

## REVIEW - Trigonometry

- Pythagorean Theorem & Primary Trig Ratios

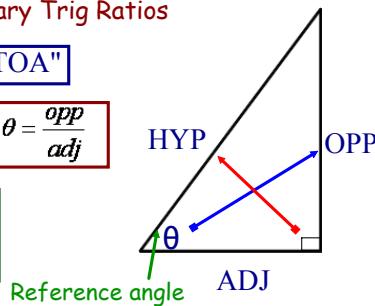
**REMEMBER: "SOH CAH TOA"**

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

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

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

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



- 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

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

SAA

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

AAS

\* SSA  
    ↑  
    AS

"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:  $a > b \rightarrow$  only one solution

CASE #2:  $a = b \rightarrow$  only one solution

CASE #3:  $a < b \dots$  Determine the altitude length ( $b \sin A$ )

(i)  $a <$  altitude  $\rightarrow$  no solution

(ii)  $a =$  altitude  $\rightarrow$  one solution (right triangle)

(iii)  $a >$  altitude  $\rightarrow$  two solutions... (Ambiguous Case)

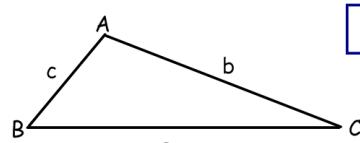
(1) acute angle

(2) obtuse angle ( $180^\circ -$  acute)

- Law of Cosines & Its Applications

Finding an unknown side...

• 2 sides and a contained angle (SAS)

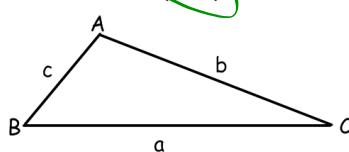


$$a^2 = b^2 + c^2 - 2bc \cos A$$

opposite

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 } Chp. 3  
Page 174 }  
Page 199 } Chp. 4

**Practice Questions...**

\* Ambiguous case  $\rightarrow$  4.3

Bearing  
all 1<sup>st</sup>

Page 129 #1 - 9

Page 154 #1 - 12

Page 175 #1 - 9

Page 200 #1 - 8

Chp. 3

Chp. 4

**Practice Tests...**

Bearing  
# 8

Page 152 #1 - 8

Page 198 #1 - 7

Chp. 3  
Chp. 4

Assignment - Solutions

#1 a)  $\tan 52^\circ = \frac{14}{x}$  b)  $c^2 = (4.5)^2 + (7.1)^2 - 2(4.5)(7.1)\cos 110^\circ$  c)  $x^2 = 20^2 - 6^2$  d)  $\frac{x}{\sin 62^\circ} = \frac{13.4}{\sin 35^\circ}$

$$x = \frac{14}{\tan 52^\circ}$$

$$c^2 = 92.515$$

$$c = \sqrt{92.515}$$

$$c = 9.62$$

$$x = \frac{13.4}{\sin 35^\circ} \times \sin 62^\circ$$

$$x = 20.63$$

#2. a)  $\cos \theta = \frac{11^2 + 8^2 - 17^2}{2(11)(8)}$  b)  $\cos \theta = \frac{12}{13}$  c)  $\frac{\sin \theta}{26} = \frac{\sin 34^\circ}{15}$

$$\cos \theta = \frac{-104}{176}$$

$$\theta = \cos^{-1}(-104/176)$$

$$\theta = 126.2^\circ$$

$$\theta = 22.6^\circ$$

$$x = 19.1$$

$$\sin \theta = \frac{\sin 34^\circ}{15} \times 26$$

$$\sin \theta = 0.9693$$

$$\theta = \sin^{-1}(0.9693)$$

$$\theta = 75.8^\circ$$

#3. a)  $b^2 = (10.8)^2 + (11.7)^2 - 2(10.8)(11.7)\cos 49^\circ$  b)  $\frac{\sin A}{11.7} = \frac{\sin 49^\circ}{9.37}$  c)  $\angle C = 180^\circ - 49^\circ - 70.5^\circ$

$$b^2 = 87.730$$

$$b = \sqrt{87.730}$$

$$b = 9.37$$

$$\sin A = \frac{\sin 49^\circ}{9.37} \times 11.7$$

$$\sin A = 0.9427$$

$$\angle A = \sin^{-1}(0.9427)$$

$$\angle A = 70.5^\circ$$

b)  $\angle C = 180^\circ - 21^\circ - 42^\circ$  c)  $\frac{a}{\sin 42^\circ} = \frac{135}{\sin 117^\circ}$  d)  $\frac{b}{\sin 21^\circ} = \frac{135}{\sin 117^\circ}$

$$\angle C = 117^\circ$$

$$a = \frac{135}{\sin 117^\circ} \times \sin 42^\circ$$

$$a = 101.4$$

$$b = \frac{135}{\sin 117^\circ} \times \sin 21^\circ$$

$$b = 54.3$$

#4.  $\frac{\sin B}{343} = \frac{\sin 88.2^\circ}{932}$   $\angle L = 180^\circ - 88.2^\circ - 21.6^\circ$   $l^2 = 343^2 + 932^2 - 2(343)(932)\cos 70^\circ$

$$\sin B = \frac{\sin 88.2^\circ}{932} \times 343$$

$$\sin B = 0.3678$$

$$\angle B = \sin^{-1}(0.3678)$$

$$\angle B = 21.6^\circ$$

$$\angle L = 70.2^\circ$$

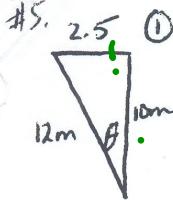
$$l^2 = 769700.2332$$

$$l = \sqrt{769700.2332}$$

$$l = 877.3$$

Distance from Paris to Berlin is..

