

$$\textcircled{\#1} \quad \frac{\sin 91^\circ}{b} = \frac{\sin 37^\circ}{15}$$

$$b = \frac{15 \cdot \sin 91^\circ}{\sin 37^\circ} = \underline{\underline{24.9}}$$

$$\text{Area} = \frac{1}{2} a \cdot b \cdot \sin \gamma$$

$$\gamma = 180^\circ - 37^\circ - 91^\circ = 52^\circ \quad \uparrow$$

$$\begin{aligned} \text{Area} &= \frac{1}{2} (15)(24.921) \sin 52^\circ \\ &= \underline{\underline{147}} \end{aligned}$$

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$$\textcircled{\#2} \quad \cos \alpha = \frac{39^2 + 40^2 - 9^2}{2(39)(40)} = 0.97436$$

$$\alpha = \underline{\underline{13.0^\circ}}$$

$$s = \frac{1}{2}(9 + 40 + 39) = 44$$

$$\begin{aligned} \text{Area} &= \sqrt{44(44-9)(44-39)(44-40)} \\ &= \underline{\underline{175}} \end{aligned}$$

$$\#3. \beta = 180^\circ - 28^\circ - 63^\circ = 89^\circ$$

$$\frac{\sin 89^\circ}{12} = \frac{\sin 63^\circ}{c}$$

$$c = \frac{12 \cdot \sin 63^\circ}{\sin 89^\circ} = \underline{\underline{10.7}}$$

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

$$= \frac{1}{2}(12)(10.694) \sin 28^\circ$$

$$= \underline{\underline{30.1}}$$

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#4. \*SSA case\*

$$\frac{\sin \alpha}{11} = \frac{\sin 79^\circ}{9}$$

$$\sin \alpha = \frac{11 \cdot \sin 79^\circ}{9} = 1.20$$

since can't be bigger than 1, so

there is no such triangle

#5

$$\frac{\sin 58^\circ}{c} = \frac{\sin 99^\circ}{20}$$

$$c = \frac{20 \cdot \sin 58^\circ}{\sin 99^\circ} = \underline{17.2}$$

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

$$\alpha = 180^\circ - 99^\circ - 58^\circ = 23^\circ$$

$$\begin{aligned} \text{Area} &= \frac{1}{2} (20)(17.172) \sin 23^\circ \\ &= \underline{67.1} \end{aligned}$$

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#6

$$a^2 = 21^2 + 13^2 - 2(21)(13) \cos 25^\circ$$

$$a^2 = 115.156 \Rightarrow a = \underline{10.7}$$

$$A = \frac{1}{2} bc \sin \alpha$$

$$= \frac{1}{2} (21)(13) \sin 25^\circ$$

$$= \underline{57.7}$$

$$\#7. \cos \beta = \frac{6^2 + 18^2 - 15^2}{2(6)(18)} = 0.625$$

$$\beta = 51.3^\circ$$

$$s = \frac{1}{2}(6 + 15 + 18) = 19.5$$

$$\text{Area} = \sqrt{19.5(19.5-6)(19.5-15)(19.5-18)}$$

$$= \underline{\underline{42.2}}$$