, $c = 6$



a =	A =
b = 33	B =
c = 6	C = 121°

SSA ⇒ LOC ⇒ Quad. Eq. ⇒ $121° \Rightarrow$ - ref ∠

$$6^2 = 33^2 + a^2 - 2(33)(a)\quad(-\cos 59°)$$

$$36 = 1089 + a^2 + 66(.5150)a$$

$$-36 \qquad -36$$

$$0 = 1053 + a^2 + 33.99a$$

↓ side

$$a^2 + 33.99a + 1053 = 0$$

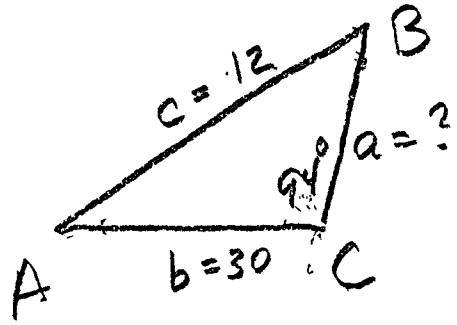
$a = 1$ $\qquad b^2 - 4ac$

$b = 33.99$ $\qquad (33.99)^2 - 4(1)(1053)$

$c = 1053$ $\qquad 1155.3201 - 4212 \Rightarrow$ d = Negative

No Solution

(123) $m\angle C = 94°$, $b = 30$, $C = 12$



a =	A =
b = 30	B =
c = 12	C = 94°

SSA ⇒ LOC (EXPECT Q.E.)

$ax^2 + bx + c = 0$

$12^2 = 30^2 + a^2 - 2(30)(a)(\cos 94°)$

$144 = 900 + a^2 - 60(-\cos 86)a$ ($\cos 86 \approx .0698$)

$-144 \quad -144$

$0 = 756 + a^2 + 4.188a$

$1a^2 + 4.188a + 756 = 0$

SIDE

$a = 1$

$b = 4.188$

$c = 756$

$b^2 - 4ac$

$(4.188)^2 - 4(1)(1)(756)$

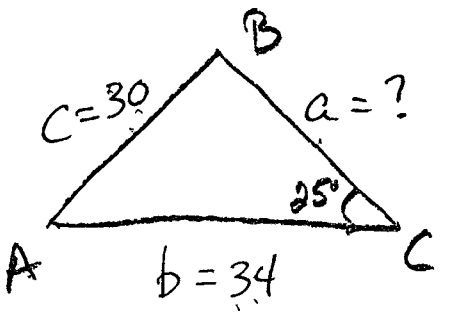
$17.539 - 3024 =$ d = NEGATIVE

$i = \sqrt{-1}$

$a + bi$ Complex

$x = \dfrac{-b \pm \sqrt{\text{negative}}}{2a} \Rightarrow$ NO REAL SOLUTION

(22) $m\angle C = 25°$, $b = 34$, $c = 30$



a =	A =
b = 34	B =
c = 30	C = 25°

SSA ⇒ LOC

$30^2 = 34^2 + a^2 - 2(34)(a)\cos 25°$

$900 = 1156 + a^2 - 68(.9063)a$

$-900 \quad -900$

$0 = 256 + a^2 - 61.6284a$

$a^2 - 61.6284a + 256 = 0$

$a = 1$

$b = -61.6284$

$c = 256$

$b^2 - 4ac$

$(-61.6284)^2 - 4(1)(256)$

$3798.0597 - 1024 = 2774.0596 = d$

$$a = \frac{-b \pm \sqrt{d}}{2a} = \frac{61.6284 \pm \sqrt{2774.0596}}{2(1)}$$

SIDE — ↑ QUAD FORM

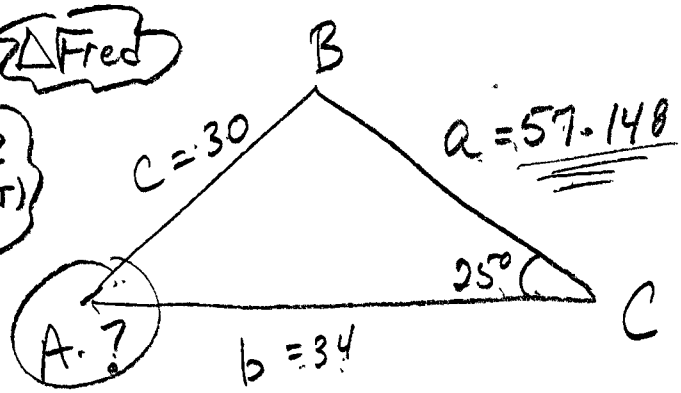
$$a = \frac{61.6284 + 52.669}{2}, \quad a = \frac{61.6284 - 52.669}{2}$$

