

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,
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SCORE: ___ / 140 POINTS

NO CALCULATORS ALLOWED ON THIS SECTION

Fill in the following values.

SCORE: ___ / 6 POINTS

[a] $\tan 60^\circ = \sqrt{3}$

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

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

[d] $\sin 30^\circ = \frac{1}{2}$

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

[f] $\csc 45^\circ = \sqrt{2}$

Complete the following table of values for the quadrantal angle 540° .

SCORE: ___ / 6 POINTS

θ	$\sin \theta$	$\cos \theta$	$\tan \theta$	$\csc \theta$	$\sec \theta$	$\cot \theta$
540°	0	-1	0	UNDEF	-1	UNDEF

MULTIPLE CHOICE: Which of the following statements is true?

SCORE: ___ / 6 POINTS

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

[b] $\sin 43^\circ < \cos 46^\circ$

[c] $\cot 43^\circ < \cot 46^\circ$

[d] none of the above

LETTER OF CORRECT ANSWER: BFind the six trigonometric function values for an angle in standard position with terminal side $4x - 3y = 0$, $x \leq 0$. **SHOW YOUR WORK.**

SCORE: ___ / 10 POINTS

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

$$x = -3$$

$$y = -4$$

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

$$\sin \theta = -\frac{4}{5}$$

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

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

$$\csc \theta = -\frac{5}{4}$$

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

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

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

SCORE: ___ / 6 POINTS

$$\csc^2 \theta = \cot^2 \theta + 1$$

$$= 37$$

$$\csc \theta = \pm \sqrt{37}$$

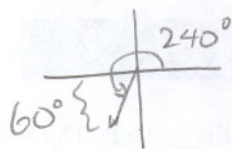
$$\theta \text{ in } Q_3 \Rightarrow \csc \theta < 0$$

$$\csc \theta = -\sqrt{37}$$

Find the six trigonometric function values for 960° . SHOW YOUR WORK.

SCORE: ___ / 10 POINTS

$$960^\circ - 360^\circ \times 2 = 240^\circ \text{ in } Q_3$$



$$\sin 960^\circ = -\frac{\sqrt{3}}{2}$$

$$\csc 960^\circ = -\frac{2\sqrt{3}}{3}$$

$$\cos 960^\circ = -\frac{1}{2}$$

$$\sec 960^\circ = -2$$

$$\tan 960^\circ = \sqrt{3}$$

$$\cot 960^\circ = \frac{\sqrt{3}}{3}$$

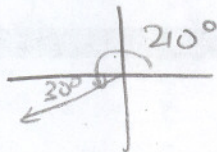
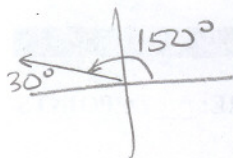
Find all values of θ in $[0^\circ, 360^\circ]$ such that $\cos \theta = -\frac{\sqrt{3}}{2}$. SHOW YOUR WORK.

SCORE: ___ / 10 POINTS

$$\text{REF ANGLE} = 30^\circ$$

$$\theta \text{ in } Q_2 \text{ or } Q_3$$

$$\theta = 150^\circ \text{ or } 210^\circ$$



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

SCORE: ___ / 10 POINTS

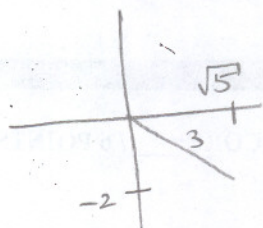
$$3\alpha + 20^\circ = 90^\circ - (2\alpha + 10^\circ)$$

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

$$5\alpha = 60^\circ$$

$$\alpha = 12^\circ$$

Find the five remaining function values of θ if $\csc \theta = -\frac{3}{2}$ and θ is in quadrant IV. SHOW YOUR WORK. SCORE: ___ / 10 POINTS



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

$$\cos \theta = \frac{\sqrt{5}}{3}$$

$$\sec \theta = \frac{3\sqrt{5}}{5}$$

$$\tan \theta = -\frac{2\sqrt{5}}{5}$$

$$\cot \theta = -\frac{\sqrt{5}}{2}$$

$$r = 3 \quad y = -2$$

$$x = \sqrt{3^2 - (-2)^2} = \sqrt{5}$$

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 -3927° . **SHOW YOUR WORK.**

