

SCORE: \_\_\_ / 140 POINTS

What month is your birthday? \_\_\_

What are the first 2 digits of your address? \_\_\_

What are the last 2 digits of your zip code? \_\_\_

What are the last 2 digits of your social security number? \_\_\_

**[IF YOU DO NOT HAVE A SOCIAL SECURITY NUMBER, USE YOUR STUDENT ID NUMBER]****NO CALCULATORS ALLOWED ON THIS SECTION**

Find the six trigonometric function values for an angle in standard position with terminal side

SCORE: \_\_\_ / 10 POINTS

 $3x - 4y = 0$ ,  $x \leq 0$ . **SHOW YOUR WORK.**

$$3(-4) - 4(-3) = 0$$

$$x = -4$$

$$\sin \theta = -\frac{3}{5}$$

$$\csc \theta = -\frac{5}{3}$$

$$y = -3$$

$$\cos \theta = \frac{4}{5}$$

$$\sec \theta = \frac{5}{4}$$

$$r = \sqrt{(-4)^2 + (-3)^2} = 5$$

$$\tan \theta = \frac{3}{4}$$

$$\cot \theta = \frac{4}{3}$$

Use an identity (**NOT x, y and r**) to find  $\tan \theta$  if  $\sec \theta = 6$  and  $\csc \theta < 0$ . **SHOW YOUR WORK.**

SCORE: \_\_\_ / 6 POINTS

$$\sec^2 \theta = \tan^2 \theta + 1$$

$$36 = \tan^2 \theta + 1$$

$$\tan^2 \theta = 35$$

$$\tan \theta = \pm \sqrt{35}$$

$$\theta \text{ in } Q_4 \Rightarrow \tan \theta < 0$$
  
$$\tan \theta = -\sqrt{35}$$

Fill in the following values.

SCORE: \_\_\_ / 6 POINTS

[a]  $\sec 30^\circ = \frac{2\sqrt{3}}{3}$

[b]  $\cot 60^\circ = \frac{\sqrt{3}}{3}$

[c]  $\cos 45^\circ = \frac{\sqrt{2}}{2}$

[d]  $\csc 60^\circ = \frac{2\sqrt{3}}{3}$

[e]  $\sin 45^\circ = \frac{\sqrt{2}}{2}$

[f]  $\tan 30^\circ = \frac{\sqrt{3}}{3}$

Complete the following table of values for the quadrantal angle  $-270^\circ$ .

SCORE: \_\_\_ / 6 POINTS

$\theta$	$\sin \theta$	$\cos \theta$	$\tan \theta$	$\csc \theta$	$\sec \theta$	$\cot \theta$
$-270^\circ$	1	0	UNDEF	1	UNDEF	0

**MULTIPLE CHOICE:** Which of the following statements is true?

SCORE: \_\_\_ / 6 POINTS

[a]  $\csc 46^\circ > \csc 43^\circ$

[b]  $\tan 46^\circ < \tan 43^\circ$

[c]  $\sin 46^\circ > \cos 43^\circ$

[d] none of the above

**LETTER OF CORRECT ANSWER:** D



Find one solution for the equation  $\csc(3\alpha - 20^\circ) = \sec(2\alpha + 10^\circ)$ . SHOW YOUR WORK.

SCORE: \_\_\_ / 10 POINTS

$$3\alpha - 20^\circ = 90^\circ - (2\alpha + 10^\circ)$$

$$3\alpha - 20^\circ = 80^\circ - 2\alpha$$

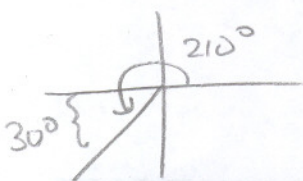
$$5\alpha = 100^\circ$$

$$\alpha = 20^\circ$$

Find the six trigonometric function values for  $930^\circ$ . SHOW YOUR WORK.

