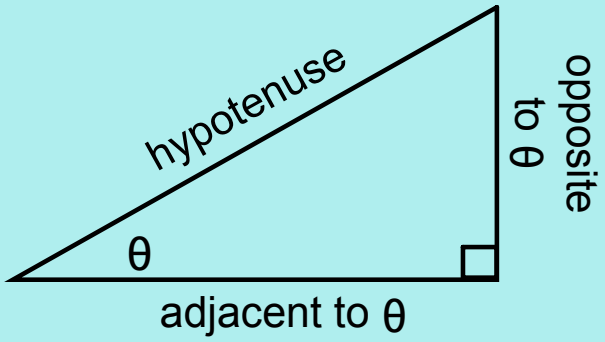
For any angle of interest (θ), there are three (3) primary trigonometric ratios.

$$\text{sine of } \theta = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\text{cosine of } \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$$

$$\text{tangent of } \theta = \frac{\text{opposite}}{\text{adjacent}}$$



S o h C a h T o a

Dec 7-9:58 PM

The Sine Law (2 formats):

In ΔABC,

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

or

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

May 14 - 9:36 PM

The cosine law:

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

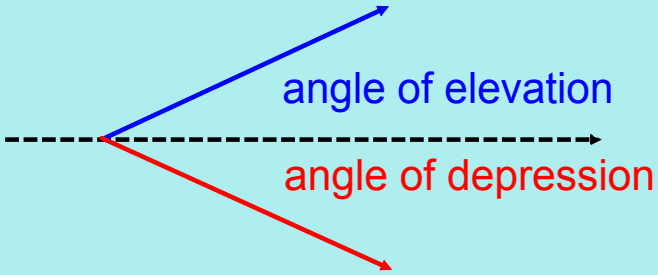
$b^2 = a^2 + c^2 - 2\,a\,c\cos B$

$c^2 = a^2 + b^2 - 2\,a\,b\cos C$

Apr 19-9:16 PM

Angle of Elevation (or Inclination): the angle measured above the horizontal.

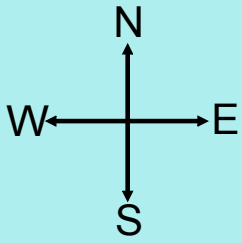
Angle of Depression (or Declination): the angle measured below the horizontal.



Dec 9-9:41 PM

Compass Directions & Bearings

(a) A <u>compass direction</u> is measured from N, S, E, or W. The angles are always between 0° and 90°.



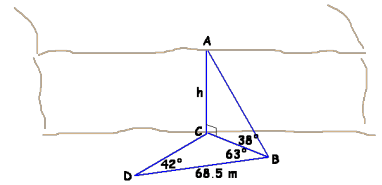
(b) A <u>bearing</u> is always measured from north, in a clockwise direction. The values are from 000 to 360 (but less than 360).

Jun 1-9:34 PM

Solving Trigonometric Problems Apr. 25/2012

Ex.1 (similar to p.270)

To calculate the height of an inaccessible cliff, data are collected and recorded on the diagram below. Calculate the height of the cliff to one decimal place.



- to find h, need a 2nd side in ΔABC
- BC is common to both Δ's
- find BC using Δ BCD

