HOMEWORK...

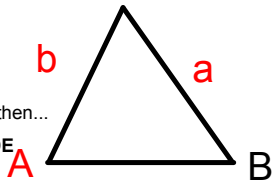
Worksheet - Ambiguous Case.pdf

Do questions #1, 2 & 4

MEMORIZE!!!

Criteria for the Ambiguous Case...

- Must be given SSA
- Given angle is acute
- a < b



*** If ALL 3 criteria are met, then...

CALCULATE THE ALTITUDE

alt = b sin A

CASE 1: a < altitude; there is NO SOLUTION

CASE 2: a = altitude; there is ONE SOLUTION [Right Triangle]

CASE 3: a >altitude; this is the 'AMBIGUOUS CASE'...TWO SOLUTIONS

1) Acute Triangle (angle, θ, is found with Law of Sines)
2) Obtuse Triangle (angle is 180° - θ)

Ambiguous Case Criteria...

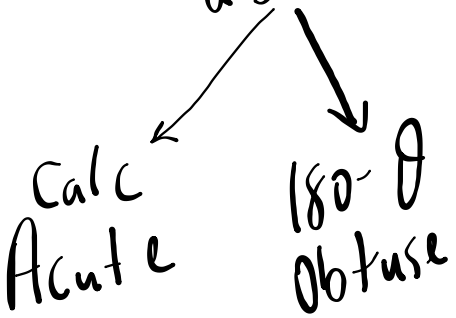
- SSA
- angle give is acute
- $a < b$

$alt = b \sin A$

① $a < alt$ No Solution

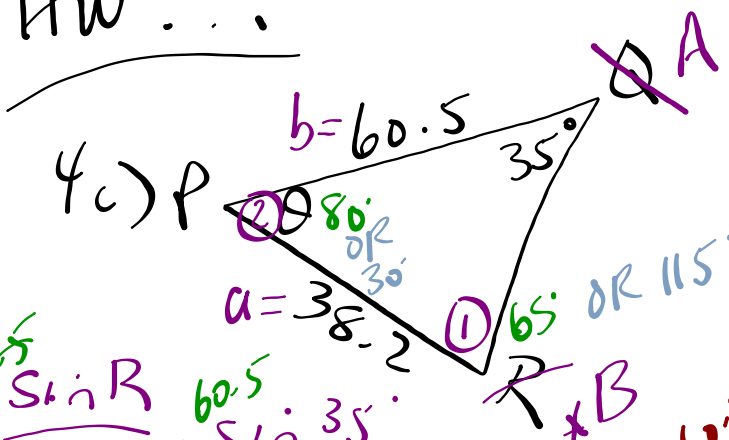
② $a = alt$ 1 Solution

③ $a > alt$ *ambiguous 2 Solutions



HW???

4) P



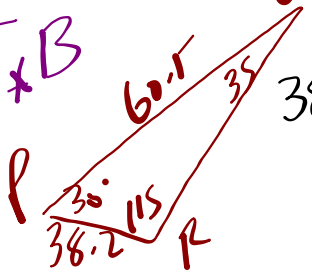
$\frac{\sin R}{60.5} = \frac{\sin 35°}{38.2}$

$\sin^{-1}\sin R = \sin^{-1}(0.9084)$

$*\angle R = 65°$

$\angle P = 80°$

OR



$\angle R = 180 - 65°$

$\angle R = 115°$

$\angle P = 30°$

✓SSA
✓acute
✓a < b

$alt = 60.5 \sin 35°$

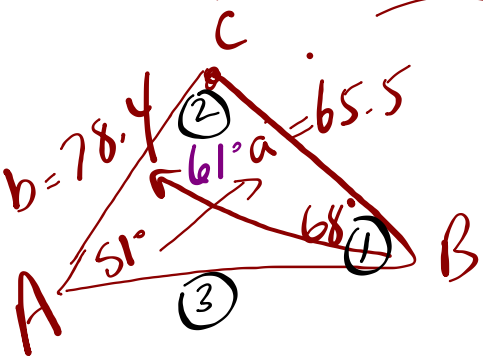
$alt = 34.7$

a vs alt

$38.2 > 34.7$

*ambiguous

Do 5 a) Solve



✗ SSA
✓ acute
✓ a < b
alt = 78.4 sin 51
alt = 60.9
a vs alt
65.5 > 60.9
✗ ambiguous

