

# Unit 3 Review Sheet

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$$1. \sin^{-1} \frac{\sqrt{2}}{2}$$

$$\sin\left(\frac{\pi}{2}\right) = \theta \\ \theta = \frac{\pi}{4}$$

$$2. \cos^{-1} \frac{\sqrt{2}}{2}$$

$$\cos\left(\frac{\pi}{2}\right) = \theta \\ \theta = \frac{\pi}{4}$$

$$3. \tan^{-1} \sqrt{3}$$

$$\tan(\sqrt{3}) = \theta \\ \theta = \frac{\pi}{3}$$

$$4. \sin^{-1}(0)$$

$$\sin(0) = \theta \\ \theta = \pi$$

$$5. \tan^{-1}(0)$$

$$\tan(0) = \theta \quad (0, \pi) \\ \theta = \pi$$

$$33. 2\cos^2\theta - 3\cos\theta + 1 = 0$$

$$2x^2 - 3x + 1 = 0$$

$$(2x-1)(x-1)$$

$$2x-1=0 \quad x-1=0$$

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

$$\cos\theta = \frac{1}{2} \quad \cos\theta = 1$$

$$\cos^{-1}\left(\frac{1}{2}\right) = 0 \quad \cos^{-1}(1) = \theta$$

$$\theta = \frac{\pi}{3}, \frac{5\pi}{3}, 0$$

$$34. 2\sin^2\theta = 3(\cos\theta + 1)$$

On the test: no application, etc. problems  
5 MCQ, 12 SAQ

$$23. 4|\cos x - 3| = 0$$

$$|\cos x| = 3/4 \\ \cos x = \pm \frac{\sqrt{3}}{2} \\ \cos x = 0 \quad \cos -\frac{\pi}{2} = 0$$

