

Name: _____ Per: _____ Date: _____
 Serafino • Precalculus



2R Unit 2 Quest Review

Part I: NON-CALCULATOR

1. Draw the following in standard position. For each, find i) a positive coterminal angle, ii) a negative coterminal angle, iii) the Quadrant, iv) reference angle and v) estimate the $\sin \theta$.

$$\begin{array}{llll} \sin 10 = 0.173 & \sin 20 = 0.342 & \sin 40 = .642 & \sin 45 = .707 \\ \sin 50 = .766 & \sin 60 = .866 & \sin 70 = .939 & \sin 80 = .985 \end{array}$$

a. 313° b. -15° c. 267° d. -297°

2. Each angle, θ , has the given properties. Draw it in standard position and evaluate the 6 trig ratios:

a. $(-4, \sqrt{2}) \in \text{QII}$ b. $\cot \theta = \frac{\sqrt{10}}{2} \in \text{QIII}$ c. $(1, -7) \in \text{QIV}$ d. $\csc \theta = \frac{3}{2} \in \text{QI}$

3. State the value of the following:

a. $\sin 240$ b. $\cos 120$ c. $\tan 180$ d. $\tan -150$

4. State all angles, $0 \leq \theta < 360$ so the following is true:

a. $\sin \theta = -1/2$ b. $\cos \theta = 1/2$ c. $\tan \theta = \sqrt{3}$ d. $\sec \theta = 0$
 e. $\sin \theta = 2$ f. $\sec \theta = -\sqrt{2}$ g. $\cos \theta = 1$ h. $\cot \theta = -\sqrt{3}/3$

5. Evaluate and simplify fully. Express answers as single and separate fractions when possible.

a. $5 \cos^2 150 + \sin 30$ b. $\frac{\cot 240 (\sec 30 - \csc 45)}{\tan 60}$ c. $\frac{8 \cos 30}{6 \tan 30}$
 d. $\frac{\sec 30}{\cos 45}$ e. $\frac{\csc^2 45 + \tan 120}{(\sin 30)^{-1}}$ f. $(\tan 135 \cdot \csc 60^\circ)^{-3}$
 g. $(\cot^2 60 \cdot \sin^3 60)^{-2}$ h. $\sec 180(\cos 45 + \sin 300)^2$
 i. $\sqrt{12(\cos 45)(\tan 330)(\csc 270)(\sec 330)(\csc 135)}$

6. Determine if the statement is true or false:

a. In QIII, $\sin^3 \theta < 0$ b. In QIV, $0 < \sec^2 \theta < 1$ c. $\cot \theta$ can be < -1
 d. $\sin \theta > -1$ in QIV e. $\tan \theta$ can equal $\cos \theta$ f. Every trig function can = 1

7. Complete the following to make a true statement:

a. $\sin 30 - \tan 45 = \cos$ _____ b. $\sin 90 + \cos 0 = \csc$ _____
 c. $\csc 75 =$ _____ 15 d. In QII, $-1 < \tan \theta < 0$ if _____ $< \theta <$ _____

8. Fill in the following with a $>$, $<$ or $=$.

- a. $\sin 42$ _____ $\sin 135$ b. $\sin 40$ _____ $\cos 40$ c. $\cos 70$ _____ $\sin 160$
 d. $\cos 12$ _____ $\sin 20$ e. $\cos 170$ _____ $\cos 215$ f. $\sin 48$ _____ $\cos 42$
 g. $|\cos 190|$ _____ $|\cos 11|$ h. $|\sin 257|$ _____ $|\sin 108|$ i. $\sin 261$ _____ $\sin 281$

Part II: CALCULATOR

Any of these questions could be put on the non-calculator section, with instructions to simply write what you WOULD type into the calculator. Be sure you know what to write in that case (ie: don't rely on a calculator error to tell you did something wrong)

9. In #1, evaluate all six trig ratios for angles in a and b.
 10. In #2, a and b, find Θ in decimal degrees, then convert the decimal to minutes & seconds
 11. Convert into degrees, minutes & seconds:

- a. 56.48° b. 0.785° c. 0.0019°

12. Convert into decimal degrees:

- a. $3^\circ 10' 14''$ b. $13^\circ 54''$ c. $23' 15''$

13. Add or subtract the following angles.

- a. $45^\circ 39' + 64^\circ 43'$ b. $70^\circ 17' - 36^\circ 52'$
 c. $45^\circ 39' 20'' + 64^\circ 43' 48''$ d. $180^\circ - 36^\circ 52'$

14. Apply the Cofunction Theorem for the following. Leave answers in the form given.

- a. $\cot 56^\circ 13' 55'' =$ _____ b. $\sec 5^\circ 49' 12' =$ _____

15. Evaluate the following functions. Round to 4 decimal places.

- a. $\sin 228.4^\circ$ b. $\cot 52.95^\circ$ c. $\sec -48.6^\circ$ d. $\cot -253.24^\circ$
 e. $\cos -18^\circ 54'$ f. $\csc -2^\circ 51''$ g. $\cot 48^\circ 29' 35''$ h. $\csc 9''$

