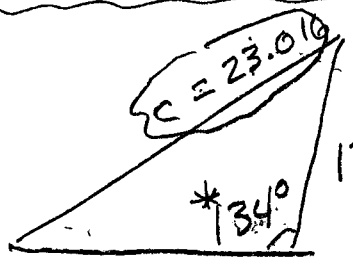
Geometry Weds. 5-1-13 Class Notes

Law of Cosines Practice:

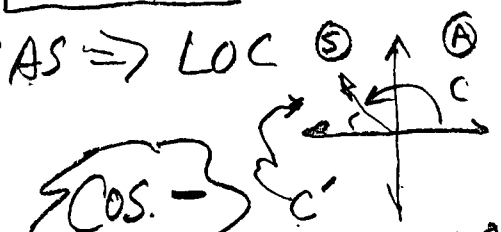
(81)



$a = 13$
$b = 12$
$c = 23.0$

$A = 24°$
$B = 22°$
$C = 134°$

SAS ⇒ LOC



cos −

$180 - 134 = 46° = C'$

$c^2 = a^2 + b^2 - 2ab \cos 134°$ ↓ ref −

$c^2 = 13^2 + 12^2 - 2(13)(12)(-.6947)$

$c^2 = 169 + 144 + 312(.6947)$

$c^2 = 313 + 216.746$

$c^2 = 529.746 \quad \therefore \quad c = \underline{23.0916}$

---

13. $\dfrac{\sin 46°}{23.016} = \dfrac{\sin A}{13} \cdot 13$

$\dfrac{13 \sin 46}{23.016} = \sin A \quad \therefore$

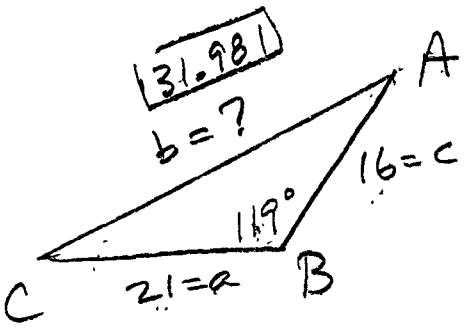
$\dfrac{13(.7193)}{23.016} = .4063 \quad \therefore \sin^{-1}(.4063) = A$

$A = 24°$

$B = 180 - (134 + 24)$

$B = \underline{22°}$

(83)

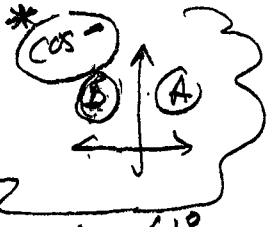


$a = 21$ $\quad$ $A = 35°$

$b = 32.0$ $\quad$ $B = 119°$

$C = 16$ $\quad$ $C = 26°$

SAS ⇒ LOC



Find b

ref ∠ = 61°

$$b^2 = 21^2 + 16^2 - 2(21)(16)(-\cos 119°)$$

$$b^2 = 441 + 256 + 672(.4848)$$

$$b^2 = 1022.7856 \therefore b = 31.981$$

---

ref

(21.) $\dfrac{\sin 61}{31.981} = \dfrac{\sin A}{21} \cdot 21$

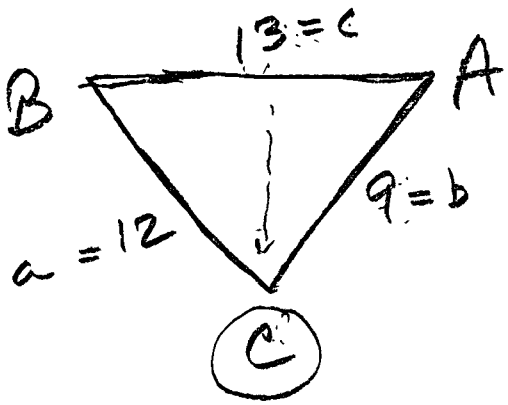
$$\frac{21(.8746)}{31.981} = \sin A$$

$$.5743 = \sin A \therefore \sin^{-1}(.5743) = A$$

$$35° = A$$

$$C = 180 - (119 + 35) = 26°$$

(84)



$a = 12$
$b = 9$
$c = 13$

$A = 63°$
$B = 42°$
$C = 75°$

SSS = LOC

$13^2 = 12^2 + 9^2 - 2(12)(9)\cos C$

$169 = 144 + 81 - 216\cos C$

$169 = 225 - 216\cos C$

$-225 \quad -225$

$\frac{-56}{-216} = \frac{-216\cos C}{-216}$

$.2593 = \cos C \quad \therefore \cos^{-1}(.2593) = C$

$75° = C$

$12^2 = 13^2 + 9^2 - 2(13)(9)\cos A$

$144 = 169 + 81 - 234\cos A$

$\frac{-106}{-234} = \frac{-234\cos A}{-234} \quad \therefore \cos^{-1}(.4530) = A$

$63° = A$

$\therefore B = 180 - (75+63)$

$= 180 - 138 = 42°$

(96) (cont)

