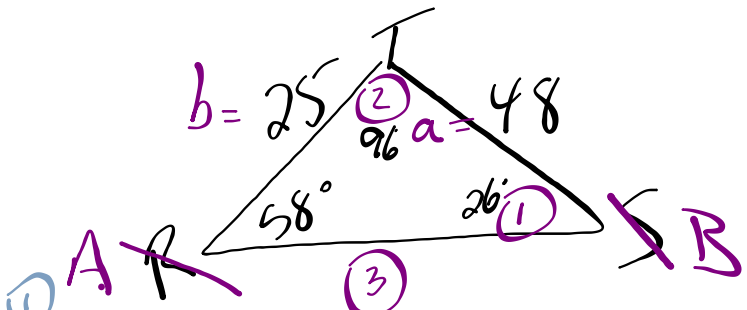
Warm Up

Given ΔRST has angle R = 58° , $r = 48$ and $s = 25$.
Solve the triangle, if there is more than one possible, solve both!!



*SSA
✓ acute
X a < b
one solution

① $\frac{\sin S}{25} = \frac{\sin 58}{48}$

$\sin^{-1}\sin S = \sin^{-1}(0.4417)$

$\angle S = 26°$

② $\angle T = 180 - 58 - 26$

$\angle T = 96°$

③ $\frac{t}{\sin 96} = \frac{48}{\sin 58}$

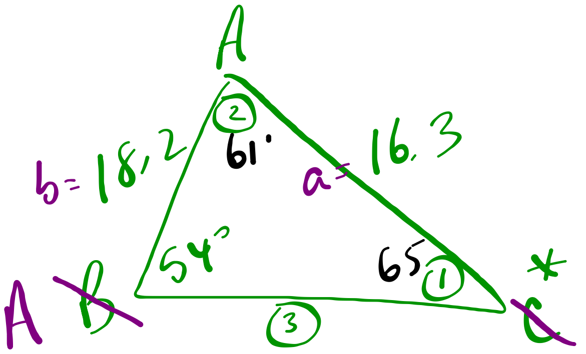
$t = 56.3$

HW 5c, 6

5c) b = 16.3

C = 18.2

∠B = 54°



*SSA
✓ acute
✓ a < b
alt = 18.2 sin 54°
alt = 14.7
a vs alt
16.3 > 14.7
*ambiguous

① $\frac{18.2 \sin C}{18.2} = \frac{18.2 \sin 54}{16.3}$

$\sin^{-1} \sin C = \sin^{-1}(0.9033)$

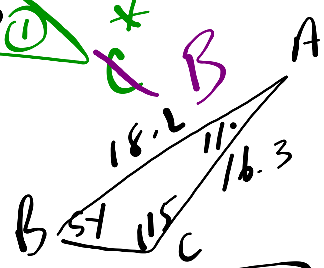
*∠C = 65°

② ∠A = 61°

③ $\frac{a \sin 61}{\sin 61} = \frac{16.3 \sin 61}{\sin 54°}$

a = 17.6

or



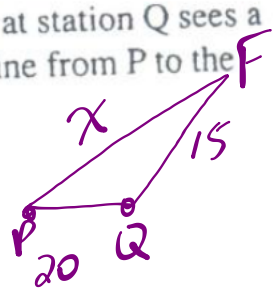
∠C = 115°

∠A = 11°

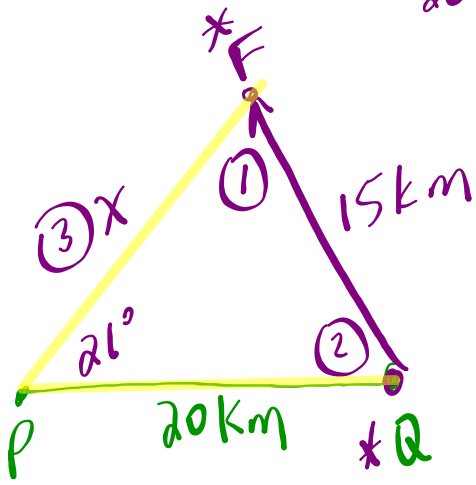
$\frac{a \sin 11}{\sin 11} = \frac{16.3 \sin 11}{\sin 54}$

a = 3.8

6 Two forest fire stations, P and Q, are 20.0 km apart. A ranger at station Q sees a fire 15.0 km away. If the angle between the line PQ and the line from P to the fire is 21°, find how far station P is from the fire.



* SSA
✓ acute
✓ a < b
alt = 20 sin 21°
alt ≈ 7.2
a vs alt
15 > 7.2
* ambiguous



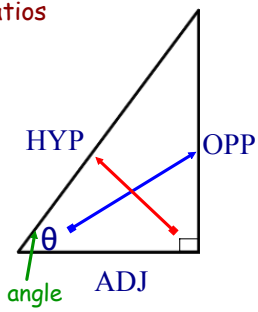
REVIEW - Trigonometry

- Pythagorean Theorem & Primary Trig Ratios

REMEMBER: "SOH CAH TOA"

$$\sin\theta = \frac{opp}{hyp} \qquad \cos\theta = \frac{adj}{hyp} \qquad \tan\theta = \frac{opp}{adj}$$

$$c^2 = a^2 + b^2$$



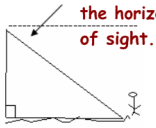
Reference angle

- Applications of Primary Trig

Angle of elevation - is the angle between the ground and the line of sight. (angle of inclination)

Always from the GROUND up

Angle of Depression - is the angle between the horizon and the line of sight.



Always outside the triangle

Also, note that the angle of elevation = angle of depression

- Law of Sines & Its Applications

$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C} \qquad \frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

"when looking for a side" "when looking for an angle"

- Ambiguous Case??? (Law of Sines - finding an angle)
  - given a side (a), the angle opposite (A) and another side (b)...

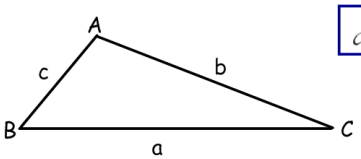
CASE #1: a > b -> only one solution
CASE #2: a = b -> only one solution
CASE #3: a < b ... Determine the altitude length (bsinA)

(i) a < altitude -> no solution
(ii) a = altitude -> one solution (right triangle)
(iii) a > altitude -> two solutions... (Ambiguous Case)
(1) acute angle
(2) obtuse angle (180° - acute)

- Law of Cosines & Its Applications

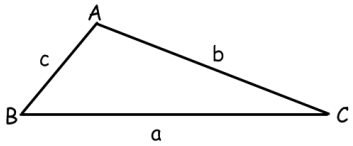
Finding an unknown side...
- 2 sides and a contained angle (SAS)

$$a^2 = b^2 + c^2 - 2bc\cos A$$



Finding an unknown angle...
- 3 known sides (SSS)

$$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$$



- Bearings and Multi-step Word Problems
- "Solving" - find ALL angles & sides

Review for Test - Lots of Practice from the Textbook!!!

Chapter Review...
(Frequently Asked Questions)

- Page 128
- Page 153
- Page 174
- Page 199

Chp. 3
Chp. 4

Tues Test!!

Practice Questions...

* Ambiguous Case → 4.3

Bearing #11, 12 →

- Page 129 #1 - 9
- Page 154 #1 - 12
- Page 175 #1 - 9
- Page 200 #1 - 8

Chp 3
Chp 4

Bearing #8 →

Practice Tests...

- Page 152 #1 - 8
- Page 198 #1 - 7

Chp. 3
Chp. 4