$$\theta = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$$

$$24. |\sin\theta| = 1/2$$

$$-\sin\theta = -0.5$$

$$\sin\theta = 1/2$$

$$\sin^{-1}(1/2) = \theta \\ \theta = \frac{\pi}{6}, \frac{5\pi}{6}$$

$$25. 2\cos\theta + 2\sqrt{3} = \sqrt{3}$$

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

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

$$\cos\theta = \frac{-\sqrt{3} - \sqrt{6}}{2}$$

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

$$\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right) = \theta$$

$$\theta = \frac{5\pi}{6}, \frac{7\pi}{6}$$

$$26. 2\cos\theta + 1 = 0$$

$$2\cos\theta = -1$$

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

$$\cos^{-1}\left(-\frac{1}{2}\right) = \theta$$

$$\theta = \frac{2\pi}{3}, \frac{4\pi}{3}$$

$$27. 4\sin^2\theta - 3 = 0$$

$$4\sin^2\theta = 3$$

$$\sin^2\theta = \frac{3}{4}$$

$$\sin\theta = \pm\frac{\sqrt{3}}{2}$$

$$\sin^{-1}\left(\pm\frac{\sqrt{3}}{2}\right) = \theta$$

$$\theta = \frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$$

$$31. \cos^2\theta - 1 = 0$$

$$\cos^2\theta = 1$$

$$\cos\theta = \pm 1$$

$$\cos^{-1}(1) = \theta$$

$$\theta = 0, \pi$$

$$32. \sin^2\theta + \sin\theta = 0$$

$$\sin\theta(\sin\theta + 1) = 0$$

$$\sin\theta = 0 \quad \sin\theta + 1 = 0$$

$$\sin^{-1}(0) = \theta \quad \sin\theta = -1$$

$$\sin^{-1}(-1) = \theta$$

$$\theta = 0, \pi, \frac{3\pi}{2}$$

# Second Page

$$17. 1 - \sin^2 \theta = \frac{1}{2}$$

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

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

$$\sin^{-1} \left( \frac{1}{2} \right) = \theta$$

$$\theta = \frac{\pi}{6}, \frac{5\pi}{6}$$

$$21.$$

$$\sin^2 \theta + \sin \theta = 0$$

$$x^2 + x = 0$$

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

$$x=0, x+1=0$$

$$x=-1$$

$$18. 4 \sin^2 \theta = 1$$

$$\sin^2 \theta = \frac{1}{4}$$

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

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

$$\sin^{-1} \left( \frac{1}{2} \right) = \theta$$

$$\theta = \frac{\pi}{6}, \frac{5\pi}{6}$$

$$\sin^{-1}(0) = \theta \quad \sin^{-1}(-1) = \theta$$

$$\theta = 0, \pi, \frac{3\pi}{2}$$

$$19. 2 \cos \theta + 2\sqrt{3} = \sqrt{3}$$

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

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

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

$$\theta = \frac{5\pi}{6}, \frac{7\pi}{6}$$

$$22. \sin^2 \theta - \cos^2 \theta = 0$$

$\frac{\sqrt{2}}{2} + -\frac{\sqrt{2}}{2}$  are the only ones  
that are the same.

$$\theta = \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$$

$$20. 2 \sin^2 \theta - 3 \sin \theta - 2 = 0$$

$$2x^2 - 3x - 2 = 0$$

$$(2x+1)(x-2) = 0$$

$$2x+1=0 \quad x-2=0$$

$$2x=-1 \quad x=2$$

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

$$\sin^{-1} \left( -\frac{1}{2} \right) = \theta$$

$$\theta = -\frac{7\pi}{6}, \frac{11\pi}{6}$$

$$\sin^{-1}(-2) = \theta$$

$$23. \tan \theta \cdot (\sec \theta) = \sec \theta$$

$$\frac{\sin \theta}{\cos \theta} \cdot \frac{1}{\sin \theta} = \sec \theta$$

$$\frac{\sin \theta}{\cos \theta \sin \theta} = \sec \theta$$

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

$$\sec \theta = \sec \theta$$

$$24. \tan u (\csc u - \sin u) = \cos u$$

$$\frac{\sin u}{\cos u} \left( \frac{1}{\sin u} - \frac{\sin u}{1} \right) = \cos u$$

$$\frac{\sin u}{\cos u \sin u} - \frac{\sin^2 u}{\cos u} = \cos u$$

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

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

$$\frac{\cos^2 u}{\cos u} = \cos u$$

$$\cos u = \cos u$$

$$25. \cot^2 x = (\csc x - 1)(\csc x + 1)$$

$$\cot^2 x = \csc^2 x + (\csc x - \csc x - 1)$$

$$\cot^2 x = \csc^2 x - 1$$

$$\cot^2 x = \cot^2 x \text{ (identity)}$$

$$26. (\csc u - \sin u) = \cos u \cot u$$

$$\frac{1}{\sin u} - \frac{\sin u}{1} = \cos u \cot u$$

$$\frac{1}{\sin u} \cdot \frac{\sin^2 u}{\sin u} = \cos u \cot u$$

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

$$\frac{\cos^2 u}{\sin u} = \cos u \cot u$$

$$\frac{\cos u}{1} \cdot \frac{\cos u}{\sin u} = \cos u \cot u$$

$$\cos u \cot u = \cos u \cot u$$

$$27. \frac{1 - \sin t}{\cos t} = \frac{\cos t}{1 + \sin t}$$

$$\text{LHS} = \frac{\cos t (1 - \sin t)}{(1 + \sin t)(1 - \sin t)}$$

$$\text{LHS} = \frac{\cos t (1 - \sin^2 t)}{1 - \sin^2 t}$$

$$\text{LHS} = \frac{\cos t (1 - \sin^2 t)}{\cos^2 t}$$

$$\text{LHS} = \frac{1 - \sin^2 t}{\cos^2 t}$$

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

$$29. \sin \frac{11\pi}{12} \quad \sin \left( \frac{\pi}{6} + \frac{3\pi}{4} \right)$$

$$\sin \frac{\pi}{6} \cos \frac{3\pi}{4} + \cos \frac{\pi}{6} \sin \frac{3\pi}{4}$$