SCORE: \_\_\_ / 10 POINTS

$$930^\circ - 360^\circ \times 2 = 210^\circ \text{ in } Q_3$$



$$\sin 930^\circ = -\frac{1}{2}$$

$$\csc 930^\circ = -2$$

$$\cos 930^\circ = -\frac{\sqrt{3}}{2}$$

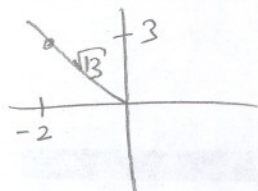
$$\sec 930^\circ = -\frac{2\sqrt{3}}{3}$$

$$\tan 930^\circ = \frac{\sqrt{3}}{3}$$

$$\cot 930^\circ = \sqrt{3}$$

Find the five remaining function values of  $\theta$  if  $\tan \theta = -\frac{3}{2}$  and  $\theta$  is in quadrant II. SHOW YOUR WORK.

SCORE: \_\_\_ / 10 POINTS



$$\sin \theta = \frac{3\sqrt{13}}{13}$$

$$\csc \theta = \frac{\sqrt{13}}{3}$$

$$\cos \theta = -\frac{2\sqrt{13}}{13}$$

$$\sec \theta = -\frac{\sqrt{13}}{2}$$

$$\tan \theta = -\frac{3}{2}$$

$$\cot \theta = -\frac{2}{3}$$

$$x = -2, y = 3$$

$$r = \sqrt{(-2)^2 + 3^2}$$

$$= \sqrt{13}$$

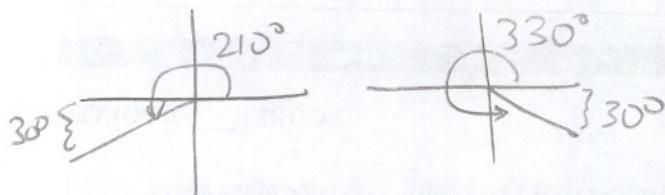
Find all values of  $\theta$  in  $[0^\circ, 360^\circ]$  such that  $\sin \theta = -\frac{1}{2}$ . SHOW YOUR WORK.

SCORE: \_\_\_ / 10 POINTS

REF ANGLE =  $30^\circ$

$\theta$  in  $Q_3$  or  $Q_4$

$$\theta = 210^\circ \text{ or } 330^\circ$$



**SUBMIT THIS SECTION BEFORE YOU PICK UP YOUR CALCULATOR**



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# CALCULATORS ALLOWED ON THIS SECTION

Find the least positive measure of an angle coterminal with  $-3729^\circ$ . SHOW YOUR WORK.

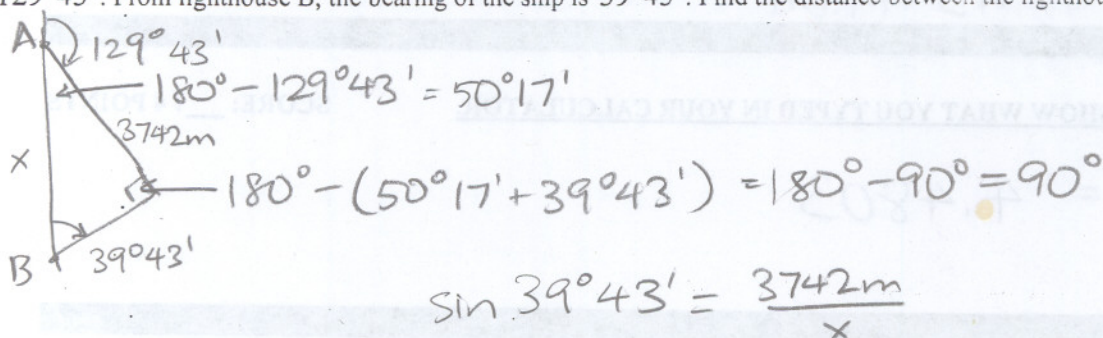
SCORE: \_\_\_ / 4 POINTS

$$-3729^\circ + 360^\circ \times 11 = 231^\circ$$

Find a value of  $\theta$  in  $[0^\circ, 90^\circ]$  such that  $\sec \theta = 7.2$ . Round your answer to 4 decimal places. SHOW WHAT YOU TYPED IN YOUR CALCULATOR. SCORE: \_\_\_ / 5 POINTS