$\frac{\sin B}{78.4} = \frac{\sin 51°}{65.5}$

$\sin^{-1}\sin B = (0.9302)$

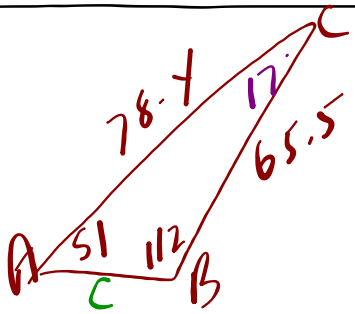
$\sin$

✗ $\angle B = 68°$
$\angle C = 61°$

$\frac{c}{\sin 61} = \frac{65.5 \sin 51}{\sin 51°}$

$C = 73.7$

02



$\angle B = 180 - 68$
$\angle B = 112°$
$\angle C = 17°$

$\frac{c}{\sin 17} = \frac{65.5 \sin N}{\sin 51}$

$C = 24.6$

The Ambiguous Case of the Law of Sines

Ambiguous Case Slide Show.ppt

am·big·u·ous [am-**big**-yoo-*uh* s] Show IPA

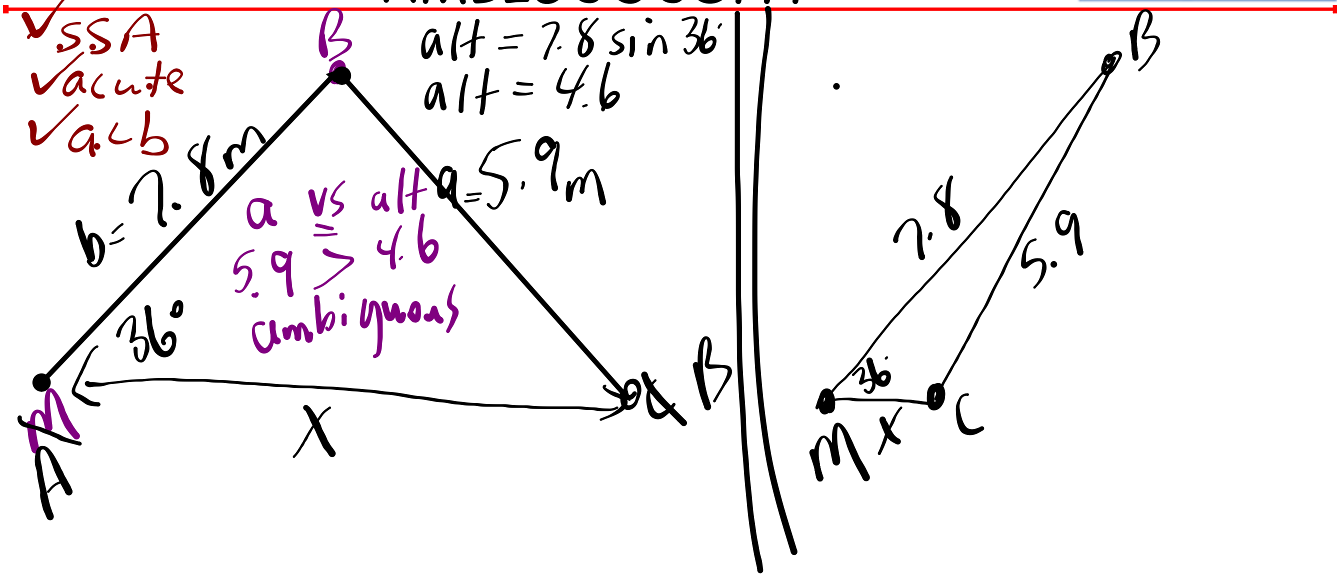
adjective

1. open to or having several possible meanings or interpretations; equivocal: *an ambiguous answer.*
2. *Linguistics* . (of an expression) exhibiting constructional homonymity; having two or more structural descriptions, as the sequence *Flying planes can be dangerous.*
3. of doubtful or uncertain nature; difficult to comprehend, distinguish, or classify: *a rock of ambiguous character.*
4. lacking clearness or definiteness; obscure; indistinct: *an ambiguous shape; an ambiguous future.*

Example 4: Solving a problem using the sine law

Martina and Carl are part of a team that is studying weather patterns. The team is about to launch a weather balloon to collect data. Martina's rope is 7.8 m long and makes an angle of 36.0° with the ground. Carl's rope is 5.9 m long. Assuming that Martina and Carl form a triangle in a vertical plane with the weather balloon, what is the distance between Martina and Carl, to the nearest tenth of a metre?

