Name: _____

G.SRT.D.10: Law of Sines - The Ambiguous Case 1

1 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

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 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

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

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

6 In $\triangle XYZ$, $m\angle X = 71$, $x = 6$, and $z = 2$. How many distinct triangles can be created with these parameters?
1) 1 2) 2 3) 3 4) 0

7 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

8 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

9 An architect commissions a contractor to produce a triangular window. The architect describes the window as $\triangle ABC$, 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 A landscape designer is designing a triangular garden with two sides that are 4 feet and 6 feet, respectively. The angle opposite the 4-foot side is 30°. How many distinct triangular gardens can the designer make using these measurements?

11 In triangle ABC, determine the number of distinct triangles that can be formed if $m\angle A = 85$, side $a = 8$, and side $c = 2$. Justify your answer.

Name: _____

12 In $\triangle ABC$, if $AC = 12$, $BC = 11$, and $m\angle A = 30$, angle C could be
1) an obtuse angle, only 2) an acute angle, only 3) a right angle, only 4) either an obtuse angle or an acute angle

13 In $\triangle ABC$, $m\angle A = 30$, $a = 14$, and $b = 20$. Which type of angle is $\angle B$?
1) It must be an acute angle. 2) It must be a right angle. 3) It must be an obtuse angle. 4) It may be either an acute angle or an obtuse angle.

14 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

15 In $\triangle KLM$, $KL = 20$, $LM = 13$, and $m\angle K = 40$. The measure of $\angle M$?
1) must be between 0° and 90° 2) must equal 90° 3) must be between 90° and 180° 4) is ambiguous

16 In triangle ABC, if $m\angle A = 40$, $BC = 10$, and $AB = 12$, then $m\angle C$ can be
1) an acute angle, only 2) a right angle, only 3) an obtuse angle, only 4) either an acute or an obtuse angle

17 If $m\angle A = 35$, $b = 3$, and $a = 4$, how many different triangles can be constructed?
1) No triangles can be constructed. 2) two triangles 3) one right triangle, only 4) one obtuse triangle, only

18 Given $\triangle ABC$ with $a = 9$, $b = 10$, and $m\angle B = 70$, what type of triangle can be drawn?
1) an acute triangle, only 2) an obtuse triangle, only 3) both an acute triangle and an obtuse triangle 4) neither an acute triangle nor an obtuse triangle

19 Main Street and Central Avenue intersect, making an angle measuring 34°. Angela lives at the intersection of the two roads, and Caitlin lives on Central Avenue 10 miles from the intersection. If Leticia lives 7 miles from Caitlin, which conclusion is valid?
1) Leticia cannot live on Main Street. 2) Leticia can live at only one location on Main Street. 3) Leticia can live at one of two locations on Main Street. 4) Leticia can live at one of three locations on Main Street.

20 In $\triangle ABC$, $m\angle A = 74$, $a = 59.2$, 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

21 In $\triangle MNP$, $m = 6$ and $n = 10$. Two distinct triangles can be constructed if the measure of angle M is
1) 35 2) 40 3) 45 4) 50

G.SRT.D.10: Law of Sines - The Ambiguous Case 1
Answer Section

1 ANS: 2

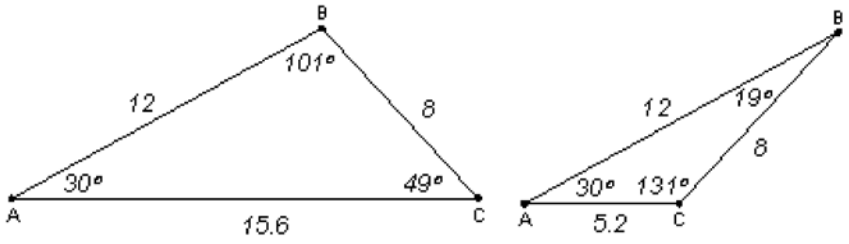
$$\frac{8}{\sin 30^\circ} = \frac{12}{\sin C}$$

$$C \approx 49^\circ$$

$$or\ C \approx 131^\circ\ (180^\circ - 49^\circ)$$

$49^\circ + 30^\circ < 180^\circ$ △

$131^\circ + 30^\circ < 180^\circ$ △



REF: 080414b

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

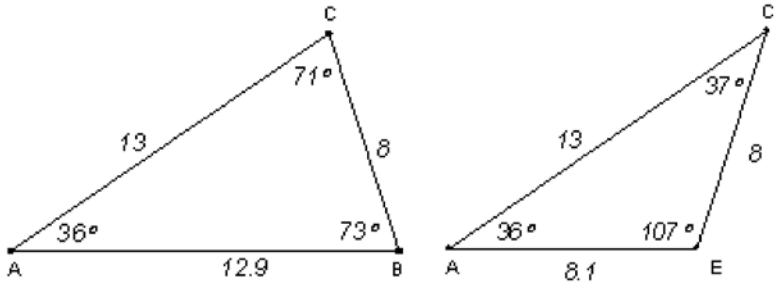
$$\frac{8}{\sin 36^\circ} = \frac{13}{\sin B}$$

