

8.6 Law of Sines-Ambiguous Case Lab

Key

Exploration-How many triangles can you construct if you are given SSA information?

1. Draw a long horizontal baseline. Label the left endpoint A. Use a protractor to draw a 30° angle at point A.
2. Measure 8 cm (side b) from point A on the newly drawn ray and label it point C.
3. Put one end of the compass at C and draw an arc with a radius of 3 cm (side a).
4. If your arc intersects the baseline, label the intersection point(s) B.
5. Draw triangle ABC if possible.
6. Fill in the table below.
7. Repeat steps 1-6 for the different measurements of a and b . ******Attach all your constructions to this worksheet, you will not get credit without them.******

ec $\frac{x}{12}$

a	b	$m\angle A$	# of Δ 's
3 cm	8 cm	30°	0
4 cm	8 cm	30°	1
6 cm	8 cm	30°	2
10 cm	8 cm	30°	1

8. Find the value of $b\sin A$. = $8\sin 30 = 4$
9. Fill in the blanks with $<$, $>$, \leq , \geq , or $=$ by comparing the information from your investigation.

- a). If a < $b\sin A$, then no triangle can be formed.
- b). If a = $b\sin A$, then one triangle can be formed.
- c). If a ≥ b , then one triangle can be formed.
- d). If b > a > $b\sin A$, then two triangles can be formed.

These relationships are only true, when starting with an acute angle in the SSA case. Let's see what happens when starting with an obtuse angle in the SSA case.

10. Repeat this process but make $m\angle A = 120^\circ$

a	b	$m\angle A$	# of Δ 's
3 cm	8 cm	120°	0
4 cm	8 cm	120°	0
6 cm	8 cm	120°	0
10 cm	8 cm	120°	1

11. Fill in the blanks with $<$, $>$, \leq , \geq , or $=$ by comparing the information from your investigation.

- a). If a ≤ b , then no triangle can be formed.
- b). If a > b , then one triangle can be formed.
- c). Were there any cases which created two triangles? None

Practice

Based on the relationships above, tell how many triangles can be formed. Explain.

acute 1. $m\angle A = 47, b = 6, a = 7$
 $a \geq b$

1 Δ

acute 2. $m\angle A = 32, b = 9, a = 6$
 $a < b$ and $a > b \sin A$

acute 3. $m\angle A = 12, b = 192, a = 40$
2 Δ 's
 $a < b$ $a > b \sin A$

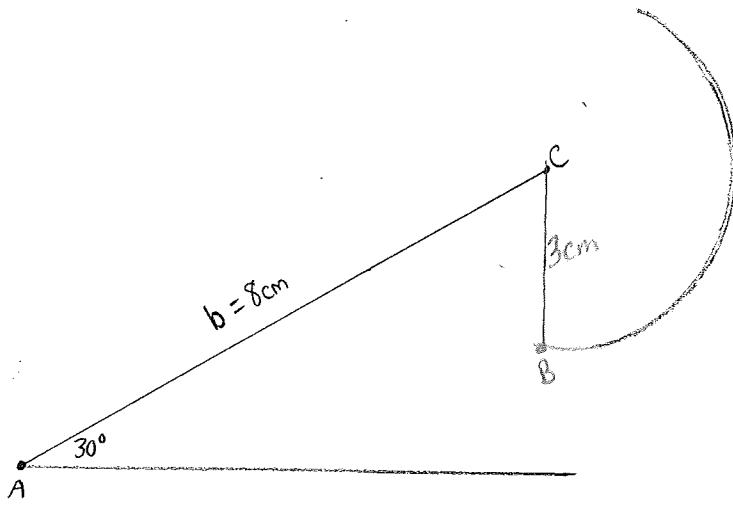
obtuse 4. $m\angle A = 112, b = 11, a = 20$
2 Δ 's
 $a > b$

