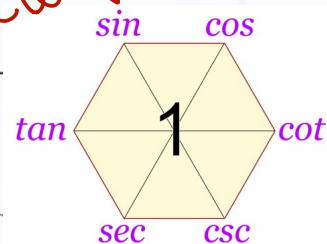


Magic Circle



Prove each identity:

1. $\sec x - \tan x \sin x = \frac{1}{\sec x}$

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

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

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

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

2. $\frac{1 + \cos x}{\sin x} = \csc x + \cot x$

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

$$\csc x + \cot x = \checkmark$$

3. $\frac{\sec \theta \sin \theta}{\tan \theta + \cot \theta} = \sin^2 \theta$

$$\frac{\frac{1}{\cos \theta} \cdot \frac{\sin \theta}{1}}{\tan \theta + \cot \theta} = \frac{\tan \theta}{\tan \theta + \cot \theta}$$

$$\frac{\tan \theta}{\tan \theta + \cot \theta} = \frac{\tan \theta}{\tan \theta + \cot \theta}$$

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

4. $\left(\frac{\sec \theta}{\cos \theta}\right) \frac{\tan \theta}{\cot \theta} = 1$

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

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

5. $\cos^2 y - \sin^2 y = 1 - 2\sin^2 y$

$$1 - \sin^2 y - \sin^2 y =$$

$$1 - 2\sin^2 y = \checkmark$$

6. $\csc^2 \theta \tan^2 \theta - 1 = \tan^2 \theta$

$$(1 + \cot^2 \theta)(\tan^2 \theta) - 1 =$$

$$\tan^2 \theta + \cot^2 \theta \cdot \tan^2 \theta - 1 =$$

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

$$\tan^2 \theta = \checkmark$$

7. $\frac{\sec^2 \theta}{\sec^2 \theta - 1} = \csc^2 \theta$

$$\frac{\sec^2 \theta}{\tan^2 \theta} =$$

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

$$\csc^2 \theta = \checkmark$$

8. $\tan^2 x \sin^2 x = \tan^2 x - \sin^2 x$

$$(\sec^2 x - 1)(\sin^2 x) =$$

$$\sec^2 x \cdot \sin^2 x - \sin^2 x =$$

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

$$\tan^2 x - \sin^2 x = \checkmark$$

9. $(\sin\theta + \cos\theta)^2 + (\sin\theta - \cos\theta)^2 = 2$

$$\sin^2\theta + 2\sin\theta\cos\theta + \cos^2\theta + \sin^2\theta - 2\sin\theta\cos\theta + \cos^2\theta =$$

$$\frac{1+1}{2} = \checkmark 2$$

10. $(\sin\theta + \cos\theta)(\tan\theta + \cot\theta) = \sec\theta + \csc\theta$

$$\sin\theta \tan\theta + \sin\theta \cot\theta + \cos\theta \tan\theta + \cos\theta \cot\theta =$$

$$\left(\frac{\sin^2\theta}{\cos\theta} + \cos\theta\right) + \left(\sin\theta + \frac{\cos^2\theta}{\sin\theta}\right)$$

$$\frac{\sin^2\theta + \cos^2\theta}{\cos\theta} + \frac{\sin^2\theta + \cos^2\theta}{\sin\theta}$$

$$\csc\theta + \sec\theta$$

11. $\frac{\tan\theta - 1}{\tan\theta + 1} = \frac{1 - \cot\theta}{1 + \cot\theta}$

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

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

12. $\frac{1 - \tan^2 x}{1 + \tan^2 x} = 1 - 2\sin^2 x$

$$\frac{1 - \tan^2 x}{\sec^2 x}$$

$$\frac{1}{\sec^2 x} - \frac{\tan^2 x}{\sec^2 x} \quad \frac{1}{1} \div \frac{1}{1}$$

$$\cos^2 x - \sin^2 x = 1 - \sin^2 x - \sin^2 x$$

13. $\frac{\cos x + 1}{\sin^3 x} = \frac{\csc x}{1 - \cos x}$

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

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

15. $\frac{\tan\theta}{\sec\theta} + \frac{\cot\theta}{\csc\theta} = \sin\theta + \cos\theta$

$$\frac{1}{1} \div \frac{1}{1} \quad \frac{1}{1} \div \frac{1}{1}$$

$$\sin\theta + \cos\theta$$

14. $\csc^4 x - \cot^4 x = \csc^2 x + \cot^2 x$

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

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

16. $\frac{\sin y + \tan y}{1 + \sec y} = \sin y$

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

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

$$\frac{\sin y(\cos y + 1)}{\cos y + 1} = \sin y = \checkmark$$

Angle Sum/Difference Identities

Date _____ Period _____

Use the angle sum identity to find the exact value of each.

