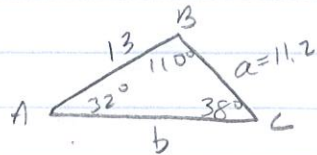


4-7 Law of Sines

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

1.



$$m\angle A = 180 - 110 - 38$$

$$m\angle A = 32^\circ$$

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

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

$$\frac{a}{\sin 32} = \frac{13}{\sin 38}$$

$$\frac{b}{\sin 110} = \frac{13}{\sin 38}$$

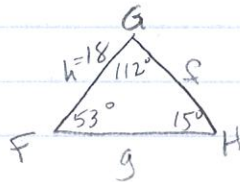
$$a = \frac{13}{\sin 38} (\sin 32)$$

$$b = \frac{13}{\sin 38} \cdot \sin 110$$

$$a = 11.2$$

$$b = 19.8$$

2.



$$m\angle H = 180 - 112 - 53$$

$$m\angle H = 15^\circ$$

$$\frac{h}{\sin H} = \frac{f}{\sin F}$$

$$\frac{h}{\sin H} = \frac{g}{\sin G}$$

$$\frac{18}{\sin 15} = \frac{f}{\sin 53}$$

$$\frac{18}{\sin 15} = \frac{g}{\sin 112}$$

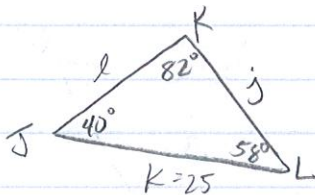
$$\sin 53 \cdot \frac{18}{\sin 15} = f$$

$$\sin 112 \cdot \frac{18}{\sin 15} = g$$

$$f = 55.5$$

$$g = 64.5$$

3.



$$m\angle K = 180 - 40 - 58$$

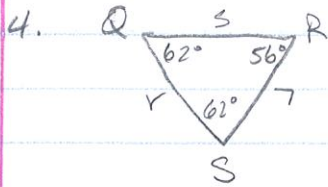
$$m\angle K = 82^\circ$$

$$\frac{k}{\sin K} = \frac{j}{\sin J}$$

$$\frac{k}{\sin K} = \frac{l}{\sin L}$$

$$\frac{25}{\sin 82} = \frac{j}{\sin 40}$$

$$\frac{25}{\sin 82} = \frac{l}{\sin 58}$$



$$m\angle S = 180 - 62 - 56$$

$$m\angle S = 62^\circ$$

$$\frac{q}{\sin Q} = \frac{r}{\sin R}$$

$$\frac{q}{\sin Q} = \frac{s}{\sin S}$$

$$\frac{7}{\sin 62^\circ} = \frac{r}{\sin 56^\circ}$$

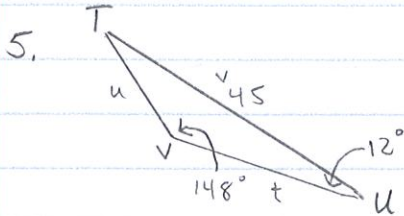
$$\frac{7}{\sin 62^\circ} = \frac{s}{\sin 62^\circ}$$

$$\sin 56^\circ \cdot \frac{7}{\sin 62^\circ} = r$$

$$\sin 62^\circ \cdot \frac{7}{\sin 62^\circ} = s$$

$$r = 6.6$$

$$s = 7$$



$$m\angle T = 180 - 148 - 12$$

$$m\angle T = 20^\circ$$

$$\frac{v}{\sin V} = \frac{u}{\sin U}$$

$$\frac{v}{\sin V} = \frac{t}{\sin T}$$

$$\frac{45}{\sin 148^\circ} = \frac{u}{\sin 12^\circ}$$

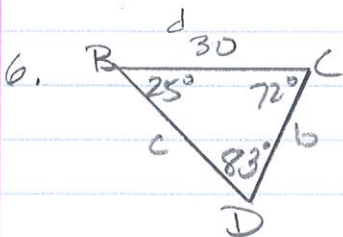
$$\frac{45}{\sin 148^\circ} = \frac{t}{\sin 20^\circ}$$

