

Name: KW  
 PC Review sheet for Exam 3 Quarter 3

Date: \_\_\_\_\_  
 Ms. Loughran

1. Copy and complete the following table.

$\theta$	$0^\circ$	$30^\circ$	$45^\circ$	$60^\circ$	$90^\circ$	$180^\circ$	$270^\circ$	$360^\circ$
Radians	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\pi$	$3\frac{\pi}{2}$	$2\pi$
$\sin \theta$	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1	0	-1	0
$\cos \theta$	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0	-1	0	1
$\tan \theta$	0	$\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$	und.	0	und.	0
$\csc \theta$	und.	2	$\frac{\sqrt{2}}{2}$	$\frac{2\sqrt{3}}{3}$	1	und.	-1	und.
$\sec \theta$	1	$\frac{2\sqrt{3}}{3}$	$\frac{\sqrt{2}}{2}$	2	und.	-1	und.	1
$\cot \theta$	und.	$\frac{\sqrt{3}}{3}$	1	$\frac{\sqrt{3}}{3}$	0	und.	0	und.

2. Determine the quadrant in which  $x$  lies if

- (a)  $\sin x > 0$  and  $\cot x < 0$  II  
 (b)  $\csc x < 0$  and  $\cot x < 0$  IV  
 (c)  $\sec x > 0$  and  $\sin x < 0$  IV  
 (d)  $\cot x < 0$  and  $\sec x < 0$  II  
 (e)  $\cot x > 0$  and  $\csc x > 0$  I

3. Express in degrees the angle whose radian measure is:

- (a)  $\frac{8\pi}{3}$       (b)  $-\pi$       (c)  $\frac{3\pi}{5}$

4. Express in radian measure the angle whose degree measure is:

- (a)  $15^\circ$       (b)  $-600^\circ$       (c)  $124^\circ$

5. In which quadrant does an angle of  $\frac{3\pi}{4}$  lie? How about  $-\frac{3\pi}{4}$ ?

6. Point P with coordinates  $(\frac{1}{2}, \frac{\sqrt{3}}{2})$  lies on the unit circle, find:

- a.  $\sin \theta$   
 b.  $\cos \theta$   
 c.  $\tan \theta$

7. Express each of the following as a function of a positive acute angle.

- a.  $\sin 140^\circ$   
 b.  $\cos 250^\circ$   
 c.  $\tan 300^\circ$   
 d.  $\cos 135^\circ$   
 e.  $\sin \frac{5\pi}{6}$   
 f.  $\tan \frac{7\pi}{6}$

①

$$\textcircled{3} \text{ a) } \frac{8\pi}{3} \cdot \frac{60}{\pi} = 480^\circ \quad \text{b) } -\pi \cdot \frac{180}{\pi} = -180^\circ$$

$$\text{c) } \frac{3\pi}{5} \cdot \frac{36}{\pi} = 108^\circ$$

$$\textcircled{4} \text{ a) } 15^\circ \cdot \frac{\pi}{180^\circ} = \frac{\pi}{12} \quad \text{b) } -600^\circ \cdot \frac{\pi}{180^\circ} = -\frac{10\pi}{3}$$

$$\text{c) } 124^\circ \cdot \frac{\pi}{180^\circ} = \frac{31\pi}{45}$$

$$\textcircled{5} \frac{3\pi}{4} \cdot \frac{180^\circ}{\pi} = 135^\circ \quad \text{QII} \quad -3\frac{\pi}{4} = -135^\circ \quad \text{QIII}$$

$$\textcircled{6} \text{ a) } \sin \theta = \frac{\sqrt{3}}{2} \quad \text{b) } \cos \theta = \frac{1}{2} \quad \text{c) } \tan \theta = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = \sqrt{3}$$

Q  
R  
S

$$\textcircled{7} \text{ a) } \sin 140^\circ = \sin (180^\circ - 40^\circ) = \sin (40^\circ)$$

$$\text{b) } \cos 250^\circ = -\cos (250^\circ - 180^\circ) = -\cos 70^\circ$$

$$\text{c) } \tan 300^\circ = -\tan (360^\circ - 300^\circ) = -\tan 60^\circ$$

$$\text{d) } \cos 135^\circ = -\cos (180^\circ - 135^\circ) = -\cos 45^\circ$$

$$\text{e) } \sin \frac{5\pi}{6} = \sin (150^\circ) = \sin (180^\circ - 150^\circ) = \sin 30^\circ = \sin \frac{\pi}{6}$$

$$\text{f) } \tan \frac{7\pi}{6} = \tan (210^\circ) = \tan (210^\circ - 180^\circ) = \tan 30^\circ = \tan \frac{\pi}{6}$$

$$\textcircled{8} \text{ a) } \cot 120^\circ = \frac{1}{\tan 120^\circ} = \frac{1}{-\tan (180^\circ - 120^\circ)} = \frac{1}{-\tan 60^\circ} = \frac{1}{-\sqrt{3}} \text{ or } -\frac{1}{\sqrt{3}}$$