acute 5. $m\angle A = 57, b = 11, a = 4$
1 Δ
 $a \leq b$

None

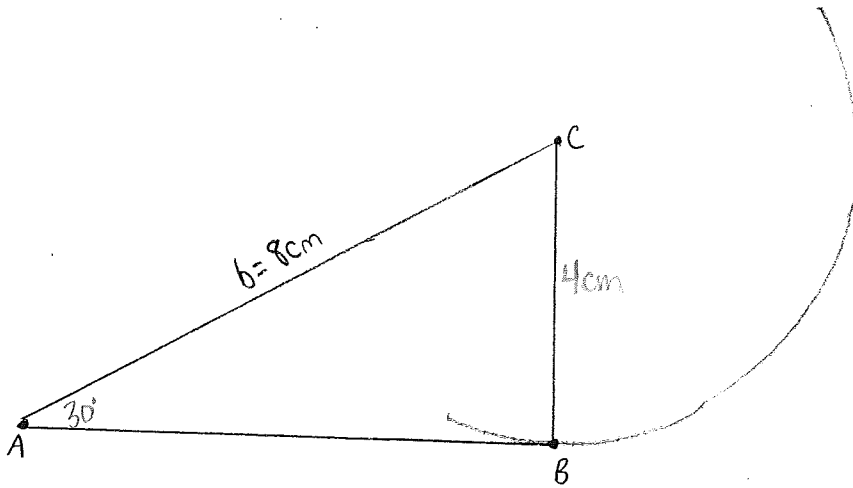
obtuse 6. $m\angle A = 149, b = 27, a = 24$
 $a \leq b$

None



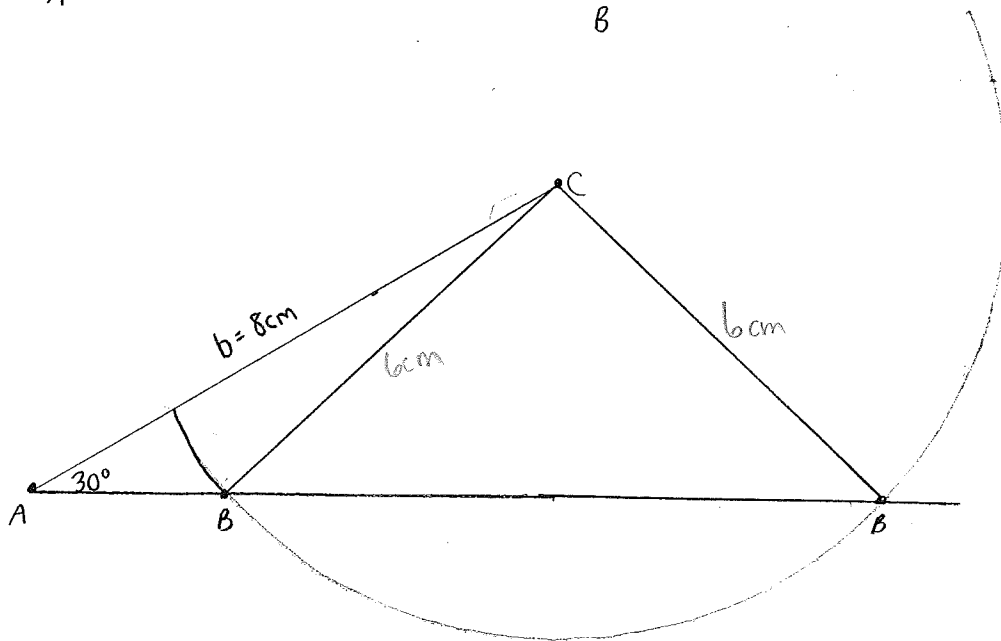
No point B intersection

2.

