

**3.6 Sine Law: The \_\_\_\_\_ Case**

Say you have a triangle where  $A=30$  and  $b=12$ ... What is the height?



What happens if  $a$  is 4?

What happens if  $a$  is 6?

What happens if  $a$  is 8?

What happens if  $a$  is 15?

**Example:** Determine if there are zero, one, or two possibilities for this triangle:

a)  $\angle A = 70^\circ, a = 5 \text{ m}, b = 10 \text{ m}$

b)  $\angle A = 30^\circ, a = 5 \text{ m}, b = 8 \text{ m}$

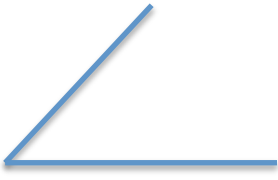
**Example:** Does this triangle involve the *SSA* situation? How many triangles are possible?

a)  $\angle B = 70^\circ, a = 5 \text{ m}, c = 10 \text{ m}$

b)  $\angle C = 50^\circ, a = 8 \text{ m}, c = 10 \text{ m}$

**Assignment:**

Given each set of measurements for  $\triangle ABC$ , determine if there are zero, one, or two possibilities. Draw the triangle(s) to support your answer.

<p>1a) <math>\angle A = 75^\circ</math>, <math>a = 4</math> m, and <math>b = 12</math> m</p> 	<p>1b) <math>\angle A = 50^\circ</math>, <math>a = 10</math> m, and <math>b = 6</math> m</p>
<p>1c) <math>\angle A = 115^\circ</math>, <math>a = 3.0</math>m, and <math>b = 9.0</math>m</p>	<p>1d) <math>\angle A = 62^\circ</math>, <math>a = 2.8</math>m, and <math>b = 3.0</math>m</p>

- 2) Decide whether each description of a triangle involves the SSA situation.  
3) Then calculate the height of each triangle and determine the number of triangles that are possible (zero, one, or two). Justify your answers.

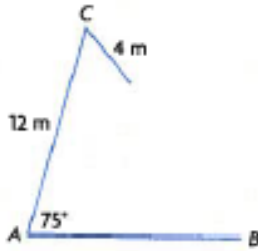
a) In $\triangle ABC$ , $\angle B = 100^\circ$ , $a = 8$ cm, and $b = 10$ cm	b) In $\triangle DEF$ , $\angle D = 81^\circ$ , $e = 9$ cm, and $f = 8$ cm
c) In $\triangle GHI$ , $\angle G = 40^\circ$ , $i = 5$ cm, and $g = 4$ cm	d) In $\triangle JKL$ , $\angle L = 15^\circ$ , $j = 71$ cm, and $k = 36$ cm
e) In $\triangle MNO$ , $\angle O = 28^\circ$ , $m = 8.4$ cm, and $o = 4.0$ cm	f) In $\triangle PQR$ , $\angle Q = 95^\circ$ , $q = 1.0$ cm, and $r = 0.5$ cm

4) Decide whether each description of a triangle involves the *SSA* situation. If it does, determine the number of triangles (zero, one, or two) that are possible with the given measurement. Draw the triangle(s) and justify your answer.

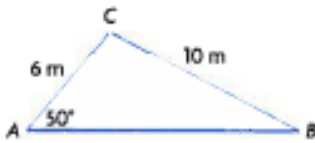
a) In $\triangle ABC$ , $\angle A = 51^\circ$ , $a = 5$ m, and $b = 14$ m	b) In $\triangle ABC$ , $\angle C = 30^\circ$ , $a = 6$ mm, and $c = 12$ mm
c) In $\triangle ABC$ , $\angle B = 40^\circ$ , $a = 12$ cm, and $b = 10$ cm	d) In $\triangle ABC$ , $\angle A = 155^\circ$ , $b = 15$ m, and $c = 12$ m

**Answer Key**

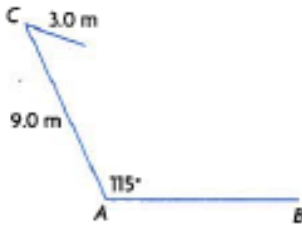
1. a) zero



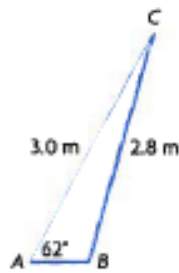
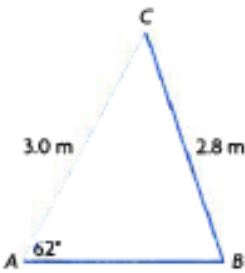
b) one



c) zero



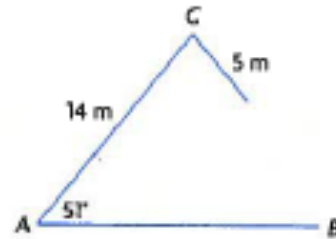
d) two



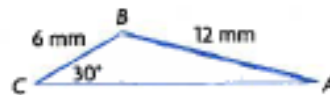
2. a) SSA  
 b) not SSA  
 c) SSA  
 d) not SSA  
 e) SSA  
 f) SSA

3. a)  $b = 7.9$  cm, one  
 b)  $b = 7.9$  cm or  $b = 8.9$  cm, one  
 c)  $b = 3.2$  cm, two  
 d)  $b = 9.3$  cm or  $b = 18.4$  cm, one  
 e)  $b = 3.9$  cm, two  
 f)  $b = 0.5$  cm, one

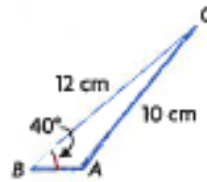
4. a) SSA, zero



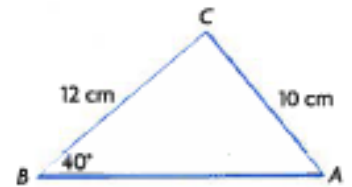
b) SSA, one



c) SSA, two



d) not SSA



**Practice Quiz**

Decide whether each description of a triangle involves the *SSA* situation. If it does, determine the number of triangles (zero, one, or two) that are possible with the given measurement. Draw the triangle(s) and justify your answer.

1) In  $\triangle ABC$ ,  $\angle A = 53^\circ$ ,  $a = 7$  m, and  $b = 15$  m

2) In  $\triangle ABC$ ,  $\angle A = 27^\circ$ ,  $a = 5$  m, and  $b = 6$  cm

**Answers:** 1) 0 2) 2