Monday, January 14, 2019
4:52 PM

Precalc KEY

4.8A Applications & Models

Obj: To solve real life problems involving right triangles

Hwk: 4.8A #1, 5, 9, 11, 19, 21, 23, 25

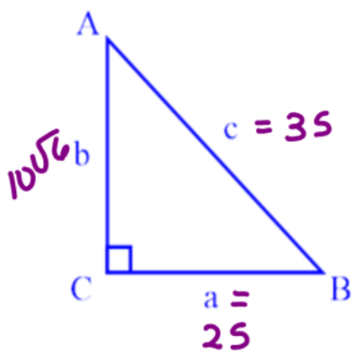
DIF. THAN ASSIGNMENT SHEET

Finish 4.8 Bearings Worksheet

Do Now: Solve the right triangle when $a = 25$, $c = 35$.

Round to the nearest tenth.

* use Degree mode!



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

$25^2 + b^2 = 35^2$

$625 + b^2 = 1225$

$b^2 = 600$

$\boxed{b = 10\sqrt{6}}$

$= 24.5$

$\sin\theta = \frac{25}{35}$

$\sin^{-1}\frac{25}{35} = A$

$\boxed{A = 45.6°}$

$\cos^{-1}\frac{25}{35} = B$

$\boxed{B = 44.4°}$

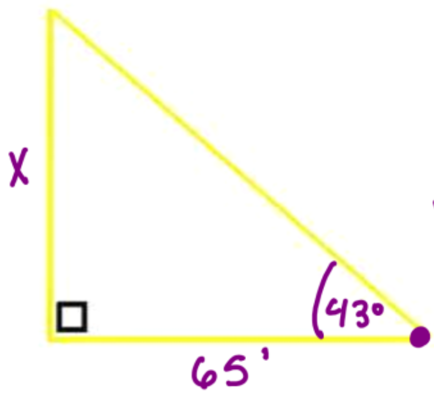
Recap:

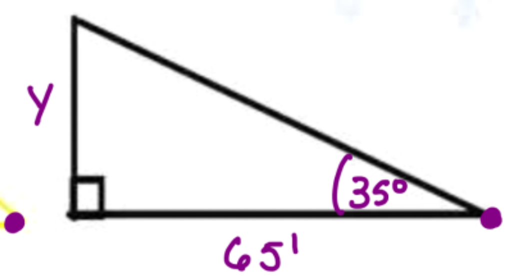
- Angles/vertices: named with CAPITAL LETTERS
- Sides: named with LOWER CASE LETTERS OPPOSITE corresponding $\angle$s
- In right triangle, measure of $\angle C$ is always 90°
- To SOLVE A RIGHT TRIANGLE, find ALL missing sides & angles (using trig & complementary angles)

Homework Questions??

Applications Involving Right Triangles

1. From a point 65 feet in front of a church, the angles of elevation to the base of the steeple and the top of the steeple are 35° and 43° respectively. Find the height of the steeple.





$\tan 43° = \frac{x}{65}$

$65 \tan 43° = x$

$x = 60.6'$

$\tan 35° = \frac{x}{65}$

$65 \tan 35° = x$

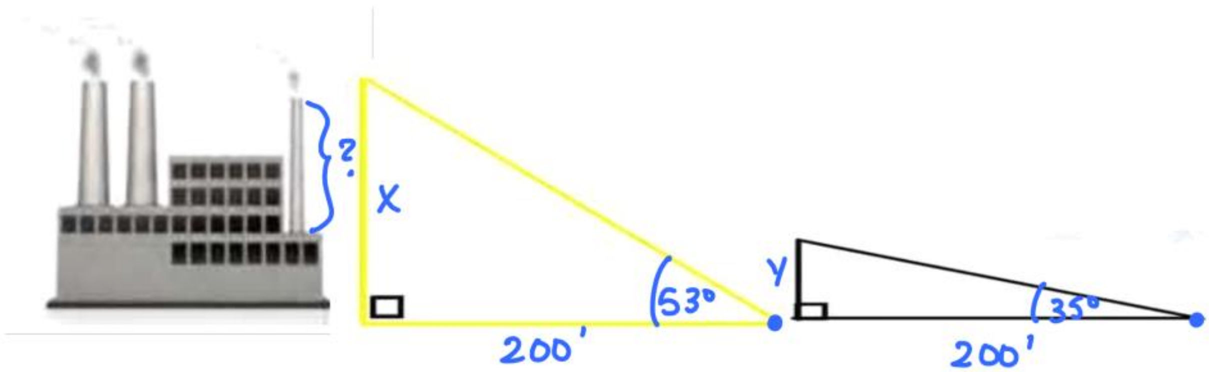
$x = 45.5'$

Height of steeple $= 60.6 - 45.5'$

$= \boxed{15.1'}$

Applications Involving Right Triangles

2. At a point 200 ft. from the base of a building, the angle of elevation to the <u>bottom</u> of a smokestack is 35°, whereas the angle of elevation to the <u>top</u> is 53°. Find the height ***s*** of the smokestack.