(CONTINUED) $a = 57.1487$ AND $a = 4.4797$

△ Fred — △ Gertrude

△Fred

122 (CONT)



a = 57.1487	A = 126°
b = 34	B = 29°
c = 30	C = 25°

$$57.1487^2 = 30^2 + 34^2 - 2(30)(34)\cos A$$

$$3265.974 = 900 + 1156 - 2040\cos A$$

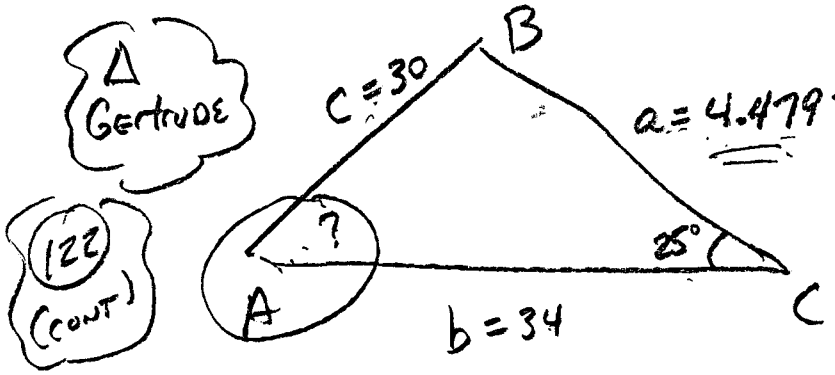
$$\frac{-1209.974}{-2040} = \frac{-2040\cos A}{-2040}$$

$$\theta' = \cos^{-1}(.5931) = A' = 53.62$$

$$\therefore A = 126^\circ$$

$$B = (180) - (126 + 25)$$

$$B = 180 - 151 = 29^\circ$$



a = 4.4797 | A = 4°

b = 34 | B = 151°

C = 30 | C = 25°

$$4.4797^2 = 30^2 + 34^2 - 2(30)(34)\cos A$$

$$20.0677 = 900 + 1156 - 2040\cos A$$

$$20.0677 = 2056 - 2040\cos A$$

$$-2056 \qquad -2056$$

$$\frac{-2035.9323}{-2040} = \frac{-2040\cos A}{-2040}$$

$$.9980 = \cos A \qquad \therefore A = \cos^{-1}(.9980)$$

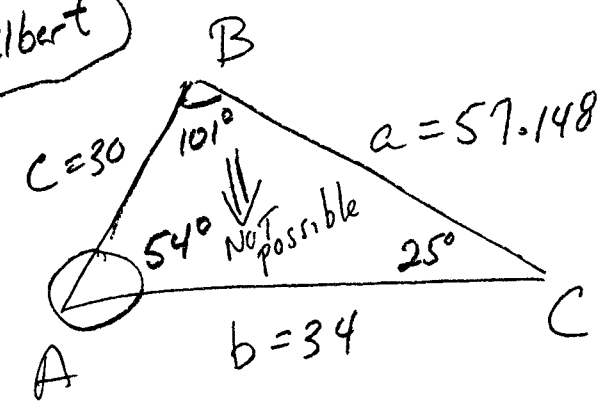
$$A = 3.619^\circ$$

$$B = 180 - (25 + 4)$$

$$B = 151^\circ$$

△ Elbert

122 (cont)



THIS IS WHY you should use the LOC twice in an AMBIGUOUS CASE!