(7)

$$\begin{aligned}
 \text{b) } \sec 210^\circ &= \frac{1}{\cos 210^\circ} = \frac{1}{-\cos(210^\circ - 180^\circ)} = \frac{1}{-\cos 30^\circ} = \frac{1}{-\frac{\sqrt{3}}{2}} \\
 &= \frac{-2}{\sqrt{3}} \text{ or } -\frac{2\sqrt{3}}{3}
 \end{aligned}$$

$$\text{c) } \tan 240^\circ = \tan(240^\circ - 180^\circ) = \tan 60^\circ = \sqrt{3}$$

$$\begin{aligned}
 \text{d) } \sec \frac{4\pi}{3} &= \frac{1}{\cos \frac{4\pi}{3}} = \frac{1}{\cos 240^\circ} = \frac{1}{-\cos(240^\circ - 180^\circ)} = \frac{1}{-\cos 60^\circ} \\
 &= \frac{1}{-\frac{1}{2}} = -2
 \end{aligned}$$

$$\text{e) } \cos(-330^\circ) = \cos 30^\circ = \frac{\sqrt{3}}{2}$$

$$\text{f) } \sin 405^\circ = \sin(405^\circ - 360^\circ) = \sin 45^\circ = \frac{\sqrt{2}}{2}$$

$$\begin{array}{l}
 \text{(9) } \tan A + \frac{\tan A \sin A}{\sin A} \quad \text{I} \\
 \text{I}
 \end{array}$$

skipped

$$\begin{array}{l}
 \text{(10) } \tan A = \frac{-3^{\text{opp.}}}{4^{\text{adj.}}} \quad \text{hyp: } 5 \\
 \text{I}
 \end{array}$$

$$\tan A \ominus$$

$$\cos A \oplus$$

QIV

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

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

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

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

$$\cot A = -\frac{4}{3}$$

skipped

$$(11) \tan x = -1$$

$$\tan x = \frac{-1}{1} = \frac{\text{opp}}{\text{adj}}$$

$$\begin{aligned} 1^2 + 1^2 &= (\text{hyp})^2 \\ 2 &= (\text{hyp})^2 \\ \text{hyp} &= \sqrt{2} \end{aligned}$$

$$\begin{aligned} \text{QII} \quad \sin x &= \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2} & \csc x &= \sqrt{2} & \cot x &= -1 \\ \cos x &= \frac{-1}{\sqrt{2}} = \frac{-\sqrt{2}}{2} & \sec x &= -\sqrt{2} \end{aligned}$$

$$\begin{aligned} (12) \quad f\left(\frac{\pi}{6}\right) &= f(30^\circ) = \tan 5(30^\circ) - \sin 2(30^\circ) \\ &= \tan 150^\circ - \sin 60^\circ \\ &= -\frac{\sqrt{3}}{3} - \frac{\sqrt{3}}{2} \quad \text{or} \\ &= -\frac{1}{\sqrt{3}} - \frac{\sqrt{3}}{2} \end{aligned}$$

$$(13) \quad \text{a) } \csc \theta \sin \theta = \frac{1}{\sin \theta} \cdot \sin \theta = 1$$

$$\text{b) } \sin \theta \cot \theta = \sin \theta \cdot \frac{\cos \theta}{\sin \theta} = \cos \theta$$

$$\text{c) } \tan \theta \csc \theta = \frac{\sin \theta}{\cos \theta} \cdot \frac{1}{\sin \theta} = \frac{1}{\cos \theta} = \sec \theta$$

$$\text{d) } \sec \theta \cot \theta = \frac{1}{\cos \theta} \cdot \frac{\cos \theta}{\sin \theta} = \frac{1}{\sin \theta} = \csc \theta$$

$$e) \sec \theta + \tan \theta$$

$$\frac{1}{\cos \theta} + \frac{\sin \theta}{\cos \theta} = \frac{1 + \sin \theta}{\cos \theta}$$

$$f) \frac{\sec \theta}{\csc \theta} = \frac{\frac{1}{\cos \theta}}{\frac{1}{\sin \theta}} = \frac{1}{\cos \theta} \cdot \frac{\sin \theta}{1} = \frac{\sin \theta}{\cos \theta} = \tan \theta$$