$$\sin 12^\circ \cdot \frac{45}{\sin 148^\circ} = u$$

$$\sin 20^\circ \cdot \frac{45}{\sin 148^\circ} = t$$

$$u = 17.7$$

$$t = 29$$



$$m\angle D = 180 - 25 - 72$$

$$m\angle D = 83^\circ$$

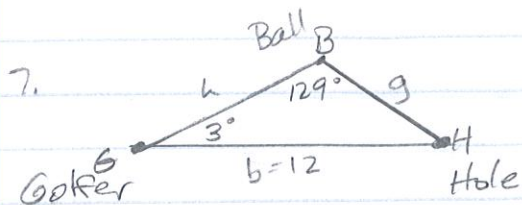
$$\frac{d}{\sin D} = \frac{b}{\sin B}$$

$$\frac{d}{\sin D} = \frac{c}{\sin C}$$

$$\frac{30}{\sin 83^\circ} = \frac{b}{\sin 25^\circ}$$

$$\frac{30}{\sin 83^\circ} = \frac{c}{\sin 72^\circ}$$

$$\sin 25^\circ \cdot 30$$

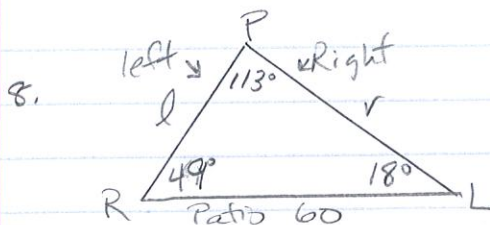


$$\frac{b}{\sin B} = \frac{g}{\sin G}$$

$$\frac{12}{\sin 129^\circ} = \frac{g}{\sin 3^\circ}$$

$$\sin 3^\circ \cdot \frac{12}{\sin 129^\circ} = g$$

$$g = .8 \text{ ft.}$$



$$m\angle P = 180 - 49 - 18 \quad m\angle P = 113^\circ$$

Left $\frac{l}{\sin L} = \frac{P}{\sin P}$

$$\frac{l}{\sin 18^\circ} = \frac{60}{\sin 113^\circ}$$

$$l = \frac{\sin 18^\circ \cdot 60}{\sin 113^\circ}$$

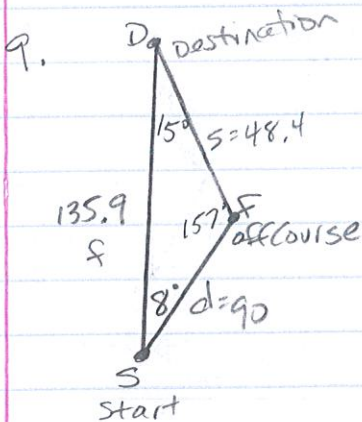
$$l = 20.1 \text{ ft.}$$

Right $\frac{r}{\sin R} = \frac{P}{\sin P}$

$$\frac{r}{\sin 49^\circ} = \frac{60}{\sin 113^\circ}$$

$$r = \frac{\sin 49^\circ \cdot 60}{\sin 113^\circ}$$

$$r = 49.2 \text{ ft.}$$



$$m\angle D = 180 - 157 - 8 \quad m\angle D = 15^\circ$$

$$\frac{s}{\sin S} = \frac{d}{\sin D}$$

$$\frac{s}{\sin 8^\circ} = \frac{90}{\sin 15^\circ}$$

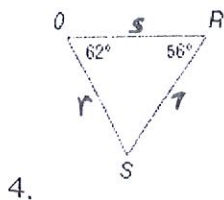
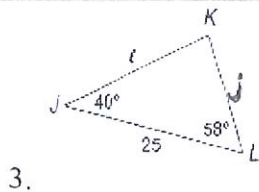
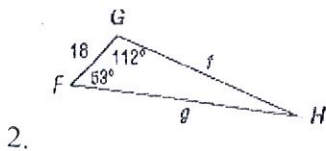
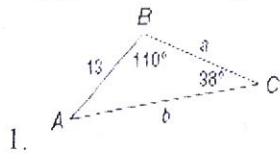
$$s = \frac{\sin 8^\circ \cdot 90}{\sin 15^\circ}$$

$$\frac{f}{\sin F} = \frac{d}{\sin D}$$

$$\frac{f}{\sin 157^\circ} = \frac{90}{\sin 15^\circ}$$

$$f = \frac{\sin 157^\circ \cdot 90}{\sin 15^\circ}$$

Solve each triangle. Round to the nearest tenth, if necessary.



7. **GOLF** A golfer misses a 12-foot putt by putting 3° off course. The hole now lies at a 129° angle between the ball and its spot before the putt. What distance does the golfer need to putt in order to make the shot?
8. **ARCHITECTURE** An architect's client wants to build a home based on the architect Jon Lautner's Sheats-Goldstein House. The length of the patio will be 60 feet. The left side of the roof will be at a 49° angle of elevation, and the right side will be at an 18° angle of elevation. Determine the lengths of the left and right sides of the roof and the angle at which they will meet.



... off course in order to avoid a storm. The pilot then