not a right-Δ

$\frac{b}{\sin B} = \frac{c}{\sin C} = \frac{d}{\sin D}$

$\frac{68.5}{\sin 75°} = \frac{d}{\sin 42°}$

$\frac{(68.5)(\sin 42°)}{(\sin 75°)} = d$

$d \doteq 47.4523$

$\tan 38° \doteq \frac{h}{47.4523}$

$h \doteq 47.4523 \tan 38°$

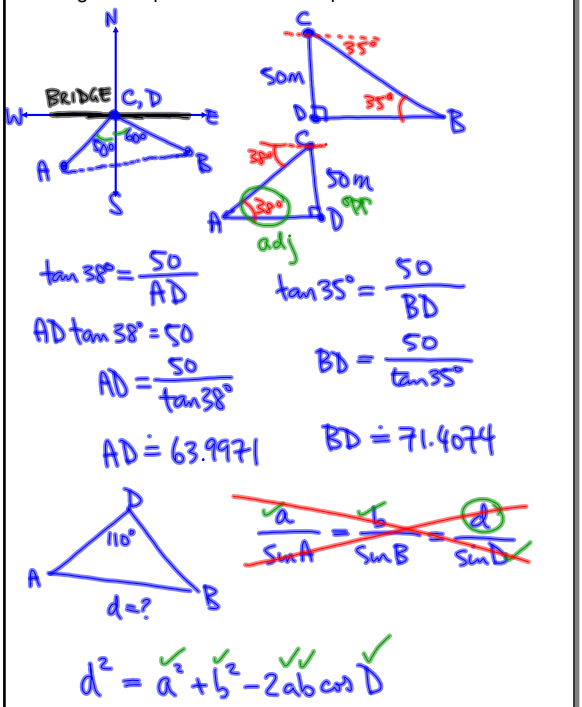
$h \doteq 37.1$

∴ the height of the cliff is 37.1m

Apr 19-9:13 PM

Ex.2

From the top of a 50 m high bridge, two boats are seen at anchor. One boat is S50°W and has an angle of depression of 38°. The other boat is S60°E and has a 35° angle of depression. How far apart are the boats?



Apr 19-9:19 PM

Ex.3

Two roads intersect at 34°. At 9:00, two cars leave the intersection on different roads at speeds of 80 km/h and 100 km/h. At 11:00, a traffic helicopter is right above the slower car, at a height of 15000 m. Determine the angle of depression and the distance from the helicopter to the faster car.

Apr 19-9:13 PM

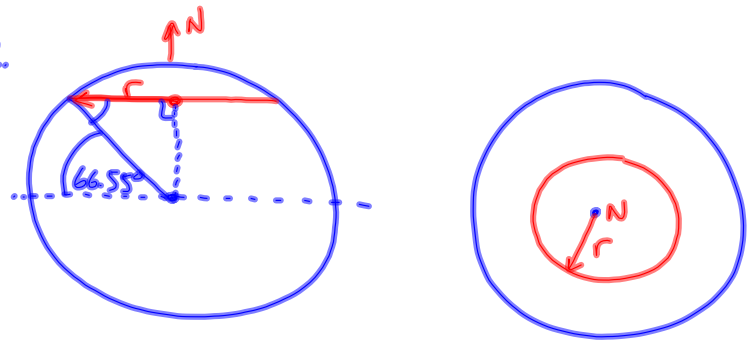
Assigned Work:

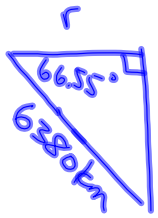
p.274 # 13, 16, 18, 19

12.

Dec 10-10:43 PM

12.





$\cos 66.55° = \frac{r}{6380}$

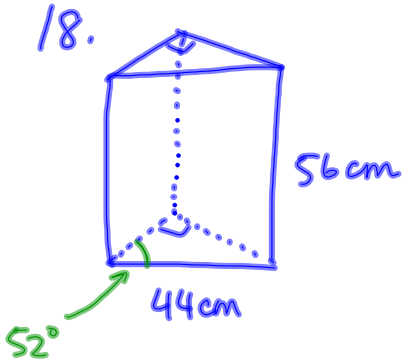
$r = 6380 \cos 66.55°$

$r \doteq$ _____

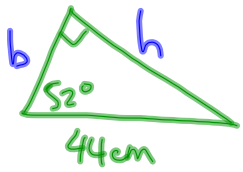
$C = 2\pi r$

Apr 26-12:34 PM

18.



$V = A_{base} \times h$ (? over A_{base}, ✓ over h)



$\cos 52° = \frac{b}{44}$

$A_\Delta = \frac{1}{2} bh$ (have 90° between)

$b = 44 \cos 52°$

$b \doteq$ ____

$\sin 52° = \frac{h}{44}$

$h = 44 \sin 52°$

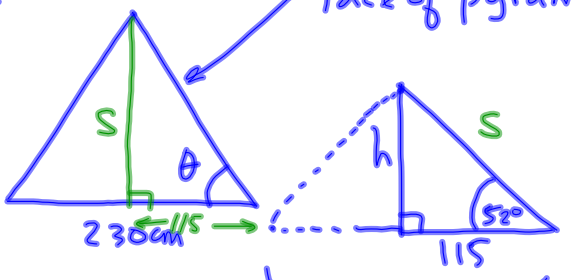
$h \doteq$ ____

$A_\Delta \doteq$ ____

Apr 26-12:34 PM

19.

face of pyramid



$\cos 52° = \frac{115}{s}$

$s \cos 52° = 115$

$s = \frac{115}{\cos 52°}$

$s \doteq$ ____

$\tan\theta = \frac{s}{115}$

Apr 26-12:45 PM