$S.N\,25 = .4226$

$$\frac{SIN25}{30} = \frac{SIN\,A}{57.1487}$$

$$\frac{57.1487}{1} \cdot \frac{.4226}{30} = .8050$$

$$SIN^{-1}(.8050) = \underline{53.6^\circ = A}$$

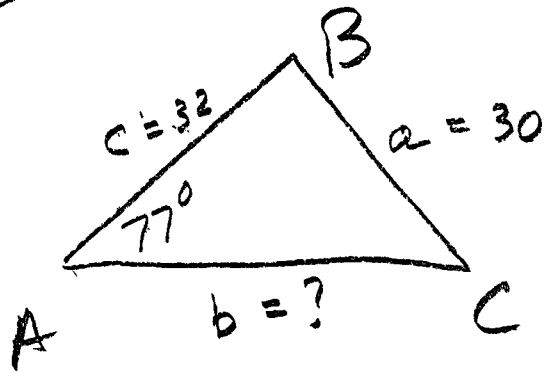
$$\therefore B = 180 - (54+25)$$

$$B = \underline{101^\circ}$$

This is AN INCORRECT solution.
This is the result of finding another ambiguous case of the LOS.

Note: this △ does not EXIST, look at longest side, is it opposite the biggest angle??

(126) $m\angle A = 77°$, $C = 32$, $a = 30$



$a = 30$ $A = 77°$

$b =$ $B =$

$c = 32$ $C =$

SSA ⇒ LOC

(2250)

$30^2 = 32^2 + b^2 - 2(32)(b)\cos 77$

$900 = 1024 + b^2 - 14.4b$

SIDE → $b^2 - 14.4b + 124 = 0$

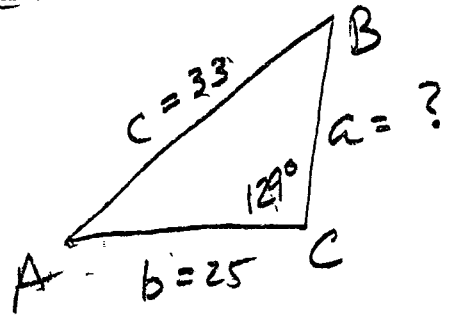
$a = 1$ $\quad b^2 - 4ac$

$b = -14.4$ $\quad (-14.4)^2 - 4(1)(124)$

$c = 124$ $\quad 207.36 - 496 =$ Negative = d

NO SOLUTIONS

(12) $m\angle C = 129°$, $b = 25$, $C = 33$



$a = 10.9$ | $A = 15°$

$b = 25$ | $B = 36°$

$c = 33$ | $C = 129°$

SSA ⇒ LOC

EXPECT A QE

$-\cos C$ ⇓ $-\cos 51°$ (.6293)

$$33^2 = 25^2 + a^2 - 2(25)(a)(-\cos 51)$$

$$1089 = 625 + a^2 + 31.465a$$

$$-1089 \quad -1089$$

$$1a^2 + 31.465a - 464 = 0$$

$a = 1$

$b = 31.465$

$c = -464$

$b^2 - 4ac$

$(31.465)^2 - 4(1)(-464)$

$990.046 + 1856 = 2846.046 = d$

$$a = \frac{-31.465 \pm \sqrt{2846.046}}{2(1)}$$

$$a = \frac{-31.465 + 53.348}{2} = 10.941$$

$$a = \frac{-31.465 - 53.348}{2} = \text{neg}$$

(12 cont)

$$10.941^2 = 33^2 + 25^2 - 2(33)(25)\cos A$$

$$119.705 = 1089 + 625 - 1650\cos A$$

$$119.705 = 1.714 - 1650\cos A$$

$$-1714 \qquad -1714$$

$$\frac{-1594.295}{-1650} = \cos A$$

$$.9662 = \cos A$$

$$\cos^{-1}(.9662) = A \approx 15^\circ$$

$$B = 180 - (129 + 15) = 36^\circ$$

QUADRATIC FORMULA

USED TO SOLVE QUADRATIC EQUATIONS IN STANDARD FORM $\Rightarrow ax^2+bx+c=0$

$$x=\frac{-b\pm\sqrt{d}}{2a} \qquad \begin{cases} d=b^2-4ac \\ \text{discriminant} \end{cases}$$

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2 Δ $x \Rightarrow$ 2 positive real SOLUTIONS

0 Δ $x \Rightarrow$ 2 negative real solution

1 Δ $x \Rightarrow$ 1 pos, 1 neg real sol.

0 Δ $x \Rightarrow$ 2 complex sol. (imaginary) $\sqrt{-1}$

1 Δ $x \Rightarrow$ 1 pos. real sol (Double root)

$i = \sqrt{-1}$ imag.

$i^2 = -1$

$a + bi$

↑ real ↑ imag

Complex

Complex Numbers

(Ex) $3 + 4i$