1) $\cos 105^\circ = \frac{\sqrt{2} - \sqrt{6}}{4}$

2) $\sin 195^\circ = \frac{\sqrt{2} - \sqrt{6}}{4}$

3) $\cos 195^\circ = \frac{-\sqrt{6} - \sqrt{2}}{4}$

4) $\cos 165^\circ = \frac{-\sqrt{6} - \sqrt{2}}{4}$

5) $\cos 285^\circ = \frac{\sqrt{6} - \sqrt{2}}{4}$

6) $\cos 255^\circ = \frac{\sqrt{2} - \sqrt{6}}{4}$

7) $\sin 105^\circ = \frac{\sqrt{6} + \sqrt{2}}{4}$

8) $\sin 285^\circ = \frac{-\sqrt{6} - \sqrt{2}}{4}$

9) $\cos 75^\circ = \frac{\sqrt{6} - \sqrt{2}}{4}$

10) $\sin 255^\circ = \frac{-\sqrt{6} - \sqrt{2}}{4}$

Use the angle difference identity to find the exact value of each.

11) $\cos 75^\circ = \frac{\sqrt{6} - \sqrt{2}}{4}$

12) $\cos -15^\circ = \frac{\sqrt{6} + \sqrt{2}}{4}$

13) $\tan 75^\circ = 2 + \sqrt{3}$

14) $\cos 15^\circ = \frac{\sqrt{6} + \sqrt{2}}{4}$

15) $\tan -105^\circ = 2 + \sqrt{3}$

16) $\sin 105^\circ = \frac{\sqrt{6} + \sqrt{2}}{4}$

17) $\tan 15^\circ = 2 - \sqrt{3}$

18) $\sin 15^\circ = \frac{\sqrt{6} - \sqrt{2}}{4}$

19) $\tan -15^\circ = \sqrt{3} - 2$

20) $\sin -75^\circ = \frac{-\sqrt{6} - \sqrt{2}}{4}$

Use the angle sum or difference identity to find the exact value of each.

21) $\sin -105^\circ = \frac{-\sqrt{6} - \sqrt{2}}{4}$

22) $\cos 195^\circ = \frac{-\sqrt{6} - \sqrt{2}}{4}$

23) $\cos \frac{7\pi}{12} = \frac{\sqrt{2} - \sqrt{6}}{4}$

24) $\tan \frac{13\pi}{12} = 2 - \sqrt{3}$

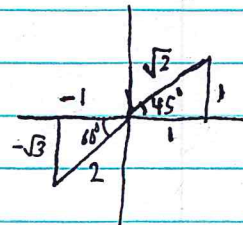
25) $\sin \frac{\pi}{12} = \frac{\sqrt{6} - \sqrt{2}}{4}$

26) $\cos -\frac{7\pi}{12} = \frac{\sqrt{2} - \sqrt{6}}{4}$

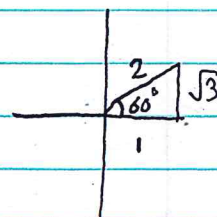
Key

Angle Sum / Difference Identities

$$\begin{aligned}
 1) \cos(60^\circ + 45^\circ) &= \cos 60^\circ \cdot \cos 45^\circ - \sin 60^\circ \cdot \sin 45^\circ \\
 &= \frac{1}{2} \cdot \frac{\sqrt{2}}{2} - \frac{\sqrt{3}}{2} \cdot \frac{\sqrt{2}}{2} \\
 &= \frac{\sqrt{2}}{4} - \frac{\sqrt{6}}{4} \\
 &= \frac{\sqrt{2} - \sqrt{6}}{4}
 \end{aligned}$$