$$g) \csc^2 \theta - \frac{\cos \theta}{\tan \theta}$$

$$\csc^2 \theta - \frac{\frac{\cos \theta}{\sin \theta}}{\frac{\sin \theta}{\cos \theta}} \quad \left) \quad \frac{\cos \theta}{\sin \theta} \cdot \frac{\cos \theta}{\sin \theta}$$

$$\csc^2 \theta - \frac{\cos^2 \theta}{\sin^2 \theta}$$

$$\frac{1}{\sin^2 \theta} - \frac{\cos^2 \theta}{\sin^2 \theta}$$

$$\frac{1 - \cos^2 \theta}{\sin^2 \theta} = \frac{\sin^2 \theta}{\sin^2 \theta} = 1$$

$$h) \sec \theta (1 + \cot \theta) - \csc \theta (1 + \tan \theta)$$

$$\sec \theta + \sec \theta \cot \theta - \csc \theta - \csc \theta \tan \theta$$

$$\frac{1}{\cos \theta} + \frac{1}{\cancel{\cos \theta}} \frac{\cancel{\cos \theta}}{\sin \theta} - \frac{1}{\sin \theta} - \frac{1}{\cancel{\sin \theta}} \frac{\cancel{\sin \theta}}{\cos \theta}$$

$$\frac{1}{\cos \theta} + \frac{1}{\sin \theta} - \frac{1}{\sin \theta} - \frac{1}{\cos \theta} = 0$$

$$(14) f(\pi) = f(180^\circ) = -3 \sin 2(180^\circ) \\ -3 \sin 360^\circ = 0$$

$$(15) f(\pi) = f(180^\circ) = \sec 180^\circ + \cot \frac{180^\circ}{3} \\ \sec 180^\circ + \cot 60^\circ \\ -1 + \frac{\sqrt{3}}{3} \text{ or } -1 + \frac{1}{\sqrt{3}}$$

$$(16) \frac{\cos \theta \tan \theta + \sin^2 \theta}{1 + \sin \theta} = \sin \theta$$

$$\frac{\cancel{\cos \theta} \cdot \frac{\sin \theta}{\cancel{\cos \theta}} + \sin^2 \theta}{1 + \sin \theta}$$

$$\frac{\sin \theta (1 + \sin \theta)}{\sin \theta + \sin^2 \theta}$$

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

(6)

(17) let  $x = \sin \theta$

$$2x - 1 = 0$$

$$2x = 1$$

$$x = \frac{1}{2}$$

$$\sin \theta = \frac{1}{2}$$

QI  $30^\circ$

QII  $180 - 30 = 150^\circ$

let  $y = \cos \theta$

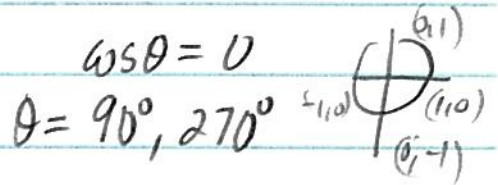
$$3y + 1 = 1$$

$$3y = 0$$

$$y = 0$$

$$\cos \theta = 0$$

$$\theta = 90^\circ, 270^\circ$$



(18)  $3 \tan \theta - 2 = \tan \theta$

let  $x = \tan \theta$

$$3x - 2 = x$$

$$-2 = -2x$$

$$1 = x$$

$$\tan \theta = 1$$

QI  $45^\circ$

QIII  $180 + 45 = 225^\circ$

(19) let  $x = \cos \theta$

$$4(x+1) = 0$$

$$4x + 4 = 0$$

$$4x = -4$$

$$x = -1$$

$$\cos \theta = -1$$

$$180^\circ$$

$$\{\pi\}$$

(20) let  $y = \cos \theta$

$$3y - \sqrt{3} = y$$

$$-\sqrt{3} = -2y$$

$$\frac{\sqrt{3}}{2} = y$$

$$\cos \theta = \frac{\sqrt{3}}{2}$$

QI  $30^\circ = \frac{\pi}{6}$

QIV  $330^\circ = \frac{11\pi}{6}$

$$\{\frac{\pi}{6}, \frac{11\pi}{6}\}$$

$$(22) \text{ let } x = \sin \theta$$

$$2(x+1) = x+3$$

$$2x+2 = x+3$$

$$x = 1$$

$$\sin \theta = 1$$

$$\theta = 90^\circ$$

$$\left\{ \frac{\pi}{2} \right\}$$

