Ambiguous Case: Solving for 2 triangles (when necessary).
Round angles to the nearest minute and sides to the nearest tenth.

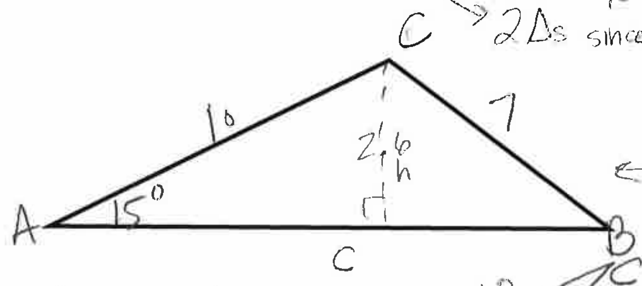
1. a = 7, b = 10, A = 15°

Is this an A.S.S. situation? Yes

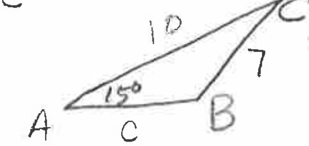
How many triangle? $\sin 15° = \frac{h}{10}$ so $h \approx 2.6$

2 Δs since $2.6 < 7 < 10$

☆ the ∠ you find first.



← 1st Δ



← 2nd Δ

A 15°	a 7	A 15°	a 7
☆ B 21°42′	b 10	B 158°18′	b 10
C 143°18′	c 16.2	C 6°42′	c 3.2

2nd Δ: $B = 180 - 21°42'$ $C = 180 - A - B =$ $\frac{\sin 15}{7} = \frac{\sin 6°42'}{c}$

1st Δ: $\frac{\sin B}{10} = \frac{\sin 15°}{7} = \frac{\sin 143°18'}{c}$

$B \approx 21°42'$ $c \approx 16.2$

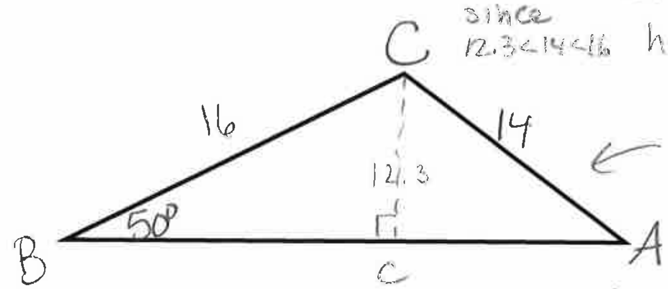
$C = 180 - A - B$

To start 2nd Δ, do 180 − ☆∠. This is because sine is positive in 1st + 2nd Quad. So ∠B could be acute or obtuse since it is not a fixed ∠

2. a = 16, b = 14, B = 50°

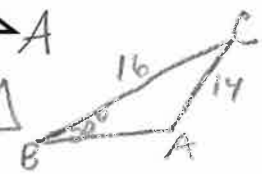
Is this an A.S.S. situation? yes

How many triangle? 2 Δ's since $12.3 < 14 < 16$ $\sin 50° = \frac{h}{16}$ $h \approx 12.3$



← 1st Δ

2nd Δ



☆ A 61°6′	a 16	A 118°54′	a 16
B 50	b 14	B 50	b 14
C 68°54′	c 17.1	C 11°6′	c 3.5

1st Δ: $\frac{\sin A}{16} = \frac{\sin 50°}{14} = \frac{\sin 68°54'}{c}$

$A \approx 61°6'$

$C = 180 - A - B$

2nd Δ: $A = 180 - ☆∠$

$C = 180 - A - B$

$\frac{\sin 50°}{14} = \frac{\sin 11°6'}{c}$

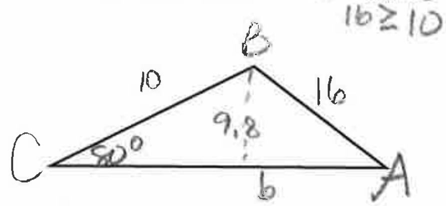
3. a = 10, c = 16, C = 80°

Is this an A.S.S. situation? yes

How many triangle? 1 $\triangle$ since $16 \geq 10$

$\sin 80^\circ = \frac{h}{10}$

$h \approx 9.8$



A 37°59'	a 10
B 62°1'	b 14.3
C 80°	c 16

A	a
B	b
C	c

$\frac{\sin A}{10} = \frac{\sin 80^\circ}{16} = \frac{\sin 62^\circ 1'}{b}$

$A = 37^\circ 59'$ $\quad b \approx 14.3$

$B = 180 - A - C$

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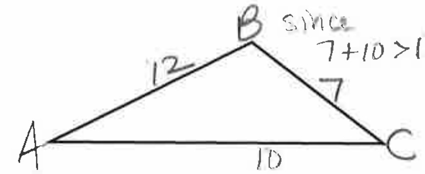
4. a = 7, b = 10, c = 12

Is this an A.S.S. situation? No

How many triangle? 1 $\triangle$ since $7 + 10 > 12$



A 35°40'	a 7
B 56°23'	b 10
C 87°57'	c 12

A	a
B	b
C	c

$\cos C = \frac{7^2 + 10^2 - 12^2}{2 \cdot 7 \cdot 10}$

$C \approx 87^\circ 57'$

$\cos B = \frac{7^2 + 12^2 - 10^2}{2 \cdot 7 \cdot 12}$

$B = 56^\circ 23'$

$A = 180^\circ - C - B$

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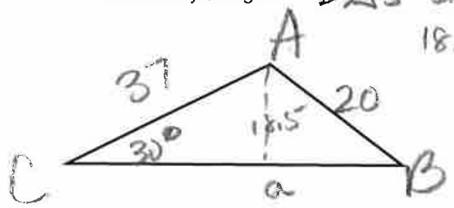
$\sin 30^\circ = \frac{h}{37}$ $\quad h = 18.5$

5. b = 37, c = 20, C = 30°

Is this an A.S.S. situation? yes

How many triangle? 2 $\triangle$s since $18.5 < 20 < 37$



A 82°20'	a 39.6
B 67°40'	b 37
C 30°	c 20

A 37°40'	a 24.4
B 112°20'	b 37
C 30°	c 20

1st $\triangle$: $\frac{\sin B}{37} = \frac{\sin 30^\circ}{20} = \frac{\sin 82^\circ 20'}{a}$

$B = 67^\circ 40'$ $\quad a \approx 39.6$

$A = 180 - B - C$

2nd $\triangle$: $B = 180 - \cancel{A}\angle$

$A = 180 - B - C$

$\frac{\sin 30^\circ}{20} = \frac{\sin 37^\circ 40'}{a}$

$a \approx 24.4$