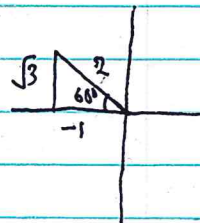


$$\begin{aligned}
 2) \sin(240^\circ - 45^\circ) &= \sin 240^\circ \cdot \cos 45^\circ - \cos 240^\circ \cdot \sin 45^\circ \\
 &= -\frac{\sqrt{3}}{2} \cdot \frac{\sqrt{2}}{2} - (-\frac{1}{2}) \cdot \frac{\sqrt{2}}{2} \\
 &= -\frac{\sqrt{6}}{4} - \frac{-\sqrt{2}}{4} \\
 &= \frac{-\sqrt{6} + \sqrt{2}}{4}
 \end{aligned}$$



$$\begin{aligned}
 3) \cos(240^\circ - 45^\circ) &= \cos 240^\circ \cdot \cos 45^\circ + \sin 240^\circ \cdot \sin 45^\circ \\
 &= -\frac{1}{2} \cdot \frac{\sqrt{2}}{2} + (-\frac{\sqrt{3}}{2}) \cdot \frac{\sqrt{2}}{2} \\
 &= -\frac{\sqrt{2}}{4} + \frac{-\sqrt{6}}{4} \\
 &= \frac{-\sqrt{2} - \sqrt{6}}{4}
 \end{aligned}$$

$$\begin{aligned}
 4) \cos(120^\circ + 45^\circ) &= \cos 120^\circ \cdot \cos 45^\circ - \sin 120^\circ \cdot \sin 45^\circ \\
 &= -\frac{1}{2} \cdot \frac{\sqrt{2}}{2} - \frac{\sqrt{3}}{2} \cdot \frac{\sqrt{2}}{2} \\
 &= -\frac{\sqrt{2}}{4} - \frac{\sqrt{6}}{4} \\
 &= \frac{-\sqrt{2} - \sqrt{6}}{4}
 \end{aligned}$$



$$\begin{aligned}
 5) \cos(240^\circ + 45^\circ) &= \cos 240^\circ \cdot \cos 45^\circ - \sin 240^\circ \cdot \sin 45^\circ \\
 &= -\frac{1}{2} \cdot \frac{\sqrt{2}}{2} - \left(-\frac{\sqrt{3}}{2}\right) \cdot \frac{\sqrt{2}}{2} \\
 &= -\frac{\sqrt{2}}{4} - \frac{-\sqrt{6}}{4} \\
 &= \frac{\sqrt{6} - \sqrt{2}}{4}
 \end{aligned}$$

$$\begin{aligned}
 6) \cos(210^\circ + 45^\circ) &= \cos 210^\circ \cdot \cos 45^\circ - \sin 210^\circ \cdot \sin 45^\circ \\
 &= -\frac{\sqrt{3}}{2} \cdot \frac{\sqrt{2}}{2} - \left(-\frac{1}{2}\right) \cdot \frac{\sqrt{2}}{2} \\
 &= -\frac{\sqrt{6}}{4} - \frac{-\sqrt{2}}{4} \\
 &= \frac{\sqrt{2} - \sqrt{6}}{4}
 \end{aligned}$$

$$\begin{aligned}
 7) \sin(60^\circ + 45^\circ) &= \sin 60^\circ \cdot \cos 45^\circ + \sin 45^\circ \cdot \cos 60^\circ \\
 &= \frac{\sqrt{3}}{2} \cdot \frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2} \cdot \frac{1}{2} \\
 &= \frac{\sqrt{6}}{4} + \frac{\sqrt{2}}{4} \\
 &= \frac{\sqrt{6} + \sqrt{2}}{4}
 \end{aligned}$$

$$\begin{aligned}
 8) \sin(240^\circ + 45^\circ) &= \sin 240^\circ \cdot \cos 45^\circ + \sin 45^\circ \cdot \cos 240^\circ \\
 &= -\frac{\sqrt{3}}{2} \cdot \frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2} \cdot \left(-\frac{1}{2}\right) \\
 &= -\frac{\sqrt{6}}{4} + \frac{-\sqrt{2}}{4} \\
 &= \frac{-\sqrt{6} - \sqrt{2}}{4}
 \end{aligned}$$

$$\begin{aligned}
 9) \cos(45^\circ + 30^\circ) &= \cos 45^\circ \cdot \cos 30^\circ - \sin 45^\circ \cdot \sin 30^\circ \\
 &= \frac{\sqrt{2}}{2} \cdot \frac{\sqrt{3}}{2} - \frac{\sqrt{2}}{2} \cdot \frac{1}{2} \\
 &= \frac{\sqrt{6}}{4} - \frac{\sqrt{2}}{4} \\
 &= \frac{\sqrt{6} - \sqrt{2}}{4}
 \end{aligned}$$