$10^2 = 11^2 + 17^2 - 2(11)(17)\cos B$

$100 = 121 + 289 - 374\cos B$

$100 = 410 - 374\cos B$

$-410 \quad -410$

$\frac{-310}{-374} = \frac{-374\cos B}{-374}$

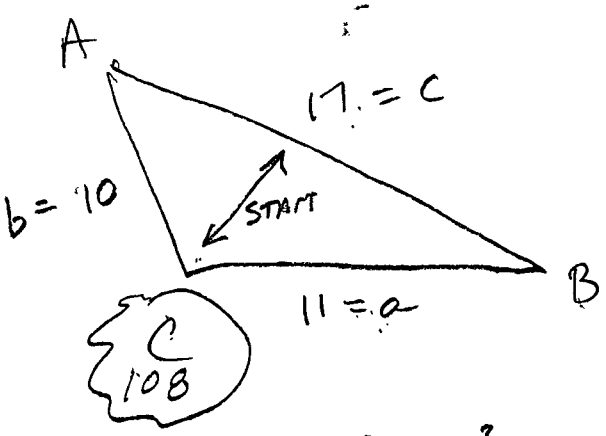
$.8289 = \cos B \quad \therefore \cos^{-1}(.8289) = B$

$\underline{34^\circ} = B$

$A = 180 - (108^\circ + 34^\circ)$

$A = 180 - 142 = \underline{38^\circ}$

(96)



$a = 11$ $\boxed{A = 38°}$

$b = 10$ $\boxed{B = 34°}$

$c = 17$ $\boxed{C = 108°}$

SSS ⇒ LOC

$$17^2 = 11^2 + 10^2 - 2(11)(10)(\cos C)$$

$$289 = 121 + 100 - 220 \cos C$$

$$289 = 221 - 220 \cos C$$

$$-221 \quad -221$$

$$\frac{68}{-220} = \frac{(-220)(\cos C)}{-220}$$

QUADRANT II ANGLE

$$-.3091 = \cos C \quad \therefore \cos^{-1}(-.3091) = C$$

$$\cos^{-1}(.3091) = C'$$

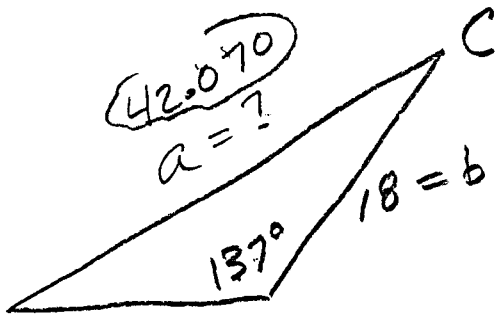
$$72° = C'$$

REF ANGLE

$$\therefore C = 180 - 72 = \underline{\underline{108°}}$$

(CONTINUED) →

(87)



$a = 42.1$ $\quad A = 137$

$b = 18$ $\quad B = 17$

$c = 27$ $\quad C = 26°$

S/A
T/C
*Cos is negative

SAS ⇒ LOC

$a^2 = 18^2 + 27^2 - 2(18)(27)\cos 137°$ ← Ref = 43°

$a^2 = 324 + 729 + 972(.7314)$

$a^2 = 1059 + 710.9208$

$a^2 = 1769.9208 \quad \therefore a = \underline{42.070}$

$18 \cdot \dfrac{\sin 43}{42.070} = \dfrac{\sin B}{18} \cdot 18$

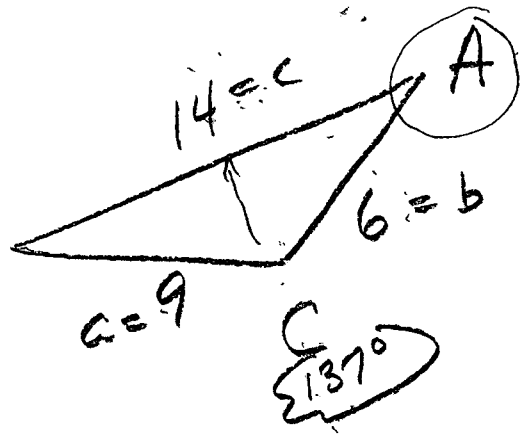
$\dfrac{18(.6820)}{42.070} = \sin B \quad \therefore \sin^{-1}(.2918) = B$

$\underline{17°} = B$

$\therefore C = 180 - (137 + 17)$

$C = 180 - 154 = \underline{26°}$

(107)



$a = 9$ $A = 26°$

$b = 6$ $B = 17°$

$c = 14$ $C = 137°$

SSS $\Rightarrow$ LOC

$$14^2 = 6^2 + 9^2 - 2(6)(9)(\cos C)$$

$$196 = 36 + 81 - 108(\cos C)$$

$$196 = 117 - 108(\cos C)$$

$$-117 \quad -117$$

$$\frac{79}{108} = \frac{-108(\cos C)}{-108}$$

$$-.7315 = \cos C$$

$\therefore \cos^{-1}(-.7315) = C$

$\therefore C' = \cos^{-1}(.7315)$

Ref Angle

$C' = 43°$

$C = 180 - 43 = \underline{\underline{137°}}$

* WARNING − cos means OBTUSE Angle

(CONTINUED)

(10? cont)

$$9^2 = 6^2 + 14^2 - 2(6)(14)\cos A$$

$$81 = 36 + 196 - 168\cos A$$

$$81 = 232 - 168\cos A$$

$$\frac{-151}{-168} = \frac{-168\cos A}{-168}$$

$$.8988 = \cos A \quad \therefore \quad \cos^{-1}(.8988) = A$$

$$\underline{\underline{26^\circ}} = A$$

$$B = 180 - (137 + 26)$$

$$= 180 - 163 = \underline{\underline{17^\circ}}$$