

WS#7-1

Right Triangle Trigonometry and Applications

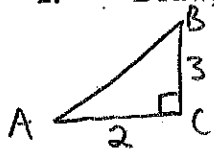
1. Cofunctions of complementary angles are equal which means that

The value of the trig function of an angle equals the value of the cofunction of the complement of the angle.

A.  $\sin 30^\circ = \cos 60$       B.  $\cot 54^\circ = \tan 36$       C.  $\cot 40^\circ - \frac{\sin 50^\circ}{\sin 40^\circ} = 0$

$\cot 40 - \frac{\cos 40}{\sin 40}$   
 $\cot 40 - \cot 40 = 0$

2. Draw, label and solve a right triangle with  $a = 3$ ,  $b = 2$  and  $\angle C = 90^\circ$ .



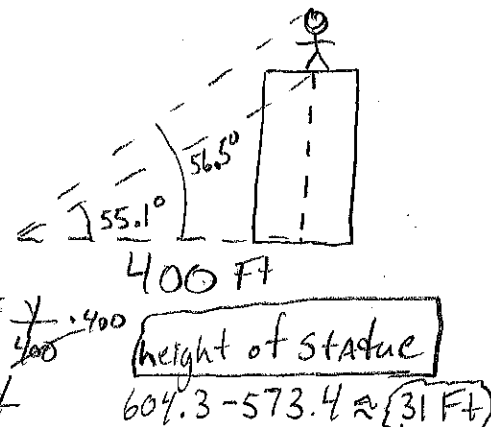
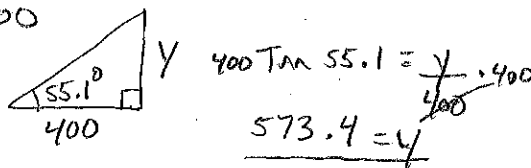
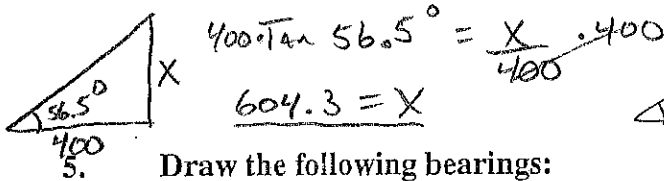
$c = \sqrt{3^2 + 2^2} = \sqrt{13}$   
 $\angle A = \tan^{-1}(3/2) = 56.3^\circ$   
 $\angle B = 90 - 56.3 = 33.7^\circ$

3. A straight trail leads from the Alpine Hotel, elevation 8000 feet, to a scenic overlook, elevation 11,100 feet. The length of the trail is 14,100 feet. What is the inclination (grade) of the trail?

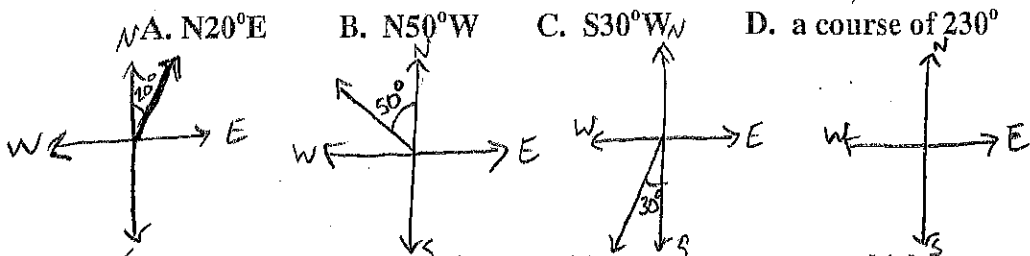


Angle of inclination =  $\sin^{-1}(\frac{3100}{14100}) = 12.7^\circ$

4. Adorning the top of the Board of Trade building in Chicago is a statue of Ceres, the Roman goddess of wheat. From street level, two observations are taken 400 feet from the center of the building. The angle of elevation to the base of the statue is  $55.1^\circ$ ; the angle of elevation to the top of the statue is  $56.5^\circ$ . What is the height of the statue? Round to the nearest foot.

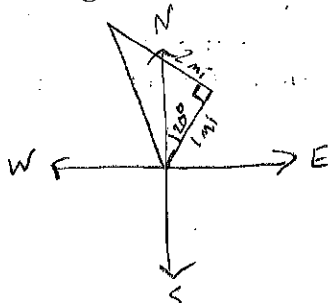


5. Draw the following bearings:



E. a bearing of  $145^\circ$   
 • A bearing Always starts  $0^\circ$  North + moves (clock wise if direction is not given (like in ex's A-C)).

6. A plane takes off from O'Hare Airport on a runway which has a bearing of  $N20^\circ E$ . After flying 1 mile, the pilot of the plane requests permission to turn  $90^\circ$  and head toward the northwest. The request is granted. After the plane goes 2 miles in this direction, what bearing should the control tower use to locate the plane?



$\tan A = \frac{2}{1}$

$A = \tan^{-1}(\frac{2}{1}) = 63.4^\circ$   
 $63.4^\circ - 20 = 43.4^\circ$   
 $N 43.4^\circ W$

