a) $\angle A = 30^\circ$, $a = 4m$, and $b = 12m$

STEP 1: Matching Pair (SSA)

STEP 2: $h = b \sin A$

$h = 12 \sin 30^\circ$

$h = 6m$

STEP 3: No triangle ($\angle A$ is acute and $a < h$)

4.3 The Ambiguous Case of the Sine Law

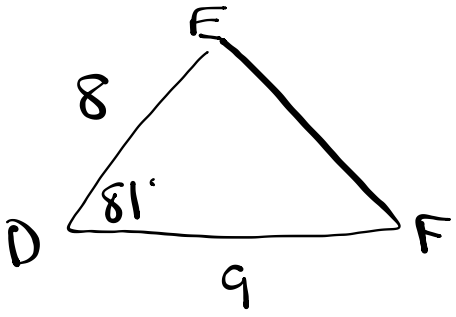
Assignment: pgs. 183 - 184
2/3(Complete together), 4, 8

② a) In $\triangle ABC$, $\angle B = 100°$, $a = 8cm$, $b = 10cm$

STEP 1: (SSA) $\angle A = 100°$, $a = 10cm$, $b = 8cm$

b) In $\triangle DEF$, $\angle D = 81°$, $e = 9cm$, $f = 8cm$

STEP 1: no matching pair



you would use the law of cosine to solve (SAS)

SOLUTIONS => 4.3 The Ambiguous Case of the Sine Law

* Complete Together

2. Decide whether each description of a triangle involves the SSA situation.
3. Calculate the height of each triangle in question 2. Determine the number of triangles that are possible (zero, one, or two). Justify your answers.

a) In ΔABC, $\angle B = 100°$, $a = 8$ cm, and $b = 10$ cm.

① This is a SSA situation. (Matching Pair)

② **We can skip step 2 since** ΔABC is obtuse.

③ Since $\angle B$ is obtuse and $b > a$, there is one triangle.

b) In ΔDEF, $\angle D = 81°$, $e = 9\,cm$, and $f = 8\,cm$.

① This is <u>not</u> a SSA situation. (No Matching Pair)
* Stop Here.

c) In ΔGHI, $\angle G = 40°$, $i = 5\,cm$, and $g = 4\,cm$.

① This is a SSA situation. (Matching Pair)

② $h = b\sin A$
↳ $h = i\sin G$
$h = 5\sin 40°$
$h = 3.2\,cm$

③ Since $\angle A$ is acute and $h < g < i$, there are 2 possible triangles.

d) In ΔJKL, $\angle L = 15°$, $j = 71\,cm$, and $K = 36\,cm$.

① This is <u>not</u> a SSA situation. (No Matching Pair)
* Stop Here

e) In ΔMNO, $\angle O = 28°$, $m = 8.4$ cm, and $o = 4.0$ cm.

① This is a SSA situation. (Matching Pair)

② $h = b \sin A$
↳ $h = m \sin O$
$h = 8.4 \sin 28°$
$h = 3.9$ cm.

③ Since $\angle O$ is acute and $h < o < m$, there are 2 possible triangles.

f) In ΔPQR, $\angle Q = 95°$, $q = 1.0$ cm, and $r = 0.5$ cm.

① This is a SSA situation. (Matching Pair)

② **We can skip step 2 since** ΔPQR is obtuse.

③ Since $\angle Q$ is obtuse, and $q > r$, there is one triangle.

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 measurements. Draw the triangle(s), and justify your answer.

a) In ΔABC, $\angle A = 51°$, $a = 5m$, and $b = 14m$.

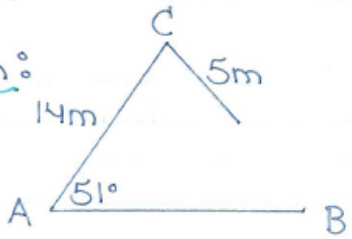
① This is a SSA situation. (Matching Pair)

* Since $\angle a$ is acute. To determine the number of triangles, you need to calculate the height, using $h = b\sin A$.

② $h = b\sin A$
$h = 14\sin 51°$
$h = 10.9m$

③ Since $\angle A$ is acute and $a < h$, there is no triangle.

Diagram:



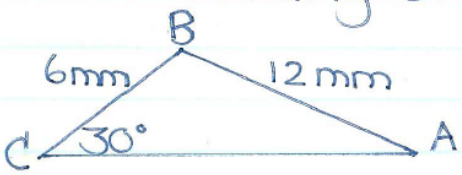
b) In ΔABC, $\angle C = 30°$, $a = 6mm$, and $c = 12mm$.

① This is a SSA situation. (Matching Pair)

② Skip (since $c > a$)

③ Since $\angle C$ is acute and $c > a$, there is one triangle.

Diagram:



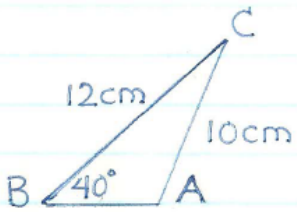
c) In ΔABC, $\angle B = 40°$, $a = 12cm$, and $b = 10cm$.

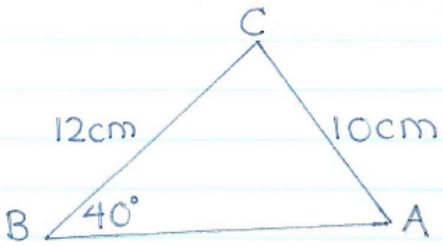
① This is a SSA situation. (Matching Pair)

② $h = b \sin A$
↳ $h = a \sin B$
$h = 12 \sin 40°$
$h = 7.7cm$

③ Since $\angle B$ is acute and $h < b < a$, there are two possible triangles.

Diagrams:





d) In ΔABC, $\angle A = 155°$, $b = 15m$, and $c = 12m$.

① This is not a SSA situation (No Matching Pair)

8. An obtuse triangle has two known side lengths: 4.0m and 4.2m. The angle that is opposite the shorter side measures 64.0°.

a) Calculate the obtuse angle is the triangle, to the nearest tenth of a degree.

$$\frac{\sin\theta}{4.2m} = \frac{\sin 64°}{4.0m}$$

$$\frac{4.0\sin\theta}{4.0} = \frac{4.2\sin 64°}{4.0}$$

$$\sin\theta = 0.9437$$

$$\theta = \sin^{-1}(0.9437)$$

$$\theta = 70.7°$$

Since the angle is obtuse:

$$\theta = 180° - 70.7°$$

$$\theta = 109.3°$$

b) Is there only one possible answer? Explain.

If $\angle A$ is 109.3°, $a = 4.2m$ and $b = 4.0m$, this is the only possible triangle. {Since $\angle A$ is obtuse and $a > b$}

Attachments

FM11-4s3.gsp

4Ws3e1.mp4

4Ws3e2.mp4

4Ws3e3.mp4