$$\frac{1}{2} \cdot -\frac{\sqrt{2}}{2} + \frac{\sqrt{3}}{2} \cdot \frac{\sqrt{2}}{2}$$

$$-\frac{\sqrt{2}}{2} + \frac{\sqrt{6}}{4}$$

$$\frac{\sqrt{6} - \sqrt{2}}{4}$$

$$30. \cos \frac{5\pi}{8} \cos \frac{2\pi}{9} - \sin \frac{5\pi}{8} \sin \frac{2\pi}{9}$$

$$\cos \left( \frac{5\pi}{8} + \frac{2\pi}{9} \right)$$

$$\cos \left( \frac{61\pi}{72} \right)$$

$$31. \tan 65^\circ + \tan 85^\circ$$

$$\frac{1 - \tan 65^\circ \tan 85^\circ}{\tan(65^\circ + 85^\circ)}$$

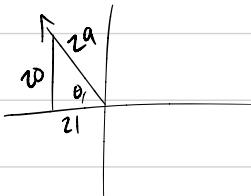
$$\tan(150^\circ)$$

$$-\frac{\sqrt{3}}{2} \cdot \frac{2}{1} + \frac{\sqrt{3}}{2} \cdot \frac{\sqrt{3}}{1}$$

32. not finished

33.  $\sin \alpha = \frac{20}{29}$ ,  $\frac{\pi}{2} < \alpha < \pi$ ;  $\cos \beta = \frac{24}{25}$ ,  $0 < \beta < \frac{\pi}{2}$

$$\cos(\alpha - \beta)$$



$$20^2 + x^2 = 29^2$$

$$400 + x^2 = 841$$

$$x^2 = 441$$

$$x = 21$$

$$24^2 + x^2 = 25^2$$

$$576 + x^2 = 625$$

$$x^2 = 49$$

$$x = 7$$

$$\sin(\alpha - \beta) = \frac{20}{29} \cdot \frac{24}{25} - \frac{21}{29} \cdot \frac{7}{25}$$

$$\frac{480}{725} + \frac{147}{725} = \frac{627}{725} \text{ not } ?$$

35.  $\sin \theta = -\frac{4}{5}$ ,  $\frac{3\pi}{2} < \theta < 2\pi$

Find  $\cos 2\theta$ .

$$\begin{array}{c} 3 \\ \sqrt{16+9} \\ \hline 5 \end{array} \quad x^2 + 4^2 = 5^2$$

$$x^2 + 16 = 25$$

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

$$\cos 2\theta =$$

$$x^2 = 9$$

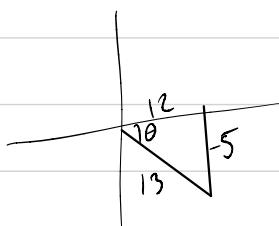
$$x = 3$$

$$1 - 2 \sin^2 \theta$$

$$1 - \frac{32}{25}$$

$$\cos 2\theta = -\frac{7}{25}$$

34.  $\cos \theta = \frac{12}{13}$ ,  $\frac{3\pi}{2} < \theta < 2\pi$



$$12^2 + x^2 = 13^2$$

$$144 + x^2 = 169$$

$$x = 5$$

$$\sin(2\theta)$$

$$2 \sin \theta \cos \theta$$

$$2 \left(\frac{5}{13}\right) \left(\frac{12}{13}\right) = \frac{120}{169}$$

# Other Review Sheet

$$4. \frac{1 - 4\sin^2 x \cos^2 x}{1 - \sin^2(2x)}$$
$$\cos^2 x$$

$$9. \cos x - \cos x \cot x = \sin x$$

$$\frac{1}{\sin x} - \frac{\cos x}{1} \cdot \frac{\cos x}{\sin x} = \sin x$$

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

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

$$\frac{\sin^2 x}{\sin x} = \sin x$$

$$\sin x = \sin x$$

$$2 \cos x = 1$$

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

$$\cos^{-1}\left(\frac{1}{2}\right) = \theta$$

$$\theta = \text{blah blah}$$