SCORE: ____ / 4 POINTS

$$-3927^\circ + 360^\circ \times 11 = 33^\circ$$

Find a value of θ in $[0^\circ, 90^\circ]$ such that $\csc \theta = 2.7$. Round your answer to 4 decimal places. **SHOW WHAT YOU TYPED IN YOUR CALCULATOR.**

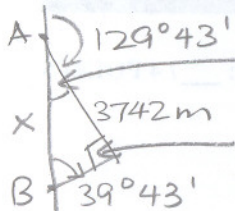
SCORE: ____ / 5 POINTS

$$\sin \theta = \frac{1}{2.7}$$

$$\theta = \sin^{-1} \frac{1}{2.7} = 21.7385^\circ$$

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



$$180^\circ - 129^\circ 43' = 50^\circ 17'$$

$$180^\circ - (50^\circ 17' + 39^\circ 43') = 180^\circ - 90^\circ = 90^\circ$$

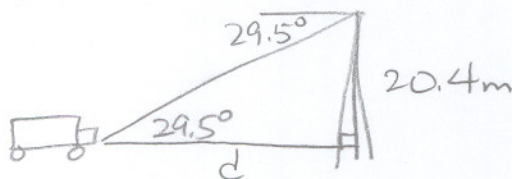
$$\sin 39^\circ 43' = \frac{3742m}{x}$$

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

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° . How far is the truck from the tower? **SHOW YOUR WORK.**

SCORE: ____ / 12 POINTS



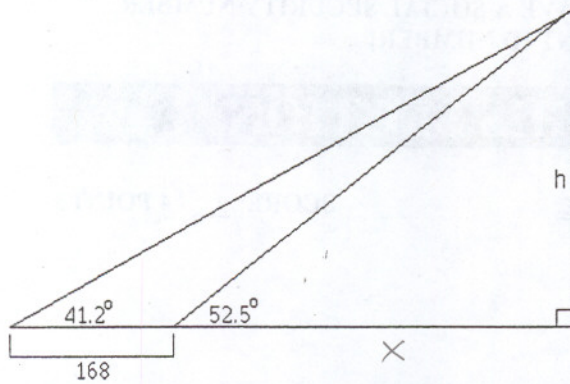
$$\tan 29.5^\circ = \frac{20.4m}{d}$$

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

THE TRUCK IS 36.1m FROM THE TOWER

Find h in the diagram. SHOW YOUR WORK.

SCORE: ___ / 12 POINTS



$$\begin{aligned}\tan 52.5^\circ &= \frac{h}{x} \Rightarrow h = x \tan 52.5^\circ \\ \tan 41.2^\circ &= \frac{h}{x+168} \Rightarrow h = (x+168) \tan 41.2^\circ \\ x \tan 52.5^\circ &= (x+168) \tan 41.2^\circ \\ x \tan 52.5^\circ &= x \tan 41.2^\circ + 168 \tan 41.2^\circ \\ x \tan 52.5^\circ - x \tan 41.2^\circ &= 168 \tan 41.2^\circ \\ x (\tan 52.5^\circ - \tan 41.2^\circ) &= 168 \tan 41.2^\circ \\ x &= \frac{168 \tan 41.2^\circ}{\tan 52.5^\circ - \tan 41.2^\circ} \\ h &= \frac{168 \tan 41.2^\circ \tan 52.5^\circ}{\tan 52.5^\circ - \tan 41.2^\circ} = 448\end{aligned}$$

Convert 37.9370° to degrees, minutes and seconds. SHOW YOUR WORK.

SCORE: ___ / 5 POINTS

$$\begin{aligned}37^\circ + 0.9370 \times 60' &= 37^\circ 56.22' \\ &= 37^\circ 56' + .22 \times 60'' \\ &= 37^\circ 56' 13.2''\end{aligned}$$

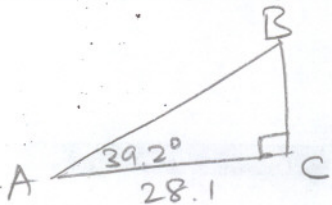
Find $\sec 12^\circ 34' 56''$ to 4 decimal places. SHOW WHAT YOU TYPED IN YOUR CALCULATOR.

SCORE: ___ / 4 POINTS

$$\sec\left(12 + \frac{34}{60} + \frac{56}{3600}\right) = 1.0246$$

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



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

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

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

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

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