

Use your calculator to find the value of each of the following. Round your answer to four decimal places.

1.  $\sin 43^{\circ}19'51''$

$\boxed{.6862}$

2.  $\sec 129^{\circ}$

$\frac{1}{\cos 129^{\circ}}$   
 $\boxed{-1.589}$

3.  $\tan(-216.73^{\circ})$

$\boxed{-.7462}$

You **MUST** draw a picture and write an equation for each problem. Round your answers to the nearest tenth. Use a separate sheet of paper.

Solve right triangle ABC with right angle A, given the following information.

4.  $a = 24.6$  and  $b = 12.9$

5.  $C = 42.1^{\circ}$  and  $b = 4.8$

6. The angle of elevation to the top of the Empire State Building in New York is  $11^{\circ}$  from a point on the ground 1 mile from the base of the building. Find the height of the Empire State Building in feet.

7. A plane is flying at an elevation of 35,000 feet within sight of the Gateway Arch in St. Louis, Missouri. The pilot would like to estimate her distance from the Arch. She finds that the angle of depression to a point on the ground below the arch is  $22^{\circ}$ .

(a) What is the distance between the plane and the arch?

(b) What is the distance between a point on the ground directly below the plane and the arch? (along the ground)

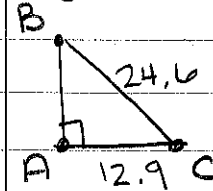
8. From the top of a 200 foot lighthouse, the angle of depression to a ship on the ocean is  $23^{\circ}$ . How far is the ship from the base of the lighthouse?

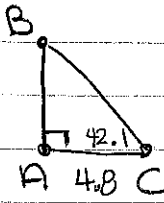
9. A 20 foot ladder leans against a building so that the angle between the ground and the ladder is  $72^{\circ}$ . How high does the ladder reach on the building?

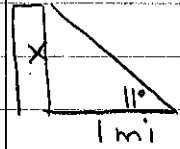
10. A 96 foot tree casts a shadow that is 120 feet long. What is the angle of elevation of the sun?

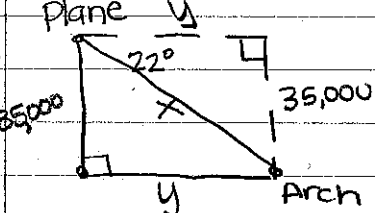
11. A man is lying on the beach, flying a kite. He holds the end of the kite string at ground level and estimates the angle of elevation of the kite to be  $50^{\circ}$ . If the string is 450 feet long, how high is the kite above the ground?

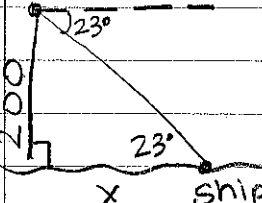
# Right Triangles WS 1

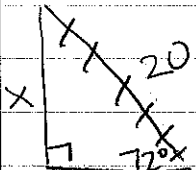
4.   $C^2 + 12.9^2 = 24.6^2$   $\cos C = \frac{12.9}{24.6}$   $\angle B = 90 - 58.4$   
 $C^2 = 438.75$   $\angle B = 31.6^\circ$   
 $C = 20.9$   $C = \cos^{-1}\left(\frac{12.9}{24.6}\right)$

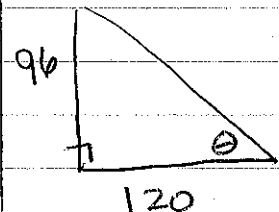
5.   $\angle B = 90 - 42.1$   $\cos 42.1^\circ = \frac{4.8}{a}$   $\tan 42.1 = \frac{c}{4.8}$   
 $\angle B = 47.9^\circ$   $a \cos 42.1^\circ = 4.8$   $C = 4.3$   
 $a = 4.8$   $a = 6.5$   
 $\cos 42.1^\circ$

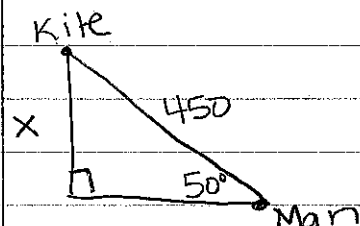
6.   $5280 \text{ ft} = 1 \text{ mi}$   $\tan 11^\circ = \frac{x}{5280}$   
 $x = 1026.3 \text{ ft}$

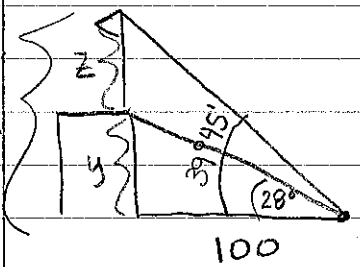
7.  a.)  $\sin 22^\circ = \frac{35000}{x}$  b.)  $\tan 22^\circ = \frac{35000}{y}$   
 $x \sin 22 = 35000$   $y \tan 22 = 35000$   
 $x = \frac{35000}{\sin 22}$   $y = \frac{35000}{\tan 22}$   
 $x = 93,431.4 \text{ ft}$   $y = 86628 \text{ ft}$

