

Use a calculator to evaluate each function. Round your answers to 4 decimal places.

- 1)  $\sin 25^\circ = 0.4226$       2)  $\cos 65^\circ = 0.4226$       3)  $\cot 71.5^\circ = \frac{1}{\tan(71.5)} = 0.3346$       4)  $\sec 42^\circ 12' = \frac{1}{\cos(42^\circ 12')} = 1.3499$   
 5)  $\cos 8^\circ 50' 25'' = 0.9881$       6)  $\tan \frac{\pi}{16} = 0.1989$       7)  $\csc 1.25 = \frac{1}{\sin(1.25)} = 1.0538$       8)  $\csc 0 = \frac{1}{\sin(0)} = \text{undefined}$

Find the value of  $\theta$  in degrees. Round to the nearest hundredth.

- 9)  $\sin \theta = 0.8191$       10)  $\cos \theta = 0.9848$       11)  $\tan \theta = 1.1920$       12)  $\sec \theta = 1.4123$   
 $\theta = \sin^{-1}(0.8191) = 54.99^\circ$        $\theta = \cos^{-1}(0.9848) = 10^\circ$        $\theta = \tan^{-1}(1.192) = 50.01^\circ$        $\cos \theta = \frac{1}{1.4123}$   
 $\theta = \cos^{-1}(\frac{1}{1.4123}) = 44.92^\circ$

Find the value of  $\theta$  in D°M'S". Round to the nearest minute.

- $\cos^{-1}(0.4223) = 65.02011851 \times 60 = 65^\circ 01'$        $\tan^{-1}(1.5002) = 56.31345804 \times 60 = 56^\circ 19'$       15)  $\csc \theta = 1.5555$       16)  $\cot \theta = 2.1234$   
 13)  $\cos \theta = 0.4223$       14)  $\tan \theta = 1.5002$       15)  $\csc \theta = 1.5555$       16)  $\cot \theta = 2.1234$   
 See scrap paper

Solve each of the following triangles. Draw and label a picture for each. Show an equation for each. Round answers to the nearest tenth. \*\*\* Show all diagrams and work on notebook paper!\*\*\*

- 17) Triangle PQR – given that angle Q is the right angle, angle R is  $33^\circ$ , side q is 18.  
 18) Triangle JKM – give that angle K is the right angle, angle M is  $62.3^\circ$ , side m is 9  
 19) Triangle SUT – given that angle T is the right angle, side u = 7.5, side t is 31.3  
 20) A 30-meter line is used to tether a helium-filled balloon. Because of a breeze, the line makes an angle of approximately  $75^\circ$  with the ground. What is the height of the balloon?  
 21) From a 60-foot observation tower on the coast, a Coast Guard officer sights a boat in difficulty. The angle of depression of the boat is  $4.5^\circ$ . How far is the boat from the shoreline?  
 22) A passenger in an airplane flying at an altitude of 37,000 feet sees two towns directly to the left of the airplane. The angles of depression to the towns are  $32^\circ$  and  $76^\circ$ . How far apart are the towns?  
 23) A boat is 160 miles north and 85 miles east of port. What bearings should be taken to head directly back to port?

Answers:

- 1) 0.4226      2) 0.4226      3) 0.3346      4) 1.3499  
 5) 0.9881      6) 0.1989      7) 1.0538      8) undefined  
 9)  $54.99^\circ$       10)  $10.00^\circ$       11)  $50.01^\circ$       12)  $44.92^\circ$   
 13)  $65^\circ 1'$       14)  $56^\circ 19'$       15)  $40^\circ 0'$       16)  $25^\circ 13'$   
 17)  $P = 57^\circ$ ;  $r = 9.8$ ;  $p = 15.1$       18)  $J = 27.7^\circ$ ;  $k = 10.2$ ;  $j = 4.7$       19)  $U = 13.9^\circ$ ;  $S = 76.1^\circ$ ;  $s = 30.4$   
 20) 29.0 m      21) 762.4 ft      22) 49,987.2 ft      23)  $S 28.0^\circ W$

