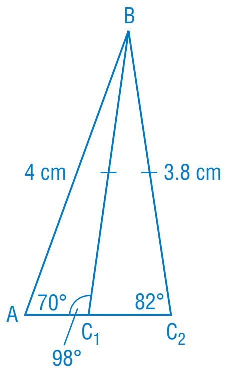
Lesson 6.3 Math Lab: Assess Your Understanding, pages 468–469

1. In ΔABC, $AB = 4$ cm and $\angle A = 70°$

a) Sketch a diagram to show that there are two triangles with $BC = 3.8$ cm.



b) To the nearest degree, measure $\angle C$ for each triangle.

$\angle C = 98°$ or $82°$

c) To the nearest hundredth of a centimetre, calculate the length of BC for which ΔABC is a right triangle.

If ΔABC is a right triangle, then

$$\sin A = \frac{BC}{AB}$$

$$\sin 70° = \frac{BC}{4}$$

$$BC = 4 \sin 70°$$

$$BC = 3.7587\ldots$$

To the nearest hundredth of a centimetre, $BC = 3.76$ cm

2. In ΔABC, $AB = 4$ cm, $BC = 3.5$ cm, and $\angle A = 70°$
Use the completed chart in Part D to justify that it is not possible to draw a triangle.

$\frac{BC}{AB} = \frac{3.5}{4}$, or 0.875

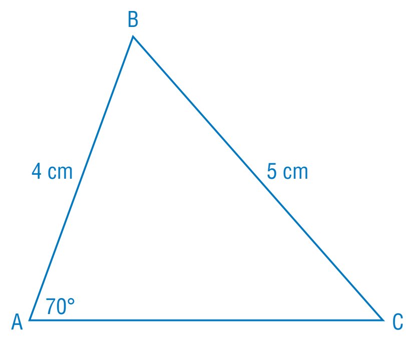
$\sin 70° \doteq 0.940$

Since $\frac{BC}{AB} < \sin 70°$, then no triangle is possible

3. In ΔABC, AB = 4 cm and $\angle$A = 70°

a) Choose a value for BC for which a unique triangle that is not a right triangle can be drawn. Draw the triangle.

Sample response:



b) Use the completed chart in Part D to justify that only one scalene triangle can be drawn with the value you chose for BC.

Sample response: I chose BC = 5 cm.

$\frac{BC}{AB} = \frac{5}{4} = 1.25$

Since $\frac{BC}{AB} > 1$, then only one triangle is possible

4. In ΔABC, AB = 10 cm and BC = 8 cm; to the nearest degree, determine possible measures of acute $\angle$A for each situation.

a) No triangle is possible.

$\angle$A is acute, so $\angle A < 90°$

For no triangle, $\sin A > \frac{8}{10}$, or 0.8

$\sin^{-1}(0.8) \doteq 53°$

For an acute angle θ, as θ increases, $\sin \theta$ also increases.

So, for no triangle, $53° < \angle A < 90°$

b) One right triangle is possible.

For a right triangle, $\frac{BC}{AB} = \sin A$

So, $\sin A = 0.8$

From part a, $\angle A \doteq 53°$; so, for one right triangle, $\angle A \doteq 53°$

c) Two scalene triangles are possible.

For two scalene triangles, $\sin A < \frac{BC}{AB} < 1$

$\frac{BC}{AB} = 0.8$, so $\sin A < 0.8$

From part a, $\angle A < 53°$; so, for two scalene triangles, $\angle A < 53°$