A2.A.75: Law of Sines - The Ambiguous Case 1: Determine the solution(s) from the SSA situation (ambiguous case)

1 In ΔABC, $m\angle A = 74$, $a = 59.2$, and $c = 60.3$. What are the two possible values for $m\angle C$, to the *nearest tenth*?
1) 73.7 and 106.3
2) 73.7 and 163.7
3) 78.3 and 101.7
4) 78.3 and 168.3

2 How many distinct triangles can be formed if $m\angle A = 35$, $a = 10$, and $b = 13$?
1) 1
2) 2
3) 3
4) 0

3 How many distinct triangles can be formed if $m\angle A = 30$, side $b = 12$, and side $a = 8$?
1) 1
2) 2
3) 3
4) 0

4 What is the total number of distinct triangles that can be constructed if $AC = 13$, $BC = 8$, and $m\angle A = 36$?
1) 1
2) 2
3) 3
4) 0

5 If the measure of $\angle A = 40°$, $a = 5$, and $b = 6$, how many different triangles can be constucted?
1) 1
2) 2
3) 3
4) 0

6 In ΔDEF, $d = 5$, $e = 8$, and $m\angle D = 32$. How many distinct triangles can be drawn given these measurements?
1) 1
2) 2
3) 3
4) 0

7 How many distinct triangles can be constructed if $m\angle A = 30$, side $a = \sqrt{34}$, and side $b = 12$?
1) one acute triangle
2) one obtuse triangle
3) two triangles
4) none

8 Sam is designing a triangular piece for a metal sculpture. He tells Martha that two of the sides of the piece are 40 inches and 15 inches, and the angle opposite the 40-inch side measures 120°. Martha decides to sketch the piece that Sam described. How many different triangles can she sketch that match Sam's description?
1) 1
2) 2
3) 3
4) 0

9 An architect commissions a contractor to produce a triangular window. The architect describes the window as ΔABC, where $m\angle A = 50$, $BC = 10$ inches, and $AB = 12$ inches. How many distinct triangles can the contractor construct using these dimensions?
1) 1
2) 2
3) more than 2
4) 0

10 Sam needs to cut a triangle out of a sheet of paper. The only requirements that Sam must follow are that one of the angles must be 60°, the side opposite the 60° angle must be 40 centimeters, and one of the other sides must be 15 centimeters. How many different triangles can Sam make?
1) 1
2) 2
3) 3
4) 0