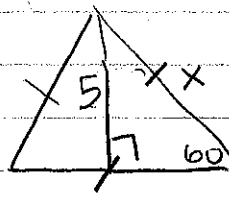
8.   $\tan 23^\circ = \frac{200}{x}$   
 $x \tan 23 = 200$   
 $x = \frac{200}{\tan 23}$   
 $x = 471.2 \text{ ft}$

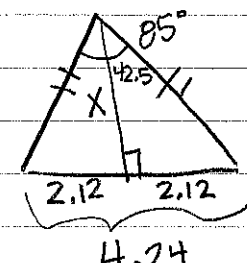
9.   $\sin 72 = \frac{x}{20}$   
 $x = 19.0 \text{ ft}$

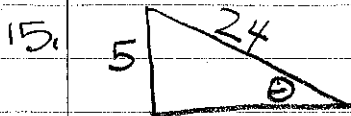
10.   $\tan \theta = \frac{96}{120}$   
 $\theta = \tan^{-1} \left( \frac{96}{120} \right)$   
 $\theta = 38.7^\circ$

11.   $\sin 50 = \frac{x}{450}$   
 $x = 344.7 \text{ ft}$

12.   $\tan 39^\circ 45' = \frac{x}{100}$        $\tan 28^\circ = \frac{y}{100}$   
 $x = 83.2$        $y = 53.2$   
 $z = 83.2 - 53.2 = 30 \text{ ft}$

13.   $\sin 60^\circ = \frac{5}{x}$   
 $x \sin 60 = 5$   
 $x = \frac{5}{\sin 60}$        $x = 5.8 \text{ cm}$

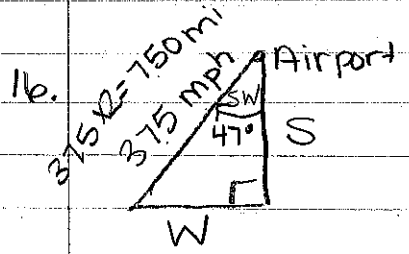
14.   $\tan 42.5 = \frac{2.12}{x}$   
 $x \tan 42.5 = 2.12$   
 $x = \frac{2.12}{\tan 42.5}$        $x = 2.3 \text{ ft}$



$$\sin \theta = \frac{5}{24}$$

$$\theta = \sin^{-1}\left(\frac{5}{24}\right)$$

$$\theta = 12^\circ$$



West

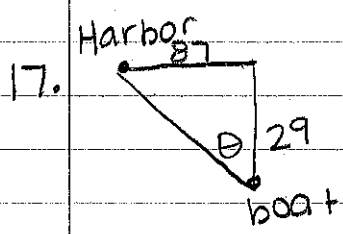
$$\sin 47^\circ = \frac{W}{750}$$

$$W = 548.5 \text{ mi}$$

South

$$\cos 47^\circ = \frac{S}{750}$$

$$S = 511.5 \text{ mi}$$



$$\tan \theta = \frac{87}{29}$$

$$\theta = \tan^{-1}\left(\frac{87}{29}\right)$$

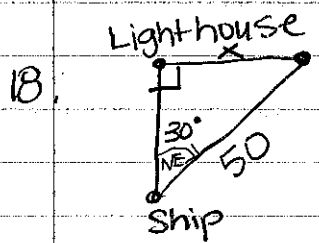
$$\theta = 71.6$$

$$\boxed{N 71.6^\circ W}$$

or

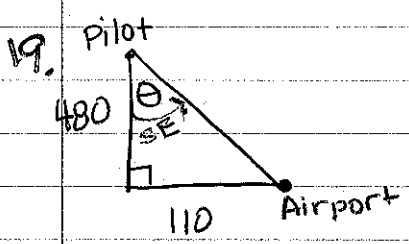
$$90 - 71.6 = 18.4$$

$$W 18.4^\circ N \leftarrow \text{awkward}$$



$$\sin 30^\circ = \frac{x}{50}$$

$$x = 25 \text{ mi}$$



$$\tan \theta = \frac{110}{480}$$

$$\theta = \tan^{-1}\left(\frac{110}{480}\right)$$

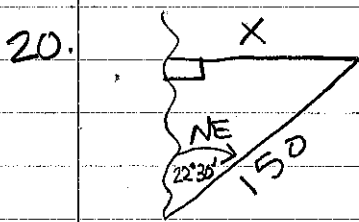
$$\theta = 12.9^\circ$$

$$\boxed{S 12.9^\circ E}$$

or

$$90 - 12.9 = 77.1$$

$$\boxed{E 77.1^\circ} \leftarrow \text{awkward}$$



$$\sin 22^\circ 30' = \frac{x}{150}$$

$$x = 57.4 \text{ miles}$$