$$\begin{aligned}
 10) \sin(180^\circ + 45^\circ) &= \sin 180^\circ \cdot \cos 45^\circ + \sin 45^\circ \cdot \cos 180^\circ \\
 &= 0 \cdot \frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2} \cdot -1 \\
 &= -\frac{\sqrt{2}}{2}
 \end{aligned}$$

$$\begin{aligned}
 10) \sin(210^\circ + 45^\circ) &= \sin 210^\circ \cdot \cos 45^\circ + \sin 45^\circ \cdot \cos 210^\circ \\
 &= -\frac{1}{2} \cdot \frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2} \cdot -\frac{\sqrt{3}}{2} \\
 &= -\frac{\sqrt{2}}{4} + -\frac{\sqrt{6}}{4} \\
 &= \frac{-\sqrt{2} - \sqrt{6}}{4}
 \end{aligned}$$

$$\begin{aligned}
 11) \cos(120^\circ - 45^\circ) &= \cos 120^\circ \cdot \cos 45^\circ + \sin 120^\circ \cdot \sin 45^\circ \\
 &= -\frac{1}{2} \cdot \frac{\sqrt{2}}{2} + \frac{\sqrt{3}}{2} \cdot \frac{\sqrt{2}}{2} \\
 &= -\frac{\sqrt{2}}{4} + \frac{\sqrt{6}}{4} \\
 &= \frac{\sqrt{6} - \sqrt{2}}{4}
 \end{aligned}$$

$$\begin{aligned}
 12) \cos(30^\circ - 45^\circ) &= \cos 30^\circ \cdot \cos 45^\circ + \sin 30^\circ \cdot \sin 45^\circ \\
 &= \frac{\sqrt{3}}{2} \cdot \frac{\sqrt{2}}{2} + \frac{1}{2} \cdot \frac{\sqrt{2}}{2} \\
 &= \frac{\sqrt{6}}{4} + \frac{\sqrt{2}}{4} \\
 &= \frac{\sqrt{6} + \sqrt{2}}{4}
 \end{aligned}$$

$$13) \tan(120^\circ - 45^\circ) = \frac{\tan 120^\circ - \tan 45^\circ}{1 + \tan 120^\circ \cdot \tan 45^\circ}$$

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

$$= \frac{-3 - 2\sqrt{3} - 1}{1 - 3}$$

$$= \frac{-4 - 2\sqrt{3}}{-2}$$

$$= 2 + \sqrt{3}$$

$$14) \cos(45^\circ - 30^\circ) = \cos 45^\circ \cdot \cos 30^\circ + \sin 45^\circ \cdot \sin 30^\circ$$

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

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

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

$$15) \tan(-150^\circ + 45^\circ) = \frac{\tan 45^\circ - \tan 150^\circ}{1 + \tan 45^\circ \cdot \tan 150^\circ}$$

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

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

$$= \frac{4 + 2\sqrt{3}}{-2}$$

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

$$\begin{aligned}
 16) \sin(150^\circ - 45^\circ) &= \sin 150^\circ \cdot \cos 45^\circ - \sin 45^\circ \cdot \cos 150^\circ \\
 &= \frac{1}{2} \cdot \frac{\sqrt{2}}{2} - \frac{\sqrt{2}}{2} \cdot \frac{-\sqrt{3}}{2} \\
 &= \frac{\sqrt{2}}{4} - \frac{-\sqrt{6}}{4} \\
 &= \frac{\sqrt{2} + \sqrt{6}}{4}
 \end{aligned}$$

$$\begin{aligned}
 17) \tan(45^\circ - 30^\circ) &= \frac{\tan 45^\circ - \tan 30^\circ}{1 + \tan 45^\circ \cdot \tan 30^\circ} \\
 &= \frac{1 - \frac{\sqrt{3}}{3}}{1 + \frac{\sqrt{3}}{3}} \\
 &= \frac{1 - \frac{\sqrt{3}}{3}}{1 + \frac{\sqrt{3}}{3}} \cdot \frac{1 - \frac{\sqrt{3}}{3}}{1 - \frac{\sqrt{3}}{3}} \\
 &= \frac{1 - \frac{2\sqrt{3}}{3} + \frac{1}{3}}{1 - \frac{3}{9}} \\
 &= \frac{\frac{12}{9} - \frac{2\sqrt{3}}{3} + \frac{1}{3}}{\frac{6}{9}} \\
 &= \frac{12 - 6\sqrt{3} + 1}{6} \\
 &= 2 - \sqrt{3}
 \end{aligned}$$

