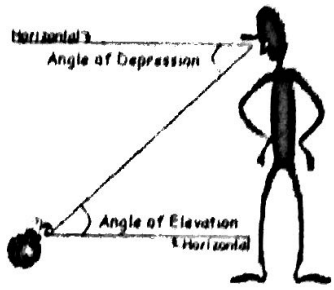
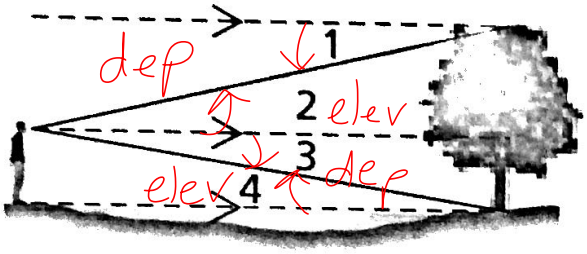
Notes: Angle of depression and angle of elevation $\frac{O}{H}$ $\frac{A}{H}$ $\frac{O}{A}$

Angle of elevation: angle your line of sight makes with the horizontal when you look **up**



Angle of depression: angle your line of sight makes with the horizontal when you look **down**

Classify each angle as an angle of elevation or an angle of depression.



EX 1: The Seattle Space Needle casts a 67-meter shadow. If the angle of elevation from the tip of the shadow to the top of the Space Needle is 70º, how tall is the Space Needle? Round to the nearest meter.

$\tan 70° = \frac{x}{67}$

$67 \tan 70° = x$

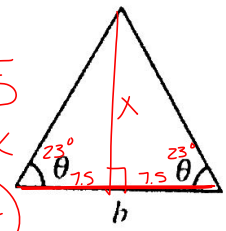
$x = 184 \text{ m}$

Ex 2: Find the altitude of an isosceles triangle given the distance between the 2 congruent angles (b) is 15 feet with an angle of elevation 23°

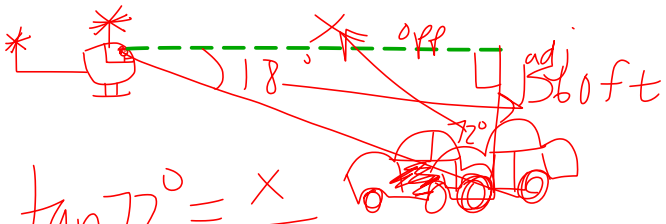
$\tan 23° = \frac{x}{7.5}$

$7.5 \tan 23° = x$

$x = 3.18 \text{ ft}$



Ex3: The pilot of a traffic helicopter sights an accident at an angle of depression of 18°. The helicopter's altitude is 1560 ft. What is the horizontal distance from the helicopter to the accident?



$\tan 72° = \frac{x}{1560}$

$x = 4801.2 \text{ ft}$

$\cot 18° = \frac{x}{1560}$

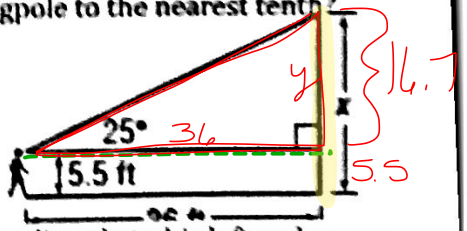
$x = \frac{1560}{\tan 18°}$

Ex 4: The town of Belmont restricts the height of flagpoles to 25 feet on any property. Lindsay wants to determine whether her school is in compliance with the regulation. Her eye level is 5.5 feet from the ground and she stands 36 feet from the flagpole. If the angle of elevation is about 25°, what is the height of the flagpole to the nearest tenth?

22.3 ft yes!