$$B \approx 73^\circ$$

$$or\ B \approx 107^\circ\ (180^\circ - 73^\circ)$$

$73^\circ + 36^\circ < 180^\circ$ △

$107^\circ + 36^\circ < 180^\circ$ △



REF: 080519b

4 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

5 ANS: 2

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

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

REF: 011419a2

6 ANS: 1

$\frac{6}{\sin 71} = \frac{2}{\sin Z}$. $\quad 18 + 71 < 180$

$Z \approx 18.4$ $\quad 162 + 71 > 180$

REF: 081620a2

7 ANS: 1

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

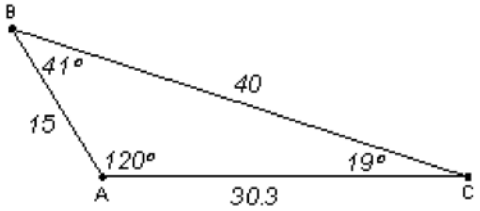
$\frac{40}{\sin 120°} = \frac{15}{\sin C}$

$C \approx 19°$

$or\ C \approx 161°\ (180° - 19°)$

$19° + 120° < 180°\ \Delta$

$161° + 120° > 180°\ \sim \Delta$



REF: 060416b

8 ANS: 1

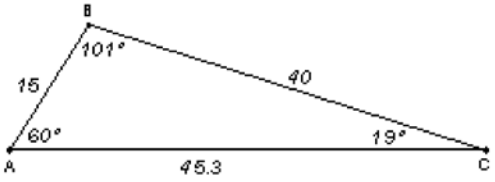
$\frac{40}{\sin 60°} = \frac{15}{\sin C}$

$C \approx 19°$

$or\ C \approx 161°\ (180° - 19°)$

$19° + 60° < 180°\ \Delta$

$161° + 60° > 180°\ \sim \Delta$



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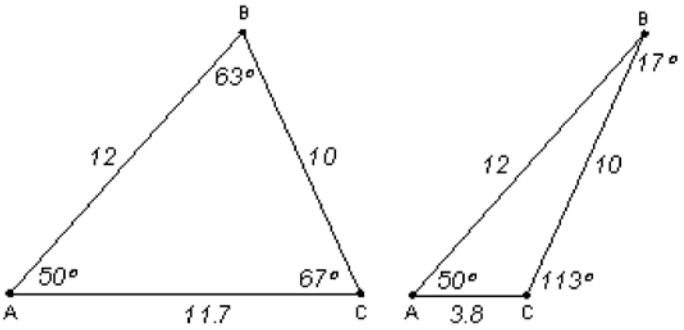
9 ANS: 2



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

$$C \approx 67°$$

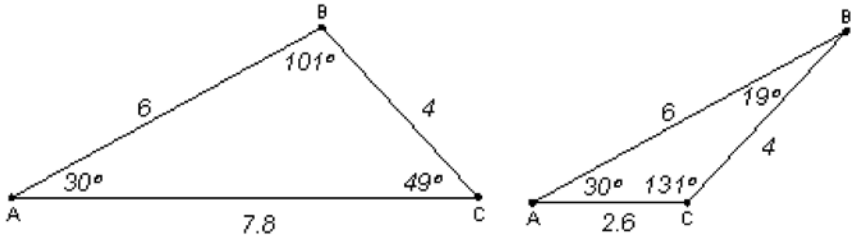
$$or\ C \approx 113°\ (180° - 67°)$$

$$67° + 50° < 180°\ \Delta$$

$$113° + 50° < 180°\ \Delta$$

REF: 080311b

10 ANS:



$$\frac{4}{\sin 30°} = \frac{6}{\sin C}$$

$$C \approx 49°$$

2. $$or\ C \approx 131°\ (180° - 49°)$$

$$49° + 30° < 180°\ \Delta$$

$$131° + 30° < 180°\ \Delta$$

REF: 010426b

11 ANS:

$$\frac{8}{\sin 85} = \frac{2}{\sin C}$$

$$C = \sin^{-1}\left(\frac{2\sin 85}{8}\right)$$

$$C \approx 14.4$$

$85 + 14.4 < 180$ 1 triangle

$85 + 165.6 \geq 180$

REF: 061529a2

12 ANS: 4

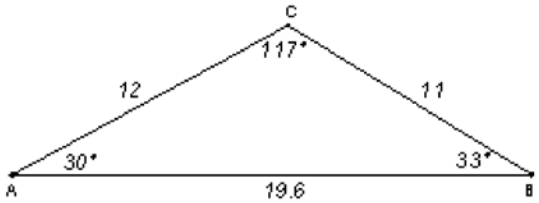
$$\frac{11}{\sin 30°} = \frac{12}{\sin B}$$

