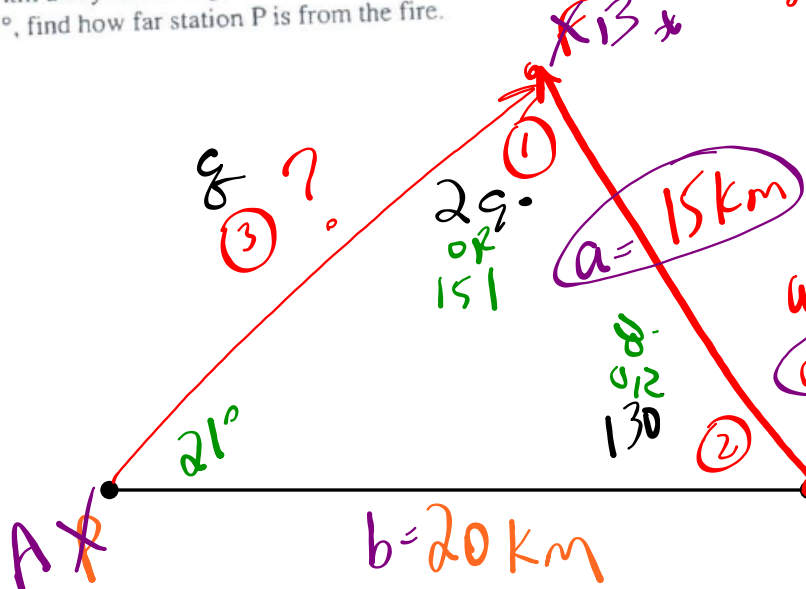


# HOMWORK ???

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.



\*ambiguous?  
 - SSA ✓  
 - acute ✓  
 - a < b ✓  
 alt = 20 sin 21°  
 alt = 7.2  
 1) a < alt  
 2) a = alt  
 3) a > alt  
 \*ambiguous  
 case  
 2 solutions

$$\frac{\sin F}{20} = \frac{\sin 21^\circ}{15}$$

$$\sin F = \frac{20 \sin(21) / 15}{1}$$

4778239327  
 sin<sup>-1</sup>(Ans)  
 28.54337582

\*LF = 29°

a2 →

∠F = 180 - 29  
 ∠F = 151°

∠Q = 3°

∠Q = 130°

$$\frac{q \sin 130}{\sin 21} = \frac{15 \sin 130}{\sin 21}$$

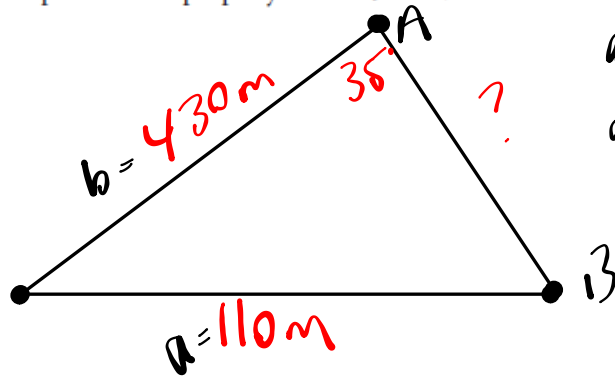
q = 32.1

$$\frac{q \sin 3}{\sin 21} = \frac{15 \sin 3}{\sin 21}$$

q = 5.8

Text p. 184 #6

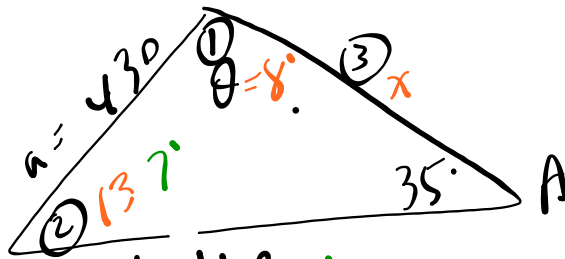
6. A landowner claims that his property is triangular, with one side that is 430 m long and another side that is 110 m long. The angle that is opposite one of these sides measures  $35^\circ$ .
- Determine the length of the third side of the property, to the nearest metre.
  - Improve the description of the property to avoid confusion.



ambiguous

- SSA ✓
- acute ✓
- $a < b$  ✓

alt =  $430 \sin 35$   
 alt = 246.6  
 $\frac{a}{b}$  vs  $\frac{alt}{b}$   
 $110 < 246.6$   
 no solution



SSA ✓  
 acute ✓  
 $a < b$  ✗  
 1 solution

(3)  $\frac{x \sin 39}{\sin 39} = \frac{430 \sin 39}{\sin 35}$   
 $x = 511.3m$

$\frac{\sin \theta}{110} = \frac{\sin 35}{430}$

$\sin \theta = \frac{110 \sin(35) / 430}{1}$   
 $\sin^{-1}(\text{Ans}) = 8.437406244$   
 $\theta = 8^\circ$

# REVIEW - Trigonometry

• Pythagorean Theorem & Primary Trig Ratios

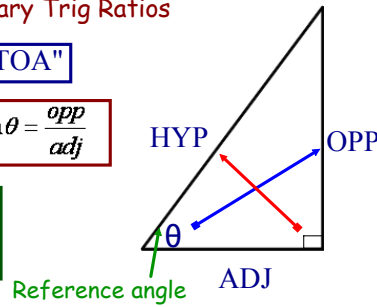
REMEMBER: "SOH CAH TOA"

$$\sin \theta = \frac{\text{opp}}{\text{hyp}}$$

$$\cos \theta = \frac{\text{adj}}{\text{hyp}}$$

$$\tan \theta = \frac{\text{opp}}{\text{adj}}$$

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



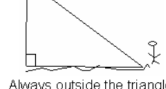
• Applications of Primary Trig

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

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

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

"when looking for a side"

"when looking for an angle"

- **Ambiguous Case???** (Law of Sines - finding an angle) \*SSA
- 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)

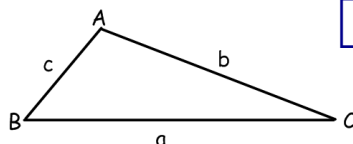
- (i)  $a <$  altitude -> no solution
  - (ii)  $a =$  altitude -> one solution (right triangle)
  - (iii)  $a >$  altitude -> two solutions... (Ambiguous Case)
- (1) acute angle
  - (2) obtuse angle ( $180^\circ -$  acute)

\* Refer to the NOTES  
alt = b sin A

• Law of Cosines & Its Applications

Finding an unknown side...

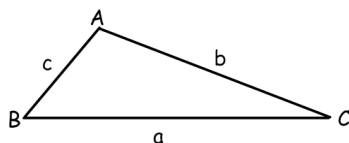
- 2 sides and a contained angle (SAS)



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

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*

*Tuesday Test!*

**Practice Questions...**

*\* Ambiguous case → 4.3*

*Bearing #11, 12 →  
Bearing #8 →*

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

*Chp. 3  
Chp. 4*

**Practice Tests...**

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

*Chp. 3  
Chp. 4*