

Law of Sines

$$\underline{\#1} \quad \frac{\sin 95^\circ}{b} = \frac{\sin 40^\circ}{15}$$

$$b = \frac{15 \sin 95^\circ}{\sin 40^\circ} \approx \underline{23.2}$$

$$\underline{\#3} \quad \frac{\sin 26^\circ}{a} = \frac{\sin 55^\circ}{10}$$

$$a = \frac{10 \sin 26^\circ}{\sin 55^\circ} \approx \underline{5.4}$$

$$\underline{\#5} \quad \frac{\sin 38^\circ}{a} = \frac{\sin 43^\circ}{24}$$

$$a = \frac{24 \sin 38^\circ}{\sin 43^\circ} \approx \underline{21.7}$$

$$\begin{aligned} \gamma &= 180^\circ - 38^\circ - 99^\circ \\ \gamma &= 43^\circ \end{aligned}$$

$$\underline{\#7} \quad \frac{\sin 59^\circ}{c} = \frac{\sin 89^\circ}{11}$$

$$c = \frac{11 \sin 59^\circ}{\sin 89^\circ} \approx \underline{9.4}$$

$$\begin{aligned} \beta &= 180^\circ - 32^\circ - 59^\circ \\ \beta &= 89^\circ \end{aligned}$$

#9

$$\frac{\sin \beta}{14} = \frac{\sin 40^\circ}{15}$$

$$\sin \beta = \frac{14 \sin 40^\circ}{15} \approx 0.5999$$

$$\beta = \underline{36.9^\circ} \text{ or } \cancel{143.1^\circ}$$

#11

$$\frac{\sin \beta}{14} = \frac{\sin 40^\circ}{8}$$

$$\sin \beta = \frac{14 \sin 40^\circ}{8} \approx 1.12$$

NO SUCH TRIANGLE

#13

$$\frac{\sin \gamma}{9} = \frac{\sin 80^\circ}{10}$$

$$\sin \gamma = \frac{9 \sin 80^\circ}{10} \approx 0.8863$$

$$\gamma = \underline{62.4^\circ} \text{ or } \cancel{117.6^\circ}$$

$$\underline{\#15} \quad \frac{\sin \alpha}{10} = \frac{\sin 40^\circ}{12}$$

$$\sin \alpha = \frac{10 \sin 40^\circ}{12} \approx 0.5357$$

$$\alpha = \underline{32.4^\circ} \text{ or } \cancel{147.6^\circ}$$

~~+ 40
187.6~~

$$\underline{\#17} \quad \frac{\sin \alpha}{10} = \frac{\sin 80^\circ}{4}$$

$$\sin \alpha = \frac{10 \sin 80^\circ}{4} \approx 2.46$$

NO SUCH TRIANGLE

SAS LAW OF COSINES

#1

$$a^2 = \underline{12^2} + \underline{14^2} - 2(\underline{12})(\underline{14}) \cos 40^\circ$$

↑
opposites

$$a^2 = 82.6 \Rightarrow \underline{a = 9.1}$$

SSS

#5

$$\cos \alpha = \frac{24^2 + 10^2 - 15^2}{2(24)(10)}$$

↑
opposites

$$\cos \alpha = 0.9396$$

$$\alpha = 20.0^\circ$$

EX. $a = 5, b = 12, c = 17$

Find β

$$5 + 12 \not> 17$$

NO SUCH TRIANGLE



The two smaller sides must add up to more than the longest side.

#2

$$c^2 = 10^2 + 15^2 - 2(10)(15)\cos 50^\circ$$

$$\underline{\underline{c = 11.5}}$$

#3

$$b^2 = 24^2 + 44^2 - 2(24)(44)\cos 100^\circ$$

$$\underline{\underline{b = 53.7}}$$

#4

$$a^2 = 19^2 + 12^2 - 2(19)(12)\cos 25^\circ$$

$$\underline{\underline{a = 9.6}}$$

#6 $12 + 14 \nrightarrow 26$

#7 $\cos \gamma = \frac{9^2 + 18^2 - 11^2}{2(9)(18)}$

$$\underline{\underline{\gamma = 28.8^\circ}}$$

8 $6 + 11 \neq 18$

9 $\cos \beta = \frac{22^2 + 29^2 - 33^2}{2(22)(29)}$

$\beta = 79.3^\circ$

10 $\cos \gamma = \frac{2^2 + 4^2 - 3^2}{2(2)(4)}$

$\gamma = 46.6^\circ$

HW : Law of Cosines Handout
1-10

(Don't do the back side)