$\tan 53° = \frac{x}{200'}$

$200' \tan 53° = x$

$x = 265.4'$

$\tan 35° = \frac{y}{200}$

$200 \tan 35° = y$

$y = 140.0'$

Height of smokestack $= 265.4' - 140.0'$

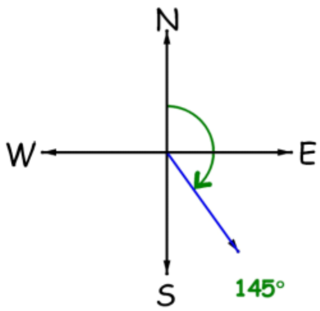
$= \boxed{125.4'}$

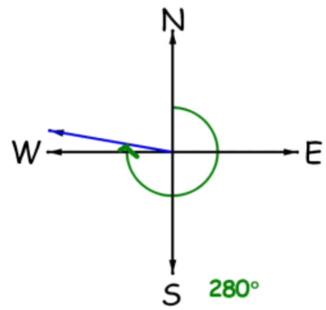
Bearing Angles (Bearings) * In notebooks

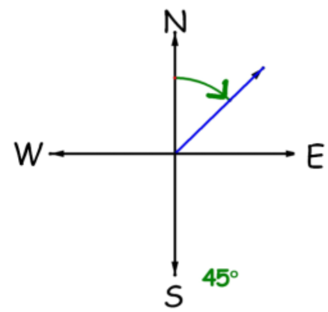
In surveying and navigation, directions are given in terms of **bearings**. A bearing measures the angle that a path or line of sight makes with a **fixed north-south line**.

There are 2 ways to express a bearing:

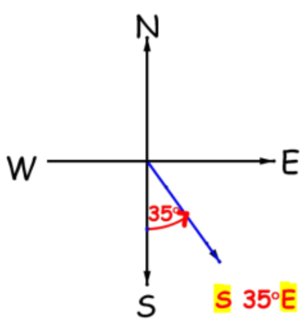
Airplane Bearings – When a single angle is given, the bearing is measured in a clockwise direction from due north.

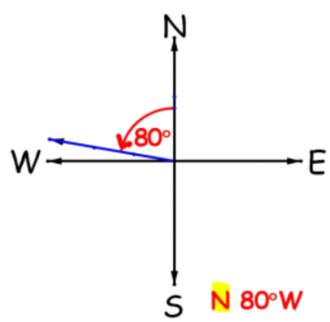


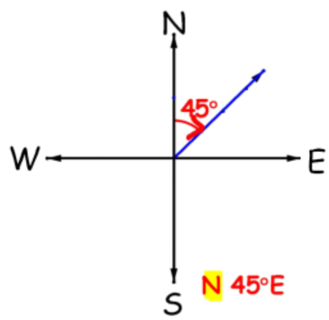




Ship Bearings – start with a north or south line and uses an acute angle to indicate rotation towards the east or west.



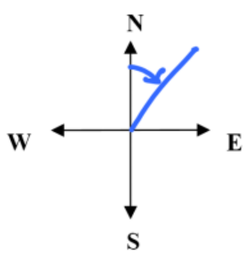


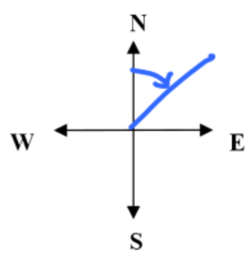


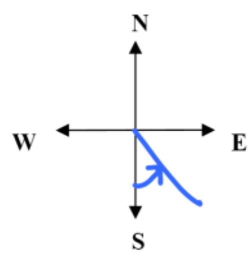
Let's Practice! (on $\frac{1}{2}$ sheet)

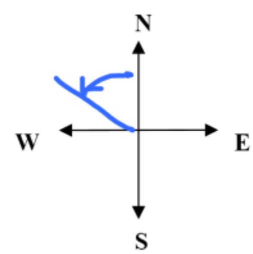
Draw a diagram that represents each bearing.

