

Trigonometry Exercise 8: Solving Triangles

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Due Date: _____

Question #4 - Fill in the chart with the solutions. Round all answers on this page to one decimal place.

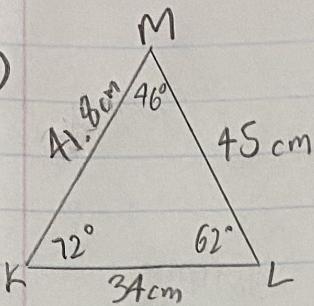
[/43 marks]

Question	Number of Solutions	Reason	Answer(s)	Answer(s)	Answer(s)
4a	1	AAS	$M = 46^\circ$	$m = 34\text{cm}$	$l = 41.8\text{cm}$
4b	1	AAS	$M = 90^\circ$	$m = 13.6\text{cm}$	$l = 11.8\text{cm}$
4c	1	SAS	$m = 8\text{cm}$	$K = 98^\circ$	$L = 30^\circ$
4d	1	SSS	$M = 69.5^\circ$	$K = 73^\circ$	$L = 37.5^\circ$
4e	1	SAS	$k = 15.2\text{cm}$	$L = 23^\circ$	$M = 57^\circ$
4f	1	SAS	$k = 28.2\text{cm}$	$L = 62.8^\circ$	$M = 79.2^\circ$
4g	1	SAS	$k = 13.2\text{cm}$	$L = 28.5^\circ$	$M = 112.5^\circ$
4h	2	SSA	$M = 46.7^\circ$ $M = 133.3^\circ$	$l = 15.8\text{cm}$ $l = 2.1\text{cm}$	$L = 94.3^\circ$ $L = 7.7^\circ$



4a)

Questions
are in
vertical
order.
Whoops!



AAS \rightarrow 1 solution

$$M = 180 - 72 - 62 = 46^\circ$$

$$\frac{m}{\sin 46} = \frac{45}{\sin 72}$$

$$m = \frac{45 \sin 46}{\sin 72}$$

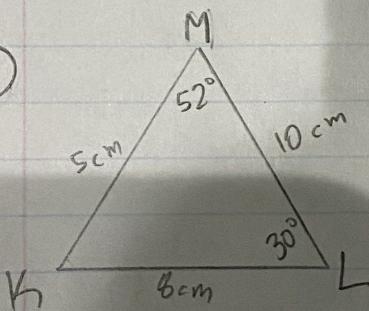
$$m \approx 34 \text{ cm}$$

$$\frac{l}{\sin 62} = \frac{45}{\sin 72}$$

$$l = \frac{45 \sin 62}{\sin 72}$$

$$l \approx 41.8 \text{ cm}$$

c)



