Solve the following triangles. **Sketch and label triangles with your final answers.** **SCORE: ____ / 14 PTS**
If no such triangle exists, write "DNE". If more than one triangle is possible, solve for all possible triangles.

[a] ΔAMC if $a = 5.6$, $m = 4.1$ and $M = 34°$

$5.6 \sin 34° = 3.1$

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

$\frac{\sin A}{5.6} = \frac{\sin 34°}{4.1}$

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

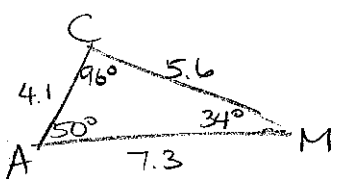
OR $180° - 50° = 130°$

IF $A = 50°$

$C = 180° - (50° + 34) = 96°$

$\frac{c}{\sin 96°} = \frac{4.1}{\sin 34°}$

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

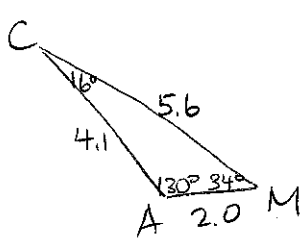


IF $A = 130°$

$C = 180° - (130° + 34°) = 16°$

$\frac{c}{\sin 16°} = \frac{4.1}{\sin 34°}$

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



[b] ΔFDT if $f = 3.5$, $d = 7.8$ and $t = 4.2$

$3.5 + 4.2 = 7.7 \leq 7.8$

DNE

[c] ΔPBJ if $p = 5.8$, $b = 3.7$ and $j = 9.3$

$9.3^2 = 5.8^2 + 3.7^2 - 2(5.8)(3.7)\cos J$

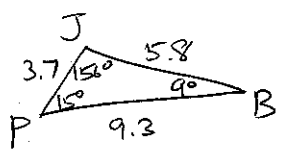
$J = \cos^{-1} \frac{9.3^2 - 5.8^2 - 3.7^2}{-2(5.8)(3.7)}$

$= 156°$

$\frac{\sin B}{3.7} = \frac{\sin 156°}{9.3}$

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

$P = 180° - (156° + 9°) = 15°$



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 ΔMLK.

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

[b] Find all values of k for which there is exactly one possible triangle ΔMLK. **Do NOT solve the triangle.**

$k = 7.3$ OR $k \geq 8.6$

[c] Find all values of k for which there are two possible triangles ΔMLK. **Do NOT solve the triangles.**

$7.3 < k < 8.6$

Find the areas of the following triangles.

SCORE: ____ / 4 PTS

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

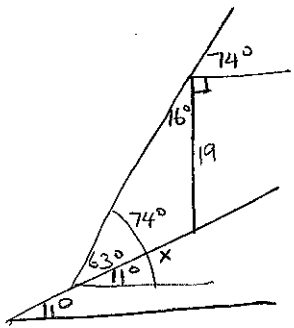
$$A = \frac{1}{2}pc\sin J = \frac{1}{2}(9.1)(7.6)\sin 34.8^\circ = 19.7$$

[b] ΔBVD 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°.



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

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