

Name \_\_\_\_\_

# MAT126 – Technical Math & Trig

## Assignment 8

**Find the acute angles (in degrees) for the trigonometric functions. Round your answers to the correct number of significant figures.**

(1)  $\sin A = 0.284$

(4)  $\csc D = 3.421$

(2)  $\cos B = 0.539$

(5)  $\sec E = 4.021$

(3)  $\tan C = 1.924$

(6)  $\cot F = 1.743$

**Determine the reference angle for each of the given angles**

(7)  $173^\circ$

(9)  $1.2 \text{ rad}$

(8)  $\frac{13\pi}{7}$

(10)  $289^\circ$

**State in which quadrant(s) the terminal side of  $\theta$  lies for each given expressions**

(11)  $\sin \theta > 0$

(14)  $\csc \theta < 0 \text{ and } \cos \theta > 0$

(12)  $312^\circ$

(15)  $\tan \theta < 0$

(13)  $\sec \theta = 3.4$

(16)  $\cot \theta = -\frac{1}{2}$

**Find the values of each of the trigonometric functions. Round your answer to the correct number of significant figures.**

(17)  $\sin 137^\circ$

(20)  $\sec 1.37$

(18)  $\cos 3.2$

(21)  $\csc 162.4^\circ$

(19)  $\tan 239^\circ$

(22)  $\cot 6.1$

Name \_\_\_\_\_

**Find all angles  $\theta$  where  $0^\circ \leq \theta < 360^\circ$ , with the given function. Round your answer to the correct number of significant figures.**

(23)  $\sin \theta = -0.25$

(26)  $\csc \theta = 4.3$

(24)  $\cos \theta = 0.34$

(27)  $\sec \theta = -1.6$

(25)  $\tan \theta = 4.13$

(28)  $\cot \theta = -2.74$

**Find all angles  $\theta$  where  $0 \leq \theta < 2\pi$ , with the given function. Round your answer to the correct number of significant figures.**

(29)  $\tan \theta = 1.2$

(32)  $\csc \theta = 3.0$

(30)  $\sin \theta = -0.72$

(33)  $\sec \theta = 1.6$

(31)  $\cos \theta = -0.58$

(34)  $\cot \theta = -0.95$

**Evaluate each function. Round your answer to the correct number of significant figures. Write your answer as a measurement in degrees; then find the answer as a measurement in radians**

(35)  $\arcsin 0.84$

(38)  $\operatorname{arcsec}(-3.15)$

(36)  $\tan^{-1}(-0.64)$

(39)  $\csc^{-1}(6.31)$

(37)  $\cos^{-1}(-0.76)$

(40)  $\operatorname{arccot}(2.54)$

Name \_\_\_\_\_

**Make a sketch of the right triangle with the information described. Solve the triangle to find missing sides and angles. Round your answers to the correct number of significant figures.**

(41)  $a = 8.00, b = 14.0$

(42)  $B = 42.0^\circ, a = 36.4$

(43)  $A = 20.0^\circ, c = 7.62$

(44)  $B = 17.2^\circ, a = 14.9$

(45)  $a = 15, c = 25$

(46)  $a = 14, b = 9.3$

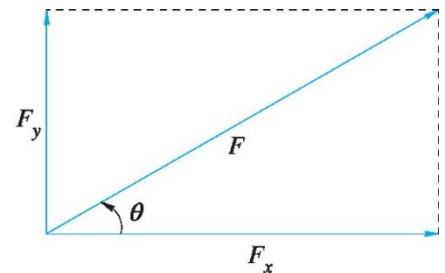
Name \_\_\_\_\_

**Applications:** Solve each of the following problems. Round your answer to the correct number of significant figures. Write your answer as part of a complete sentence with appropriate units

- (47) In an AC circuit that has inductance  $X_L$  and resistance  $R$ , the phase angle can be determined from the equation  $\tan \phi = \frac{X_L}{R}$ . If  $X_L = 21.3\Omega$  and  $R = 17.9\Omega$ , what is the phase angle?

- (48) From the top of a lighthouse, the angle of depression of the waterline of a boat is  $22.3^\circ$ . If the lighthouse is 21.7 feet high, how far away is the ship from the bottom of the lighthouse?

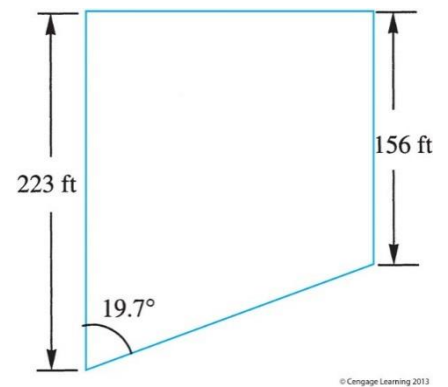
- (49) A vector is usually resolved into component vectors that are perpendicular to each other. Thus, you get a rectangle with one side  $F_x$ , the horizontal component, and the other  $F_y$ , the vertical component as shown in the figure. The original vector  $F$  is the diagonal of the rectangle. If  $F = 11.4\text{ N}$  and  $\theta = 34.6^\circ$ , what are the horizontal and vertical components of this force?



Name \_\_\_\_\_

- (50) The potential voltage,  $V$ , of a sinusoidal current in an AC circuit is given by  $V = V_{max} \sin \theta$  where  $V_{max}$  is the maximum potential. Find  $V$  when  $V_{max} = 115.2 \text{ V}$  and  $\theta = 113.4^\circ$ .

- (51) The figure shows the outline of some ground that needs to be sodded. How many square feet of sod are needed to completely cover the ground?



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- (52) The phase angle,  $\theta$ , in an inductive circuit between the impedance,  $Z$ , and the resistance,  $R$ , can be found by using  $\theta = \arccos\left(\frac{Z}{R}\right)$ . Find  $\theta$  when  $Z = 30 \Omega$  and  $R = 50 \Omega$ .

Name \_\_\_\_\_

(53) A 1200 rpm motor is directly connected to a 12-in diameter circular saw blade. What is the linear velocity of the saw's teeth in feet/min?

(54) A pulley belt is 4.0 m long and takes 2.0 s to complete one revolution. If the radius of the pulley is 180 mm, what is the angular velocity of a point on the rim of the pulley?