1. Bearing of 32°
2. N 42° E
3. S 31° E
4. N 52°W



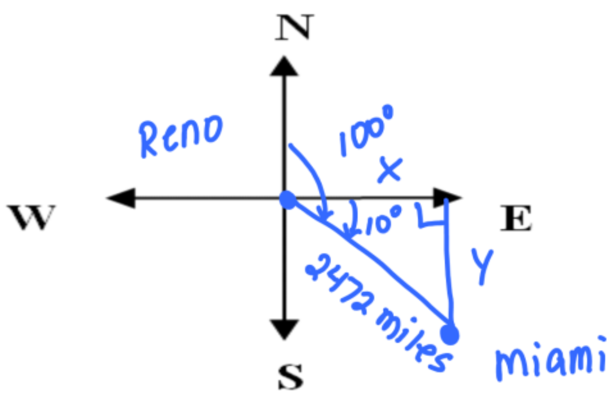






Applications Involving Bearings (back of ½ sheet)

1.) A jet leaves Reno, Nevada and is headed toward Miami, Florida at a bearing of 100°. The distance between the two cities is approximately 2472 miles. How far north and how far west is Reno relative to Miami?



$\sin 10° = \frac{y}{2472 \text{ miles}}$

$2472 \sin 10° = y$

$\boxed{y = 429.3 \text{ miles north}}$

$\cos 10° = \frac{x}{2472}$

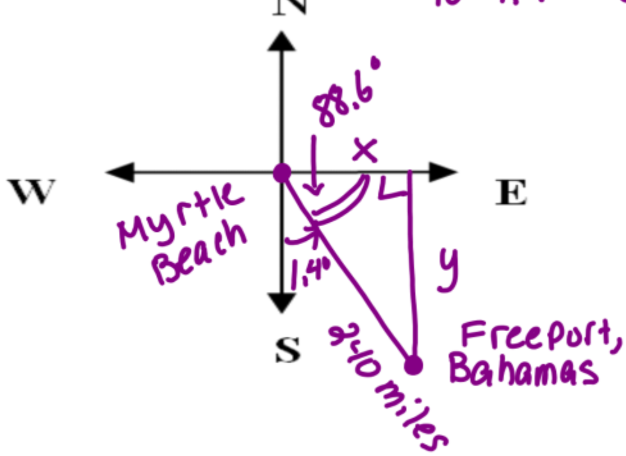
$2472 \cos 10° = x$

$\boxed{x = 2434.4 \text{ miles west}}$

2.) A yacht leaves a dock in Myrtle Beach, SC & heads toward Freeport, Bahamas at a bearing of S 1.4° E. If the ship travels as a speed of 20 knots (nautical miles per hour), how far east and south is the yacht after 12 hours?

$20 \times 12 = 240$ miles

$90° - 1.4° = 88.6°$



$\sin 88.6° = \frac{y}{240}$

$240 \sin 88.6° = y$

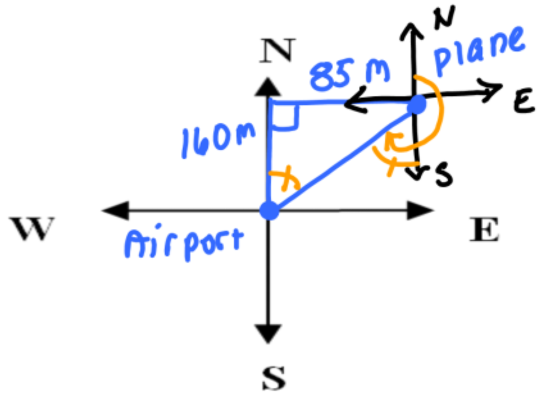
$\boxed{y = 239.9 \text{ miles south}}$

$\cos 88.6° = \frac{x}{240}$

$240 \cos 88.6° = x$

$\boxed{x = 5.9 \text{ miles east}}$

3.) An airplane is 160 miles north and 85 miles east of an airport. The pilot wants to fly directly to the airport. What bearing should be taken?



$$\tan\theta = \frac{85}{160}$$

$$\tan^{-1}\frac{85}{160} = 28°$$

$$180° + 28° = \boxed{208°}$$

Closure:

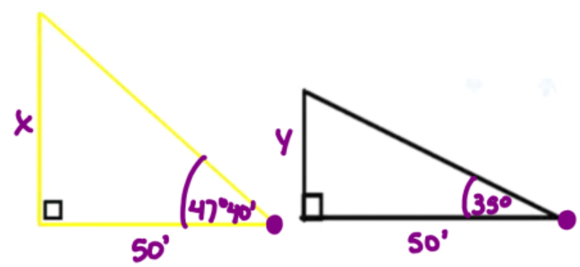
A Quick Look at HW…………

19.) **Height -** From a point 50 feet in front of a church, the angles of elevation to the base of the steeple and the top of the steeple are 35° and 47°40' respectively.

a) Draw right triangles that give a visual representation of the problem. Label the known and unknown quantities.

b) Use a trigonometric function to write an equation involving the unknown quantity.

c) Find the height of the steeple.



25.) A cellular telephone tower that is 150 feet tall is placed on top of a mountain that is 1200 feet above sea level. What is the angle of depression from the top of the tower to a cell phone user who is 5 horizontal miles away and 400 feet above sea level?