16. State all angles, $0 \leq \Theta < 360$ so the following is true. Give answers in decimals AND minutes/seconds

- a. $\cos \Theta = 0.2356$ b. $\sin \Theta = 1.3495$ c. $\csc \Theta = -1.3488$
 d. $\csc \Theta = 17/14$ e. $\sec \Theta = 19/3$ f. $\tan \Theta = 19/77$



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Unit 2 Test Review KEY:**Part I: NON-CALCULATOR**

1. a. 313° i) 673° ii) -47° iii) QIV iv) 47° v) $\sin 313 \approx -0.73$
 b. -15° i) 345° ii) -375° iii) QIV iv) 15° v) $\sin -15 \approx -0.25$
 c. 267° i) 627° ii) -93° iii) QIII iv) 87° v) $\sin 267 \approx -0.99$
 d. -297° i) 63° ii) -657° iii) QI iv) 63° v) $\sin -297 \approx 0.89$

2. a. $(-4, \sqrt{2}) \in \text{QII}$

b. $\cot \theta = \frac{\sqrt{10}}{2} \in \text{QIII}$

$$\sin \theta = \frac{1}{3} \quad \cos \theta = -\frac{2\sqrt{2}}{3} \quad \tan \theta = -\frac{\sqrt{2}}{4}$$

$$\csc \theta = 3 \quad \sec \theta = -\frac{3\sqrt{2}}{4} \quad \cot \theta = -2\sqrt{2}$$

$$\sin \theta = -\frac{\sqrt{14}}{7} \quad \cos \theta = -\frac{\sqrt{35}}{7} \quad \tan \theta = \frac{\sqrt{10}}{5}$$

$$\csc \theta = -\frac{\sqrt{14}}{2} \quad \sec \theta = -\frac{\sqrt{35}}{5} \quad \cot \theta = \frac{\sqrt{10}}{2}$$

c. $(1, -7) \in \text{QIV}$

d. $\csc \theta = 3/2 \in \text{QI}$

$$\cos \theta = -\frac{7\sqrt{2}}{10} \quad \sin \theta = \frac{\sqrt{2}}{10} \quad \tan \theta = -7$$

$$\csc \theta = -\frac{5\sqrt{2}}{7} \quad \sec \theta = -5\sqrt{2} \quad \cot \theta = -\frac{1}{7}$$

$$\sin \theta = \frac{2}{3} \quad \cos \theta = \frac{\sqrt{5}}{3} \quad \tan \theta = \frac{2\sqrt{5}}{5}$$

$$\csc \theta = \frac{3}{2} \quad \sec \theta = \frac{3\sqrt{5}}{5} \quad \cot \theta = \frac{\sqrt{5}}{2}$$

3. a. $\sin 240 = -\frac{\sqrt{3}}{2}$ b. $\cos 120 = -\frac{1}{2}$ c. $\tan 180 = 0$ d. $\tan -150 = \frac{\sqrt{3}}{3}$

4. a. $\sin \theta = -1/2$ b. $\cos \theta = 1/2$ c. $\tan \theta = \sqrt{3}$ d. $\sec \theta = 0$
 $\theta = 210, 330$ $\theta = 60, 300$ $\theta = 60, 240$ **no solution**

d. $\sin \theta = 2$ f. $\sec \theta = -\sqrt{2}$ g. $\cos \theta = 1$ h. $\cot \theta = -\sqrt{3}/3$
No solution $\theta = 135, 225$ $\theta = 0$ $\theta = 120, 300$

5. a. $5 \cos^2 150 + \sin 30 = \frac{17}{4}$ b. $\frac{\cot 240 (\sec 30 - \csc 45)}{\tan 60} = \frac{2\sqrt{3}-3\sqrt{2}}{9}$ or $\frac{2\sqrt{3}}{9} - \frac{\sqrt{2}}{3}$ c. $\frac{8 \cos 30}{6 \tan 30} = 2$

d. $\frac{\sec 30}{\cos 45} = \frac{2\sqrt{6}}{3}$ e. $\frac{\csc^2 45 + \tan 120}{(\sin 30)^{-1}} = 1 - \frac{\sqrt{3}}{2}$ or $\frac{2-\sqrt{3}}{2}$ f. $(\tan 135 \cdot \csc 60^\circ)^{-3} = -\frac{3\sqrt{3}}{8}$

g. $(\cot^2 60 \cdot \sin^3 60)^{-2} = 64/3$ h. $\sec 180(\cos 45 + \sin 300)^2 = -\frac{5}{4} + \frac{\sqrt{6}}{2}$ or $\frac{-5+2\sqrt{6}}{4}$

i. $\sqrt{12(\cos 45)(\tan 330)(\csc 270)(\sec 330)(\csc 135)} = 2\sqrt{2}$

6. a. In QIII, $\sin^3 \theta < 0$ b. In QIV, $0 < \sec^2 \theta < 1$ c. $\cot \theta$ can be < -1
True **False** **True**
 d. $\sin \theta > -1$ in QIV e. $\tan \theta$ can equal $\cos \theta$ f. Every trig function can $= 1$
True **False** **True**