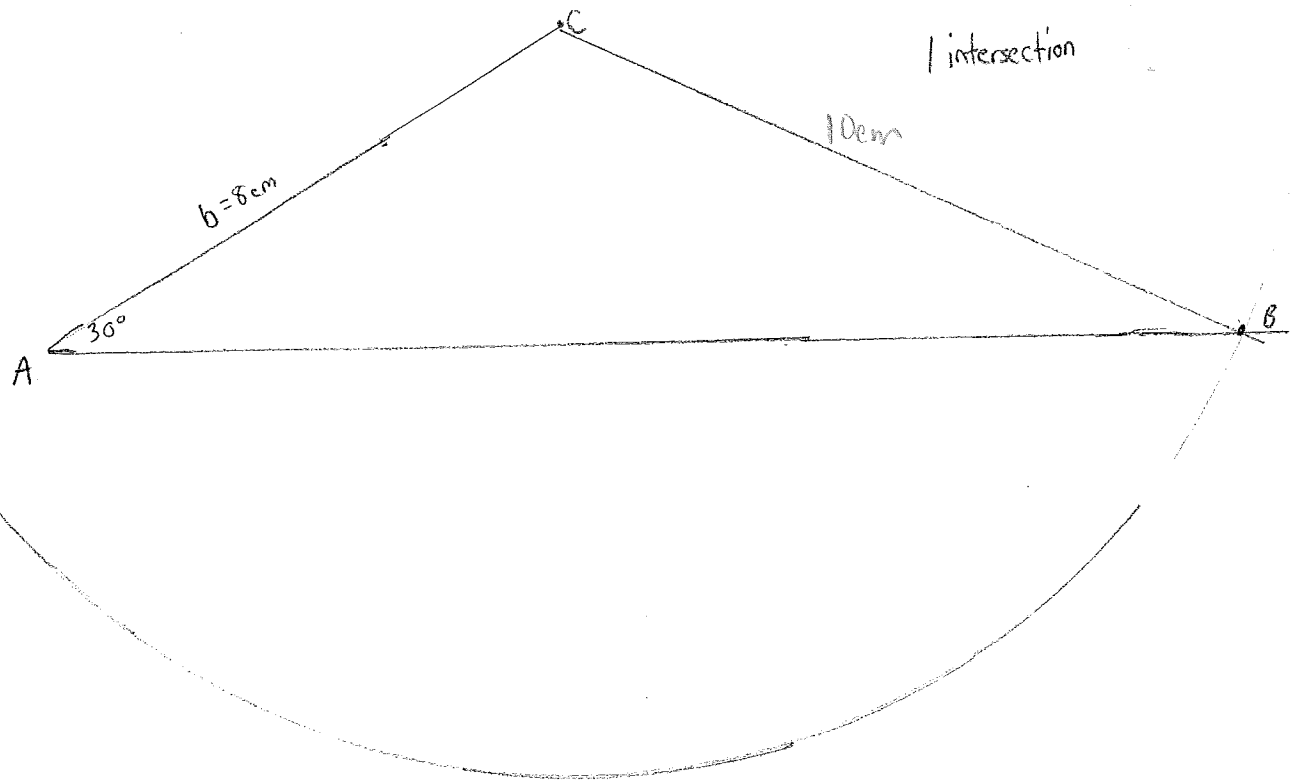


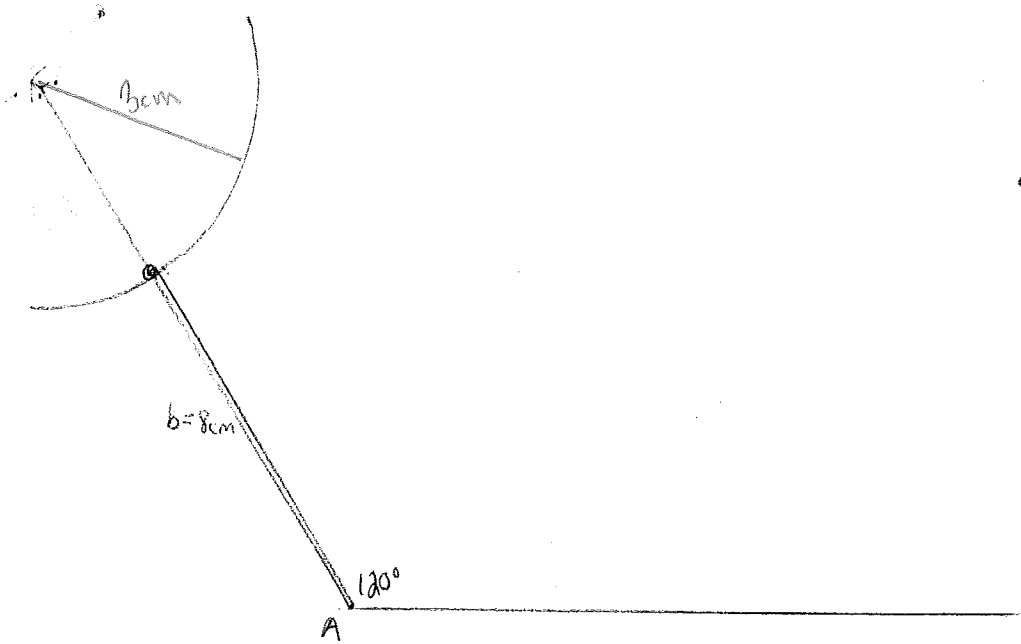
1 intersection

3.