SAS \rightarrow 1 solution

$$m^2 = 5^2 + 10^2 - 2(5 \cdot 10) \cos 52$$

$$m^2 = 25 + 100 - 100(0.6157)$$

$$m^2 \leq 125 - 61.57$$

$$m^2 = 63.4339$$

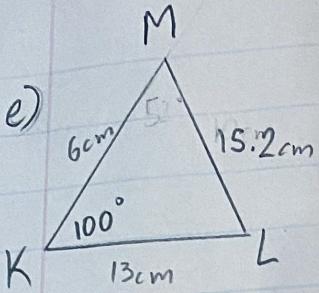
$$m \approx 8 \text{ cm}$$

$$l = \frac{\sin L}{5} = \frac{\sin 52^\circ}{8}$$

$$\sin L = \frac{5 \sin 52^\circ}{8}$$

$$L \approx 30^\circ$$

$$K = 180 - 52 - 30 = 98^\circ$$



SAS \rightarrow 1 solution

$$k^2 = 6^2 + 13^2 - 2(6 \cdot 13) \cos 100^\circ$$

$$k^2 = 232.17 - 156$$

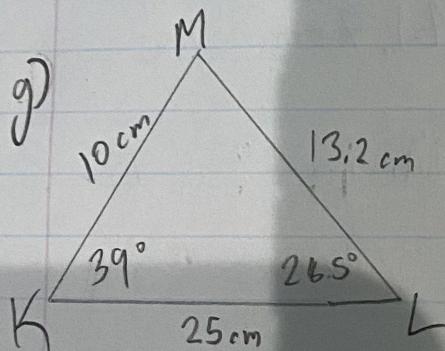
$$k \approx 15.2 \text{ cm}$$

$$\frac{\sin L}{6} = \frac{\sin 100^\circ}{15.2}$$

$$\sin L = \frac{6 \sin 100^\circ}{15.2}$$

$$L \approx 23^\circ$$

$$M = 180 - 100 - 23 = 57^\circ$$



SAS \rightarrow 1 solution

$$k^2 = 10^2 + 25^2 - 2(10 \cdot 25) \cos 39^\circ$$

$$k^2 = 174.9$$

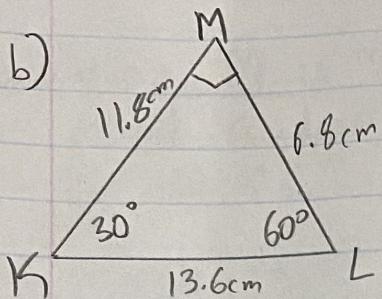
$$k \approx 13.2 \text{ cm}$$

$$\frac{\sin L}{10} = \frac{\sin 39}{13.2}$$

$$\sin L = \frac{10 \sin 39}{13.2}$$

$$L \approx 28.5^\circ$$

$$M = 180 - 39 - 28.5 = 112.5^\circ$$



AAS \rightarrow 1 solution

$$M = 180 - 60 - 30 = 90^\circ$$

$$\tan 60^\circ = \frac{1}{6.8}$$

$$6.8 \tan 60^\circ = 1$$

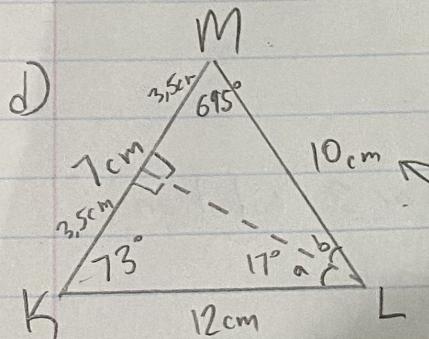
$$1 \approx 11.8 \text{ cm}$$

$$\sin 30^\circ = \frac{6.8}{m}$$

$$\csc 30^\circ = \frac{m}{6.8}$$

$$6.8 \csc 30^\circ = m$$

$$m \approx 13.6 \text{ cm}$$



SSS \rightarrow 1 solution

This is assuming that the question meant 10 cm not 10 units. If not, this question has no solution

$$\sin a = \frac{3.5}{12}$$

$$a \approx 17^\circ$$

$$\sin b = \frac{3.5}{10}$$

$$b \approx 20.5^\circ$$

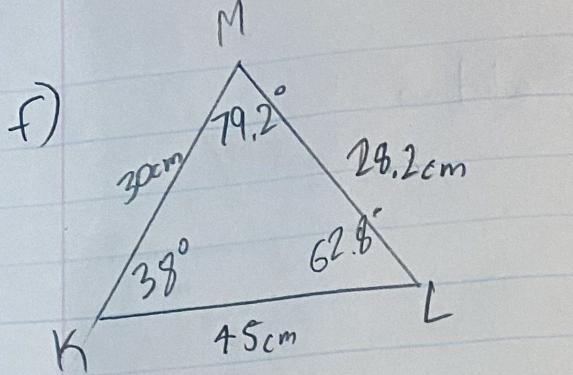
$$K = 180 - 90 - 17 = 73^\circ$$

$$M = 180 - 90 - 20.5 = 69.5^\circ$$

$$L = a + b$$

$$= 17 + 20.5$$

$$= 37.5^\circ$$



SAS \rightarrow 1 solution

$$k^2 = 30^2 + 45^2 - 2(30 \cdot 45) \cos 38^\circ$$

$$k^2 = 797.4$$

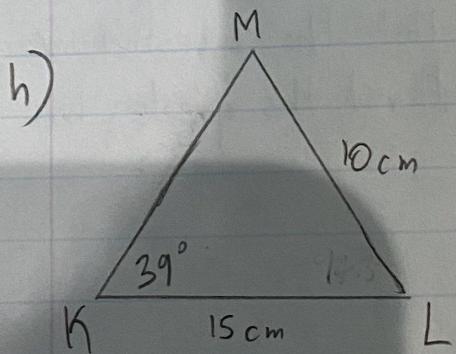
$$k \approx 28.2 \text{ cm}$$

$$\frac{\sin M}{45} = \frac{\sin 38^\circ}{28.2}$$

$$\sin M = \frac{45 \sin 38^\circ}{28.2}$$

$$M \approx 79.2^\circ$$

$$L = 180 - 38^\circ - 79.2^\circ = 62.8^\circ$$



SSA \rightarrow 1 or 2 solutions

$$15 > 10$$

$$m > 39^\circ$$

2 solutions

When M is acute

$$\frac{\sin M}{15} = \frac{\sin 39}{10}$$

$$L = 180 - 39 - 46.7 = 94.3^\circ$$

$$\sin M = \frac{15 \sin 29}{10}$$

$$\frac{1}{\sin 94.3} = \frac{10}{\sin 39}$$

$$M \approx 46.7^\circ$$

$$l = \frac{10 \sin 94.3}{\sin 39}$$

$$l \approx 15.8 \text{ cm}$$

h (ctnd) When M is obtuse

Second Quadrant: $180 - \theta$

$$M = 180 - 46.7 = 133.3^\circ$$

$$L = 180 - 133.3 - 39 = 7.7^\circ$$

$$\frac{l}{\sin 7.7} = \frac{10}{\sin 39}$$

$$l = \frac{10 \sin 7.7}{\sin 39}$$

$$l \approx 2.1 \text{ cm}$$