

Suppose that $m = 8.6$. and $K = 58^\circ$.

SCORE: ____ / 6 PTS

- [a] Find all values of k for which there are no possible triangles $\triangle MLK$.

$$k < m \sin K \rightarrow k < 8.6 \sin 58^\circ \rightarrow k < 7.3$$

- [b] Find all values of k for which there is exactly one possible triangle $\triangle MLK$. Do NOT solve the triangle.

$$k = 7.3 \text{ or } k \geq 8.6$$

- [c] Find all values of k for which there are two possible triangles $\triangle MLK$. Do NOT solve the triangles.

$$7.3 < k < 8.6$$

Find the areas of the following triangles.

SCORE: ____ / 4 PTS

- [a] $\triangle JCP$ if $p = 9.1$, $c = 7.6$, $C = 56.6^\circ$ and $J = 34.8^\circ$

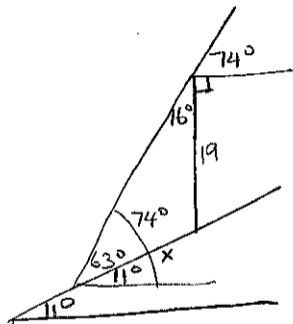
$$A = \frac{1}{2} p c \sin J = \frac{1}{2} (9.1)(7.6) \sin 34.8^\circ = 19.7$$

- [b] $\triangle BVD$ if $b = 5.7$, $v = 7.1$ and $d = 4.3$

$$s = \frac{1}{2} (b + v + d) = \frac{1}{2} (5.7 + 7.1 + 4.3) = 8.55$$

$$A = \sqrt{s(s-b)(s-v)(s-d)} = \sqrt{8.55(8.55-5.7)(8.55-7.1)(8.55-4.3)} = 12.3$$

A flagpole at a right angle to the horizontal is located on a slope that makes an angle of 11° with the horizontal. SCORE: ____ / 6 PTS
The flagpole is 19 feet tall, and its shadow points directly down the slope. Find the length of the shadow when the angle of elevation from the tip of the shadow to the sun is 74° .



$$\frac{x}{\sin 16^\circ} = \frac{19}{\sin 63^\circ}$$

$$x = \frac{19 \sin 16^\circ}{\sin 63^\circ} = 6 \text{ FT}$$

Solve the following triangles. Sketch and label triangles with your answers.

SCORE: ___ / 14 PTS

If no such triangle exists, write "DNE". If more than one triangle is possible, solve for all possible triangles.

[a] $\triangle AMC$

if $a = 5.6$, $m = 4.1$ and $M = 34^\circ$

$$5.6 \sin 34^\circ = 3.1$$

$$3.1 < 4.1 < 5.6 \rightarrow 2 \Delta's$$

$$\frac{\sin A}{5.6} = \frac{\sin 34^\circ}{4.1}$$

$$A = \sin^{-1} \frac{5.6 \sin 34^\circ}{4.1} = 50^\circ$$

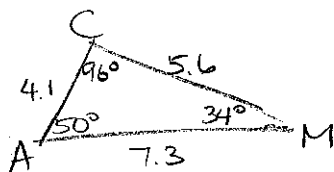
$$\text{or } 180^\circ - 50^\circ = 130^\circ$$

IF $A = 50^\circ$

$$C = 180^\circ - (50^\circ + 34^\circ) = 96^\circ$$

$$\frac{c}{\sin 96^\circ} = \frac{4.1}{\sin 34^\circ}$$

$$c = \frac{4.1 \sin 96^\circ}{\sin 34^\circ} = 7.3$$

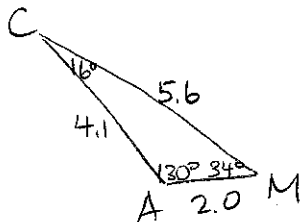


IF $A = 130^\circ$

$$C = 180^\circ - (130^\circ + 34^\circ) = 16^\circ$$

$$\frac{c}{\sin 16^\circ} = \frac{4.1}{\sin 34^\circ}$$

$$c = \frac{4.1 \sin 16^\circ}{\sin 34^\circ} = 2.0$$



[b] $\triangle FDT$

if $f = 3.5$, $d = 7.8$ and $t = 4.2$

$$3.5 + 4.2 = 7.7 \leq 7.8$$

DNE

[c] $\triangle PBJ$

if $p = 5.8$, $b = 3.7$ and $j = 9.3$

$$9.3^2 = 5.8^2 + 3.7^2$$

$$-2(5.8)(3.7) \cos J$$

$$J = \cos^{-1} \frac{9.3^2 - 5.8^2 - 3.7^2}{-2(5.8)(3.7)}$$

$$= 156^\circ$$

$$\frac{\sin B}{3.7} = \frac{\sin 156^\circ}{9.3}$$

$$B = \sin^{-1} \frac{3.7 \sin 156^\circ}{9.3} = 9^\circ$$

$$P = 180^\circ - (156^\circ + 9^\circ) = 15^\circ$$