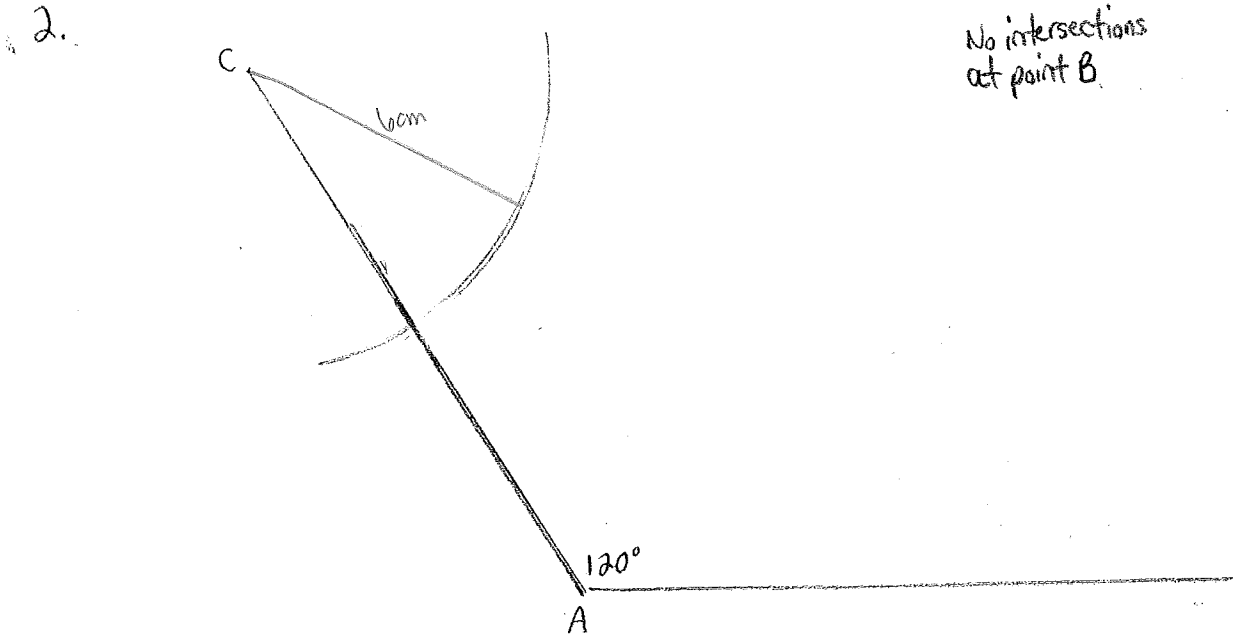


2 intersections

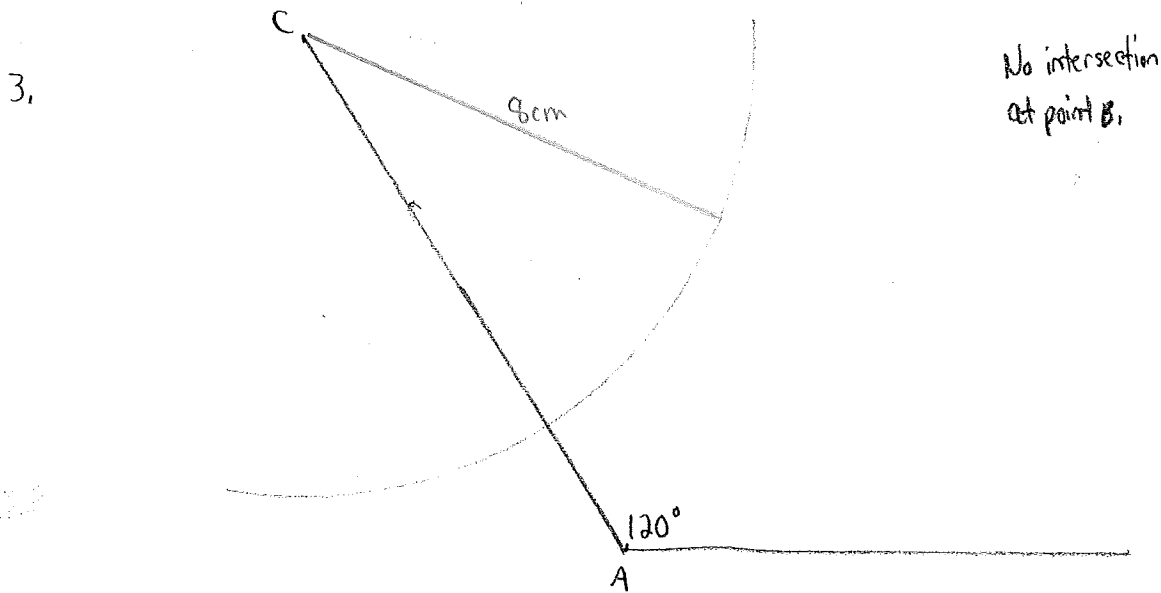




No intersection
at point B.



No intersections
at point B.



No intersection
at point B.

4.