$$15. \sin \theta = \frac{1}{1.5555}$$

$$\theta = \sin^{-1} \left( \frac{1}{1.5555} \right)$$

$$\theta = 40.00691832$$

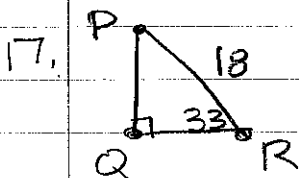
$$\theta = 40^{\circ} 0'$$

$$16. \tan \theta = \frac{1}{2.1234}$$

$$\theta = \tan^{-1} \left( \frac{1}{2.1234} \right)$$

$$\theta = 25.21775454$$

$$25^{\circ} 13'$$



$$\angle P = 90 - 33$$

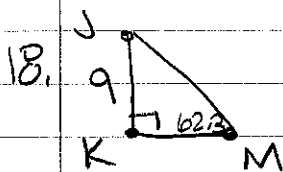
$$= 57^{\circ}$$

$$\sin 33 = \frac{r}{18}$$

$$\cos 33 = \frac{p}{18}$$

$$r = 9.8$$

$$p = 15.1$$



$$\angle J = 90 - 62.3$$

$$= 27.7^{\circ}$$

$$\sin 62.3 = \frac{9}{K}$$

$$K \sin 62.3 = 9$$

$$K = \frac{9}{\sin 62.3}$$

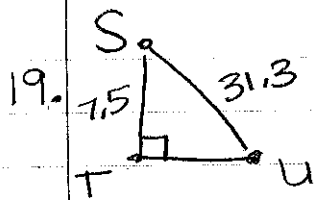
$$K = 10.21$$

$$\tan 62.3 = \frac{9}{j}$$

$$j \tan 62.3 = 9$$

$$j = \frac{9}{\tan 62.3}$$

$$j = 4.7$$



$$7.5^2 + S^2 = 31.3^2$$

$$S^2 = 923.44$$

$$\boxed{S = 30.4}$$

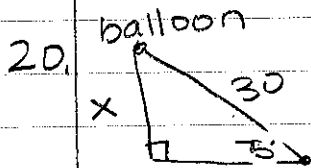
$$\sin u = \frac{7.5}{31.3}$$

$$\angle S = 90 - 13.9$$

$$\boxed{= 76.1^\circ}$$

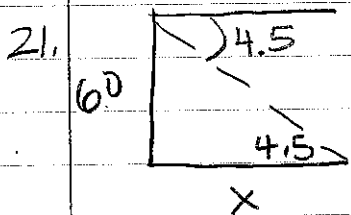
$$u = \sin^{-1}\left(\frac{7.5}{31.3}\right)$$

$$\boxed{u = 13.9^\circ}$$



$$\sin 75^\circ = \frac{x}{30}$$

$$\boxed{x = 29\text{m}}$$



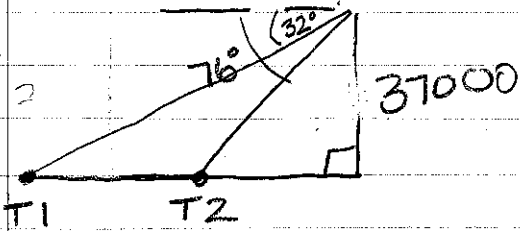
$$\tan 4.5^\circ = \frac{60}{x}$$

$$x \tan 4.5^\circ = 60$$

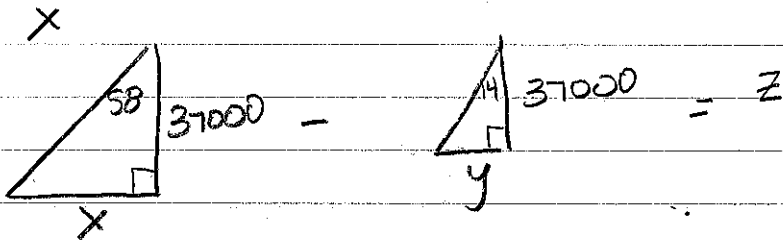
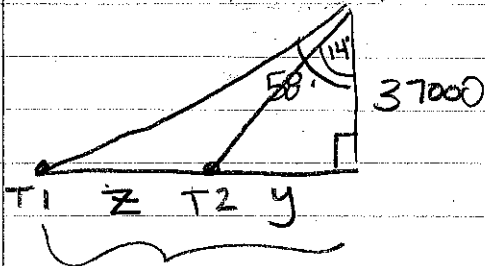
$$x = \frac{60}{\tan 4.5^\circ}$$

$$\boxed{x = 762.4\text{ft}}$$

22.



$$\begin{array}{r} 90 \\ -32 \\ \hline 58^\circ \end{array} \quad \begin{array}{r} 90 \\ -76 \\ \hline 14^\circ \end{array}$$



$$\tan 58 = \frac{x}{37000}$$

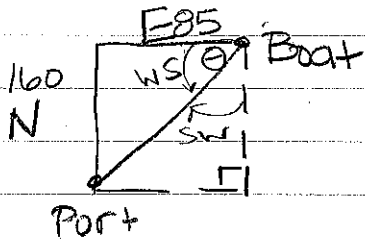
$$\tan 14 = \frac{y}{37000}$$

$$x = 59212.4$$

$$y = 9225.1$$

$$59212.4 - 9225.1 = \boxed{49987.3 \text{ ft}}$$

23.



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

$$\theta = 62^\circ$$

W 62° S ← Awkward

$$90 - 62 = 28$$

$$\boxed{S 28^\circ W}$$