$\tan 25^\circ = \frac{y}{36}$

$36 \tan 25^\circ = y$

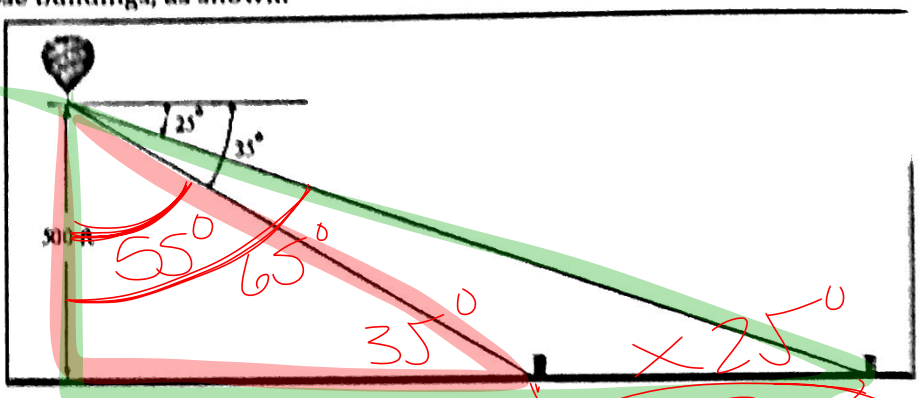


Ex 5: A hot air balloon is flying at an altitude of 500 feet. A passenger sees two buildings directly to his left and uses a transit to measure the angles of depression to those buildings, as shown:

How far apart are the buildings?

$\tan 55^\circ = \frac{y}{500}$

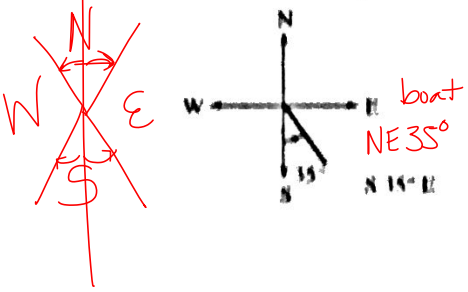
$\tan 65^\circ = \frac{z}{500}$



Bearing:

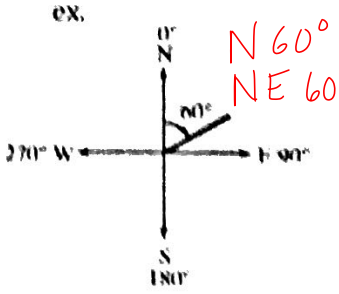
Directions measuring the acute angle that a path or line of sight makes with a fixed north-south line.

ex. S 35° E means 35 degrees east of south



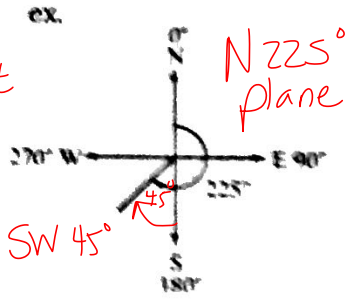
Write the bearing of the given angle:

ex.



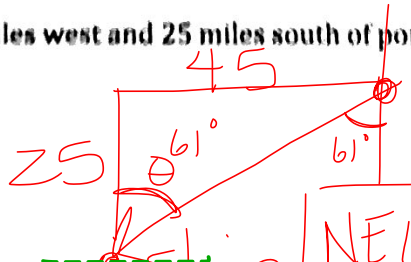
N 60° plane
NE 60° boat

ex.



N 225° plane
SW 45°

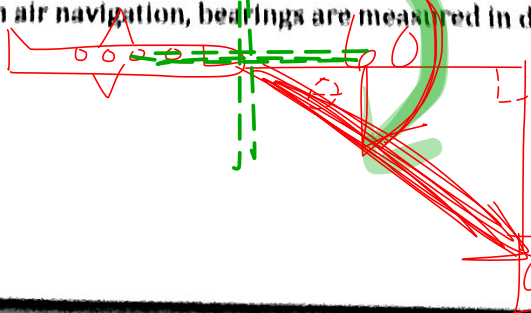
Ex 6: A ship is 45 miles west and 25 miles south of port. If the captain wants to sail directly to port what bearing should he take?



2nd tan

$\tan^{-1}\left(\frac{45}{25}\right) \approx 61^\circ$

Ex 7: A plane is 100 miles north and 60 miles west of the airport. What bearing should the pilot take to go directly to the airport? (In air navigation, bearings are measured in degrees **clockwise** from **north**)



N 149° W

$\tan^{-1}\left(\frac{100}{60}\right) + 90^\circ$