7. Complete the following to make a true statement:

a. $\sin 30 - \tan 45 = \cos 120$ or **240**

b. $\sin 90 + \cos 0 = \csc 30$ or **150**

c. $\csc 75 = \sec 15$

d. In QII, $-1 < \tan \theta < 0$ if $\theta = 135 < \theta < 180$

8. Fill in the following with a $>$, $<$ or $=$.

- a. $\sin 42 < \sin 135$ b. $\cos 40 > \sin 40$ c. $\cos 70 = \sin 160$
 d. $\cos 12 > \sin 20$ e. $\cos 170 < \cos 215$ f. $\sin 48 = \cos 42$
 g. $|\cos 190| > |\cos 11|$ h. $|\sin 257| > |\sin 108|$ i. $\sin 261 < \sin 281$

Part II: CALCULATOR

9. a. 313° : $\sin 313 = -0.7314$, $\cos 313 = 0.6820$, $\tan 313 = -1.0724$,
 $\csc 313 = -1.3673$, $\sec 313 = 1.4663$, $\cot 313 = -0.9325$
 b. -15° : $\sin -15 = -0.2588$, $\cos -15 = 0.9659$, $\tan -15 = -0.2679$,
 $\csc -15 = -3.8637$, $\sec -15 = 1.0353$, $\cot -15 = -3.7321$
10. a. $(-4, \sqrt{2}) \in \text{QII}$ $\theta = 160.5288^\circ$; $\theta = 160^\circ 31' 44''$
 b. $\cot \theta = \frac{\sqrt{10}}{2} \in \text{QIII}$ $\theta = 212.3115^\circ$; $\theta = 160^\circ 18' 42''$
11. a. $56.48^\circ = 56^\circ 28' 48''$ b. $0.785^\circ = 47' 6''$ c. $0.0019^\circ = 7''$
12. a. $3^\circ 10' 14'' = 3.17055^\circ$ b. $13^\circ 54'' = 13.015^\circ$ c. $23' 15'' = 0.3875^\circ$
13. Add or subtract the following angles.
- a. $45^\circ 39' + 64^\circ 43' = 110^\circ 22'$ b. $70^\circ 17' - 36^\circ 52' = 33^\circ 25'$
 c. $45^\circ 39' 20'' + 64^\circ 43' 48'' = 110^\circ 23' 8''$ d. $180^\circ - 36^\circ 52' = 143^\circ 8''$
14. Apply the Cofunction Theorem for the following. Leave answers in the form given.
- a. $\cot 56^\circ 13' 55'' = \tan 33^\circ 46' 5''$ b. $\sec 5^\circ 49' 12'' = \csc 84^\circ 10' 48''$
15. Evaluate the following functions. Round to 4 decimal places.
- a. $\sin 228.4^\circ = -0.7478$ b. $\cot 52.95^\circ = 0.7549$ c. $\sec -48.6^\circ = 1.5121$ d. $\cot -253.24^\circ = -3.011$
 f. $\cos -18^\circ 54' = 0.9461$ f. $\csc -2^\circ 51'' = -28.4523$ g. $\cot 48^\circ 29' 35'' = 0.8849$ h. $\csc 9'' = 3496.0137$
16. State all angles, $0 \leq \theta < 360$ so the following is true. Give answers in decimals AND minutes/seconds
- a. $\cos \theta = 0.2356$ b. $\sin \theta = 1.3495$ c. $\csc \theta = -1.3488$
 $\theta = 76.373^\circ$, $76^\circ 22' 23''$ **No solution** $\theta = 227.85079^\circ$, $227^\circ 51' 3''$
 $\theta = 283.627^\circ$, $283^\circ 37' 37''$ $\theta = 312.1492^\circ$, $312^\circ 8' 57''$
- d. $\csc \theta = 17/14$ e. $\sec \theta = -19/3$ f. $\tan \theta = 2/311$
 $\theta = 55.4397^\circ$; $55^\circ 26' 23''$ $\theta = 99.0847^\circ$; $99^\circ 5' 5''$ $\theta = 0.3685^\circ$, $22' 6''$
 $\theta = 124.5603^\circ$; $124^\circ 33' 37''$ $\theta = 260.9153^\circ$; $260^\circ 54' 55''$ $\theta = 180.85079^\circ$, $180^\circ 22' 6''$