AMBIGUOUS???



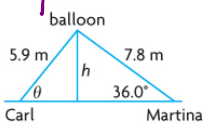
Example 4: Solving a problem using the sine law

Martina and Carl are part of a team that is studying weather patterns. The team is about to launch a weather balloon to collect data. Martina's rope is 7.8 m long and makes an angle of 36.0° with the ground. Carl's rope is 5.9 m long. Assuming that Martina and Carl form a triangle in a vertical plane with the weather balloon, what is the distance between Martina and Carl, to the nearest tenth of a metre?

Sandra's Solution: Using the sine law and then the cosine law

Let h represent the height of the weather balloon.
Let θ represent the angle for Carl's rope.

Situation 1:

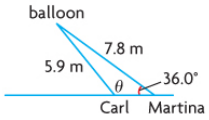


$$\sin 36.0 = \frac{h}{7.8}$$
$$7.8(\sin 36.0) = 7.8\left(\frac{h}{7.8}\right)$$
$$4.5847\ldots = h$$

I drew the triangle.

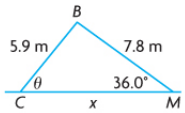
I noticed that this is a *SSA* situation. I had to determine the height of the triangle to determine if this is an ambiguous case.

Situation 2:



Carl's rope is longer than the height and shorter than Martina's rope, so there are two possible triangles. I drew the second triangle.

Situation 1:



$$\frac{\sin\theta}{7.8} = \frac{\sin 36^\circ}{5.9}$$
$$\sin\theta = \frac{7.8\sin 36^\circ}{5.9}$$
$$\sin\theta = 0.7770\ldots$$
$$\theta = \sin^{-1}(0.7770\ldots)$$
$$\theta = 50.9932\ldots^\circ$$

I substituted the side lengths and angles (including θ) into the formula for the sine law and isolated θ.

$$\angle B = 180^\circ - 36.0^\circ - 50.9932\ldots^\circ$$
$$\angle B = 93.0067\ldots^\circ$$

The measures of the angles in a triangle sum to 180°.

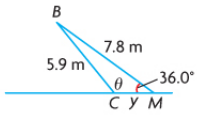
$$x^2 = 5.9^2 + 7.8^2 - 2(5.9)(7.8)\cos 93.0067\ldots^\circ$$
$$x^2 = 100.4777\ldots$$
$$x = 10.0238\ldots$$

In Situation 1, Martina and Carl are 10.0 m apart.

I used the cosine law to determine the distance, x, between Martina and Carl. I substituted the known measurements into the cosine law.

Situation 2:

I also considered the situation in which Carl is closer to Martina.



$$\frac{\sin\theta}{7.8} = \frac{\sin 36^\circ}{5.9}$$
$$\sin\theta = \frac{7.8\sin 36^\circ}{5.9}$$
$$\sin\theta = 0.7770\ldots$$
$$\theta = \sin^{-1}(0.7770\ldots)$$
$$\theta = 50.9932\ldots^\circ$$

I used the sine law to determine θ.

$$\theta = 180^\circ - 50.9932\ldots^\circ$$
$$\theta = 129.0067\ldots^\circ$$

I determined the measure of the supplementary angle, which is suitable for this situation.

$$\angle B = 180^\circ - 36.0^\circ - 129.0067\ldots^\circ$$
$$\angle B = 14.9932\ldots^\circ$$

The measures of the angles in a triangle sum to 180°.

$$y^2 = 5.9^2 + 7.8^2 - 2(5.9)(7.8)\cos 14.9932\ldots^\circ$$
$$y^2 = 6.7433\ldots$$
$$y = 2.5968\ldots$$

I can use $\angle B$ in the cosine law to determine the distance, y, between Martina and Carl.

I substituted the measure of $\angle B$ and the given side lengths into the cosine law.

In the second situation, Martina and Carl are 2.6 m apart.
Martina and Carl are either 10.0 m apart or 2.6 m apart.

HOMEWORK...

*Quiz: Ambiguous Criteria

Worksheet - Ambiguous Case.pdf

#5, 6, & 7 bcd

Page 184: #7, 8, ~~11~~

Test → Tues

Attachments

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