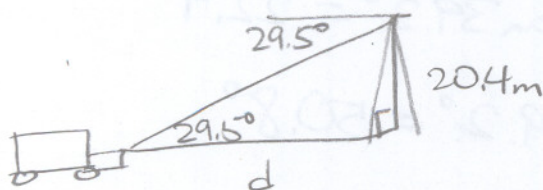
$$\cos \theta = \frac{1}{7.2}$$

$$\theta = \cos^{-1} \frac{1}{7.2} = 82.0164^\circ$$

Two lighthouses are located on a north-south line. From lighthouse A, the bearing of a ship 3742m away is  $129^\circ 43'$ . From lighthouse B, the bearing of the ship is  $39^\circ 43'$ . Find the distance between the lighthouses. SHOW YOUR WORK. SCORE: \_\_\_ / 12 POINTS

$$x = \frac{3742m}{\sin 39^\circ 43'} = 5856m$$

THE LIGHTHOUSES ARE 5856m APART

The angle of depression from the top of a 20.4m tall television tower to a utility truck is  $29.5^\circ$ . How far is the truck from the tower? SHOW YOUR WORK. SCORE: \_\_\_ / 12 POINTS

$$\tan 29.5^\circ = \frac{20.4m}{d}$$

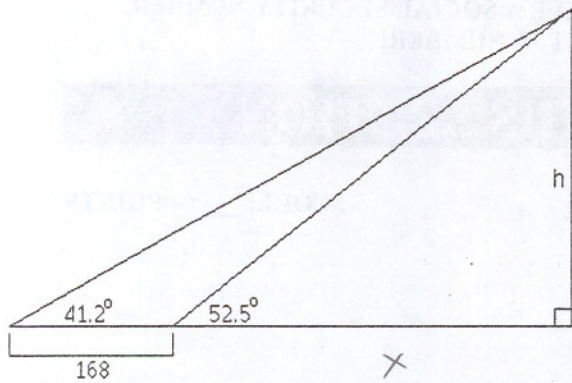
$$d = \frac{20.4m}{\tan 29.5^\circ} = 36.1m$$

THE TRUCK IS 36.1m FROM  
THE TOWER



Find  $h$  in the diagram. SHOW YOUR WORK.

SCORE: \_\_\_ / 12 POINTS



$$\tan 52.5^\circ = \frac{h}{x}$$

$$\tan 41.2^\circ = \frac{h}{x+168}$$

$$x = \frac{h}{\tan 52.5^\circ}$$

$$x = \frac{h}{\tan 41.2^\circ} - 168$$

$$\frac{h}{\tan 52.5^\circ} = \frac{h}{\tan 41.2^\circ} - 168$$

$$\frac{h}{\tan 52.5^\circ} - \frac{h}{\tan 41.2^\circ} = -168$$

$$h \left( \frac{1}{\tan 52.5^\circ} - \frac{1}{\tan 41.2^\circ} \right) = -168$$

$$h = \frac{-168}{\frac{1}{\tan 52.5^\circ} - \frac{1}{\tan 41.2^\circ}} = 448$$

Convert  $97.7303^\circ$  to degrees, minutes and seconds. SHOW YOUR WORK.

SCORE: \_\_\_ / 5 POINTS

$$\begin{aligned} 97^\circ + 0.7303 \times 60' &= 97^\circ 43.818' \\ &= 97^\circ 43' + 0.818 \times 60'' \\ &= 97^\circ 43' 49.08'' \end{aligned}$$

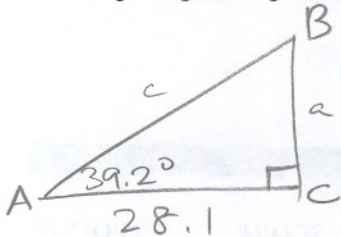
Find  $\cot 12^\circ 34' 56''$  to 4 decimal places. SHOW WHAT YOU TYPED IN YOUR CALCULATOR.

SCORE: \_\_\_ / 4 POINTS

$$\frac{1}{\tan \left( 12 + \frac{34}{60} + \frac{56}{3600} \right)} = 4.4803$$

Solve the right angle triangle  $ABC$  if  $C = 90.0^\circ$ ,  $A = 39.2^\circ$  and  $b = 28.1$ . SHOW YOUR WORK.

SCORE: \_\_\_ / 12 POINTS



$$\cos 39.2^\circ = \frac{28.1}{c}$$

$$c = \frac{28.1}{\cos 39.2^\circ} = 36.3$$

$$\tan 39.2^\circ = \frac{a}{28.1}$$

$$a = 28.1 \tan 39.2^\circ = 22.9$$

$$B = 90^\circ - 39.2^\circ = 50.8^\circ$$