877.3 km



$$\cos \theta = \frac{12^2 + 10^2 - 2.5^2}{2(12)(10)} \quad \text{#5.}$$

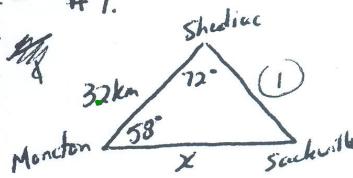
$$\cos \theta = \frac{237.75}{240}$$

$$\cos \theta = 0.9906$$

$$\theta = \cos^{-1}(0.9906)$$

3

Angle must be ...  $\boxed{\theta = 7.9^\circ} \quad \textcircled{1}$

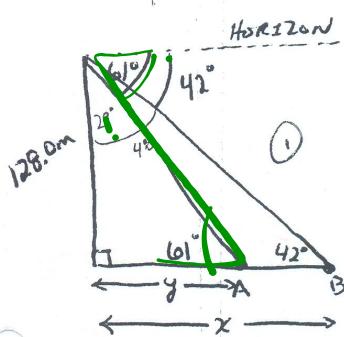


$$\angle @ \text{Sackville} = 180^\circ - 58^\circ - 72^\circ$$

$$= 50^\circ \quad \textcircled{1}$$

Distance between Moncton and Sackville is.

$$\boxed{39.7 \text{ Km}} \quad \textcircled{1}$$



$$\tan 42^\circ = \frac{128.0}{x}$$

$$x = \frac{128.0}{\tan 42^\circ}$$

$$x = 142.158 \quad \textcircled{1}$$

$$\tan 61^\circ = \frac{128.0}{y}$$

$$y = \frac{128.0}{\tan 61^\circ}$$

$$y = 70.951 \quad \textcircled{1}$$

$$\text{Distance Apart} = 142.158 - 70.951$$

$$= 71.21$$

Fires are  $\boxed{71.21 \text{ m}}$  apart  $\quad \textcircled{1}$

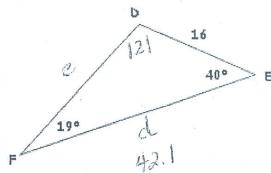
1. Find the perimeter of  $\triangle DEF$ . [4]

$$\frac{d}{\sin 121^\circ} = \frac{16}{\sin 19^\circ}$$

$$d = 42.1$$

$$\frac{e}{\sin 40^\circ} = \frac{16}{\sin 19^\circ}$$

$$e = 31.6$$

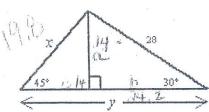


$$\text{Perimeter} = 16 + 42.1 + 31.6$$

$$89.7$$

*Practice Test Solutions*

2. Find the value of  $x$  and  $y$ . [4]



$$\sin 30^\circ = \frac{a}{28}$$

$$14 = a$$

$$\sin 45^\circ = \frac{x}{28}$$

$$x = \frac{14}{\sin 45^\circ}$$

$$x = 19.8$$

$$\tan 45^\circ = \frac{14}{c}$$

$$c = 14$$

$$\tan 45^\circ = \frac{y}{c}$$

$$y = 14$$

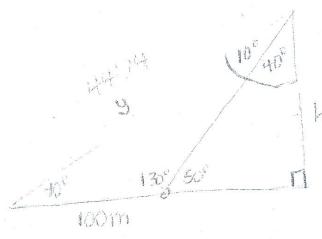
$$\cos 30^\circ = \frac{b}{28}$$

$$24.2 = b$$

$$y = 38.2$$

10

3. Bill determines that the angle of elevation to the top of a building measures  $40^\circ$ . If he walks 100 m closer to the building, the measure of the new angle of elevation will be  $50^\circ$ . Find the height of the building. [4]  
(must draw a diagram)



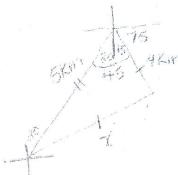
$$\frac{h}{\sin 30^\circ} = \frac{100}{\sin 10^\circ}$$

$$y = 441.14$$

$$\sin 40^\circ = \frac{h}{441.14}$$

$$283.6 = h$$

4. In Outdoor Pursuits, Mr. MacKinnon's class head out on a walking trail in a direction N  $30^\circ$  E. They travel 5km and then make camp. The next morning they walk 4km to their next camp at a direction of E  $75^\circ$  S. How far will they be from their original starting point? (must draw a diagram) [5]



$$x^2 = 5^2 + 4^2 - 2(5)(4)\cos 15^\circ$$

$$x^2 = 13.71$$

$$x = 3.6$$



5. Solve the following triangle...  $\triangle MVH$ ;  $m = 15.7 \text{ cm}$ ,  $\angle M = 43^\circ$  and  $v = 18.5 \text{ cm}$ .

Must include a sketch.

If more than one answer exists, sketch both triangles with all measurements included.

[5]