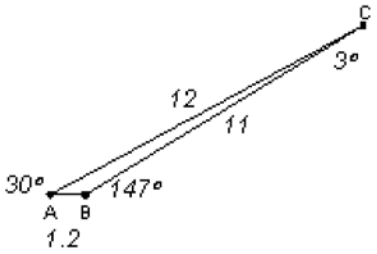
$$B \approx 33°$$

$$or\ B \approx 147°\ (180° - 33°)$$

$33° + 30° < 180°$ △

$147° + 30° < 180°$ △





REF: 010309b

13 ANS: 4

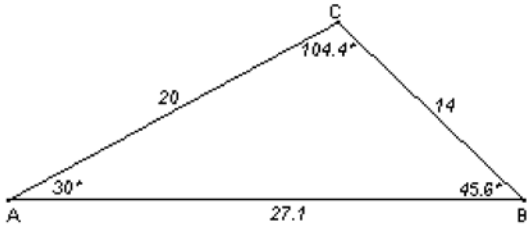
$$\frac{14}{\sin 30°} = \frac{20}{\sin B}$$

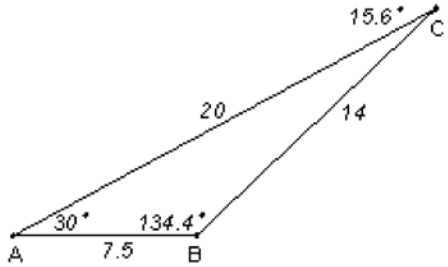
$$B \approx 45.6°$$

$$or\ B \approx 134.4°\ (180° - 45.6°)$$

$45.6° + 30° < 180°$ △

$134.4° + 30° < 180°$ △





REF: 010720b

14 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

15 ANS: 4

$\frac{13}{\sin 40} = \frac{20}{\sin M}$. $81 + 40 < 180$. $(180 - 81) + 40 < 180$

$M \approx 81$

REF: 061327a2

16 ANS: 4

$\frac{10}{\sin 40} = \frac{12}{\sin C}$ $50.5 + 40 < 180$

$C = \sin^{-1} \frac{12 \sin 40}{10}$ $129.5 + 40 < 180$

≈ 50.5

REF: 061617a2

17 ANS: 4 REF: 011018b

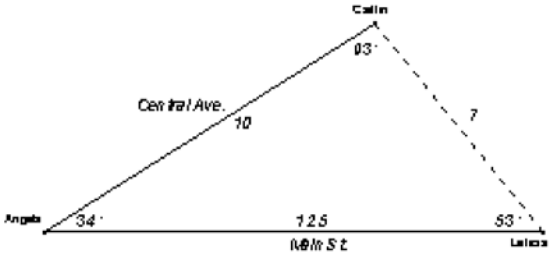
18 ANS: 1

$\frac{9}{\sin A} = \frac{10}{\sin 70}$. $58° + 70°$ is possible. $122° + 70°$ is not possible.

$A \approx 58$

REF: 011210a2

19 ANS: 3



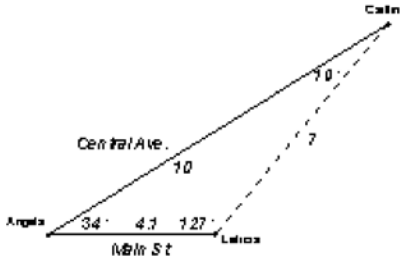
$$\frac{7}{\sin 34°} = \frac{10}{\sin L}$$

$$L \approx 53°$$

$$or\ L \approx 127°\ (180° - 53°)$$

$$53° + 34° < 180°\ \triangle$$

$$127° + 34° < 180°\ \triangle$$



REF: 060119b

20 ANS: 3

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

$$C \approx 78.3$$

REF: 081006a2

21 ANS: 1

$$\frac{6}{\sin 35} = \frac{10}{\sin N}$$

$$N \approx 73$$

$$73 + 35 < 180$$

$$(180 - 73) + 35 < 180$$

REF: 061226a2