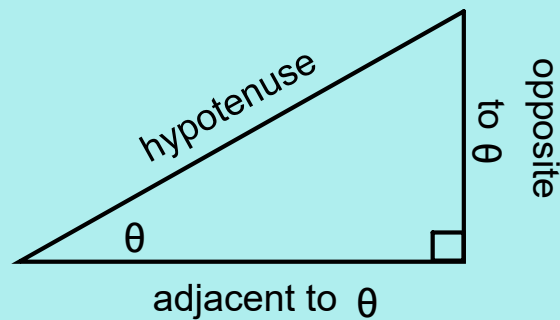


For any angle of interest (θ), there are three (3) primary trigonometric ratios.

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

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

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



S o h C a h T o a

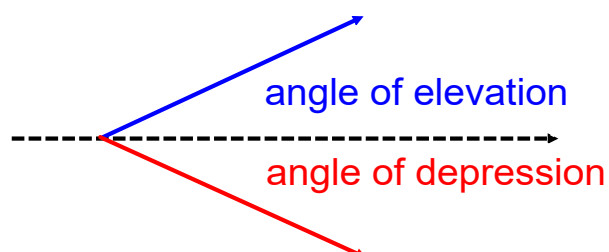
Dec 7-9:58 PM

Solving Trigonometric Problems

Apr. 26/2019

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

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



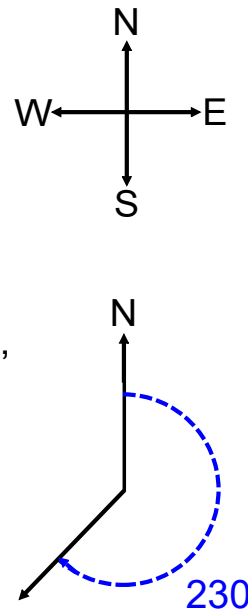
Dec 9-9:41 PM

Compass Directions & Bearings

(a) A compass direction is measured from N, S, E, or W. The angles are traditionally between 0° and 45° .

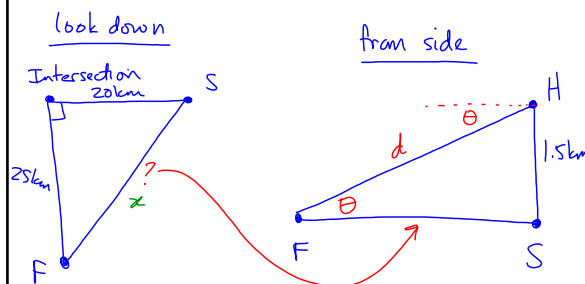
$N 10^\circ E$ or $10^\circ E$ of N
 start + turn turn start

(b) A bearing 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

Ex.1 Two roads intersect at 90° . At 9:00, two cars leave the intersection on different roads at speeds of 80 km/h and 100 km/h. At 9:15, a traffic helicopter is directly above the slower car, at a height of 1500 m. Determine the angle of depression and the distance from the helicopter to the faster car.



$$\begin{aligned} \textcircled{1} \quad x^2 &= 20^2 + 25^2 & \textcircled{2} \quad d^2 &= x^2 + 1.5^2 \\ x^2 &= 1025 & d^2 &= 1025 + 2.25 \\ x &= \sqrt{1025}, x > 0 & d &= \sqrt{1027.25} \end{aligned}$$

$$d = 32.05$$

$$\textcircled{3} \quad \tan \theta = \frac{1.5}{\sqrt{1025}}$$

$$\theta = 2.7^\circ$$

\therefore the angle of depression is 2.7°
 and the distance is 32.05 km.

Apr 19-9:13 PM

Ex.2 Two people are on a bridge that is 30 m high, and they are standing 75 m apart. One person looks straight out from the bridge (i.e., at 90°) and sees a boat, measuring an angle of depression of 16°.

- (a) How far is the boat from the bridge?
- (b) What angle of depression does the 2nd person measure?

from above 2 people: P, Q

(a) $\tan 16^\circ = \frac{30}{AB}$
 $AB \tan 16^\circ = 30$
 $AB = \frac{30}{\tan 16^\circ}$

(b) ② $BC^2 = AB^2 + 75^2$ ① $AB = 104.6224$
 $BC^2 = \left(\frac{30}{\tan 16^\circ}\right)^2 + 75^2$ $AB = 104.6$
 $BC = 128.7278$

③ $\tan \theta = \frac{30}{BC}$
 $\theta = \tan^{-1}\left(\frac{30}{BC}\right)$
 $\theta = 13.1^\circ$

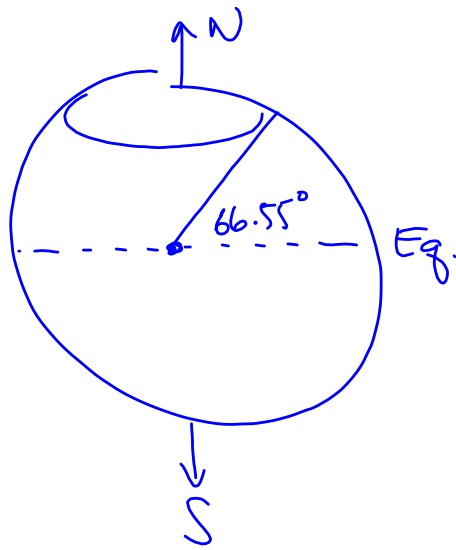
Apr 19-9:19 PM

(a) AB is distance from boat to bridge

Apr 29-12:38 PM

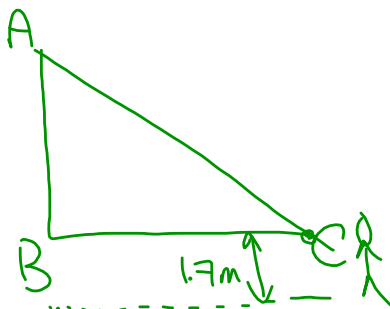
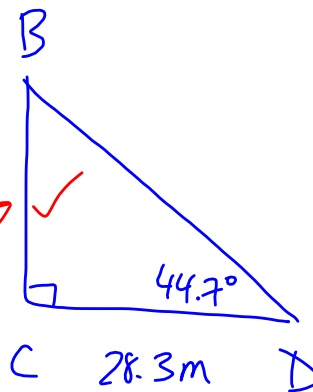
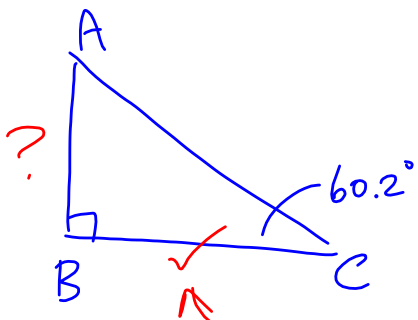
Assigned Work:

p.274 # 11, 12, 13, 16, 19



Dec 10-10:43 PM

13.



- ① calculate BC from $\triangle BCD$
- ② AB from $\triangle ABC$
- ③ add 1.7m to AB

Apr 29-1:38 PM