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Answer Section

1 ANS: 3

$\frac{59.2}{\sin 74} = \frac{60.3}{\sin C}$ $180 - 78.3 = 101.7$

$C \approx 78.3$

REF: 081006a2

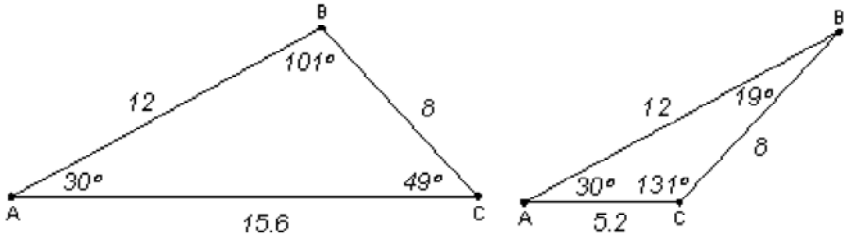
2 ANS: 2

$\frac{10}{\sin 35} = \frac{13}{\sin B}$. $35 + 48 < 180$

$B \approx 48, 132$ $35 + 132 < 180$

REF: 011113a2

3 ANS: 2



$\frac{8}{\sin 30°} = \frac{12}{\sin C}$

$C \approx 49°$

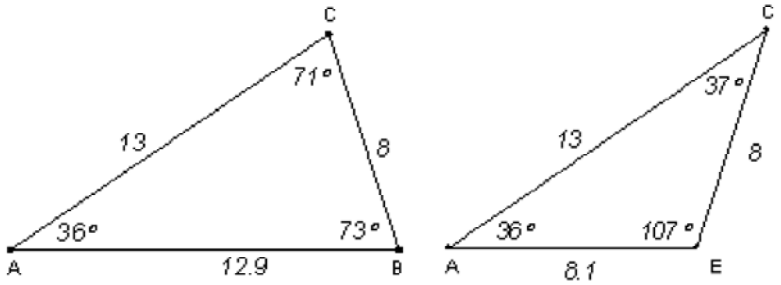
$or\ C \approx 131°\ (180° - 49°)$

$49° + 30° < 180°$ △

$131° + 30° < 180°$ △

REF: 080414b

4 ANS: 2



$\frac{8}{\sin 36°} = \frac{13}{\sin B}$

$B \approx 73°$

$or\ B \approx 107°\ (180° - 73°)$

$73° + 36° < 180°$ △

$107° + 36° < 180°$ △

REF: 080519b

5 ANS: 2

$\frac{5}{\sin 40} = \frac{6}{\sin B}$. $50.5 + 40 < 180$

$B = 50.5$ or 129.5 $129.5 + 40 < 180$

REF: 061011b

6 ANS: 2

$\frac{5}{\sin 32} = \frac{8}{\sin E}$ $57.98 + 32 < 180$

$E \approx 57.98$ $(180 - 57.98) + 32 < 180$

REF: 011419a2

7 ANS: 4

$\frac{\sqrt{34}}{\sin 30} = \frac{12}{\sin B}$

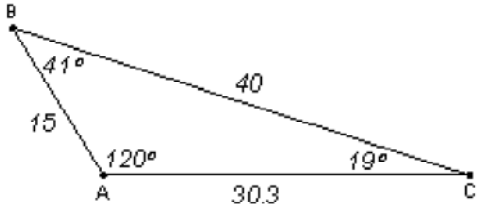
$B = \sin^{-1} \frac{12 \sin 30}{\sqrt{34}}$

$\approx \sin^{-1} \frac{6}{5.8}$

REF: 011523a2

8 ANS: 1

The triangle has an obtuse angle of 120°, and may not have a second obtuse angle. Check if one triangle is



$\frac{40}{\sin 120°} = \frac{15}{\sin C}$

$C \approx 19°$

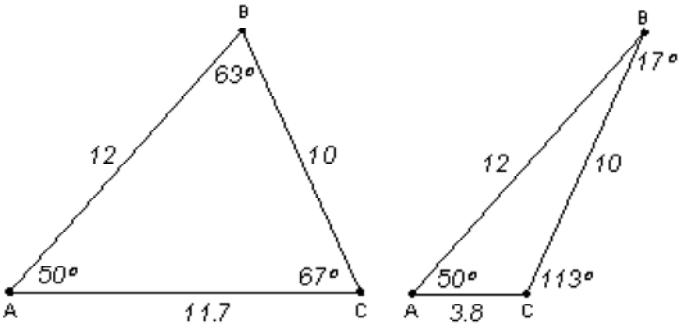
possible. $or\ C \approx 161°\ (180° - 19°)$

$19° + 120° < 180°$ △

$161° + 120° > 180°$ ~△

REF: 060416b

9 ANS: 2



$$\frac{10}{\sin 50°} = \frac{12}{\sin C}$$

$$C \approx 67°$$

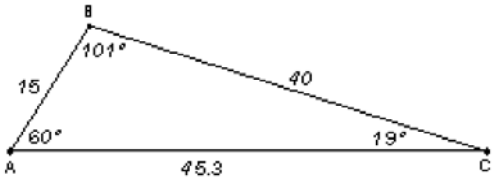
$$or\ C \approx 113°\ (180° - 67°)$$

$$67° + 50° < 180°\ \triangle$$

$$113° + 50° < 180°\ \triangle$$

REF: 080311b

10 ANS: 1



$$\frac{40}{\sin 60°} = \frac{15}{\sin C}$$

$$C \approx 19°$$

$$or\ C \approx 161°\ (180° - 19°)$$

$$19° + 60° < 180°\ \triangle$$

$$161° + 60° > 180°\ \sim\triangle$$

REF: 060620b