$$\begin{aligned}
 18) \sin(45^\circ - 30^\circ) &= \sin 45^\circ \cdot \cos 30^\circ - \cos 45^\circ \cdot \sin 30^\circ \\
 &= \frac{\sqrt{2}}{2} \cdot \frac{\sqrt{3}}{2} - \frac{\sqrt{2}}{2} \cdot \frac{1}{2} \\
 &= \frac{\sqrt{6}}{4} - \frac{\sqrt{2}}{4} \\
 &= \frac{\sqrt{6} - \sqrt{2}}{4}
 \end{aligned}$$

$$19) \tan(30^\circ - 45^\circ) = \frac{\tan 30^\circ - \tan 45^\circ}{1 + \tan 30^\circ \cdot \tan 45^\circ} \quad 20) \sin(-30^\circ - 45^\circ) = \sin -30^\circ \cdot \cos 45^\circ - \sin 45^\circ \cdot \cos -30^\circ$$

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

$$= \frac{-1 + 2\frac{\sqrt{3}}{3} - \frac{3}{9}}{1 - \frac{3}{9}}$$

$$= \frac{-\frac{12}{9} + \frac{2\sqrt{3}}{3}}{\frac{6}{9}}$$

$$= \frac{-12 + 6\sqrt{3}}{6}$$

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

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

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

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

$$21) \sin(-45^\circ - 60^\circ) = \sin -45^\circ \cdot \cos 60^\circ - \sin 60^\circ \cdot \cos -45^\circ$$

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

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

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

$$22) \cos(150^\circ + 45^\circ) = \cos 150^\circ \cdot \cos 45^\circ - \sin 150^\circ \cdot \sin 45^\circ$$

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

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

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

$$\begin{aligned}
 23) \quad \cos\left(\frac{10\pi}{12} - \frac{3\pi}{12}\right) &= \cos\frac{10\pi}{12} \cdot \cos\frac{3\pi}{12} + \sin\frac{10\pi}{12} \cdot \sin\left(\frac{3\pi}{12}\right) \\
 &= \frac{-\sqrt{3}}{2} \cdot \frac{\sqrt{2}}{2} + \frac{1}{2} \cdot \frac{\sqrt{2}}{2} \\
 &= \frac{-\sqrt{6}}{4} + \frac{\sqrt{2}}{4} \\
 &= \frac{\sqrt{2}-\sqrt{6}}{4}
 \end{aligned}$$

$$\begin{aligned}
 24) \quad \tan\left(\frac{10\pi}{12} + \frac{3\pi}{12}\right) &= \frac{\tan\frac{10\pi}{12} + \tan\frac{3\pi}{12}}{1 - \tan\frac{10\pi}{12} \cdot \tan\frac{3\pi}{12}} \\
 &= \frac{\frac{-\sqrt{3}}{3} + 1 \cdot 1 - \frac{\sqrt{3}}{3}}{1 + \frac{\sqrt{3}}{3} \cdot 1 - \frac{\sqrt{3}}{3}} \\
 &= \frac{1 - \frac{2\sqrt{3}}{3} + \frac{3}{9}}{1 - \frac{3}{9}} \\
 &= \frac{\frac{12}{9} - \frac{2\sqrt{3}}{3}}{\frac{6}{9}} \\
 &= \frac{12 - 6\sqrt{3}}{6} \\
 &= 2 - \sqrt{3}
 \end{aligned}$$

$$\begin{aligned}
 25) \quad \sin\left(\frac{3\pi}{12} - \frac{2\pi}{12}\right) &= \sin\frac{3\pi}{12} \cdot \cos\frac{2\pi}{12} + \sin\frac{2\pi}{12} \cdot \cos\frac{3\pi}{12} \\
 &= \frac{\sqrt{2}}{2} \cdot \frac{\sqrt{3}}{2} - \frac{\sqrt{2}}{2} \cdot \frac{1}{2} \\
 &= \frac{\sqrt{6}}{4} - \frac{\sqrt{2}}{4} \\
 &= \frac{\sqrt{6}-\sqrt{2}}{4}
 \end{aligned}$$

$$\begin{aligned}
 26) \quad \cos\left(-\frac{4\pi}{12} - \frac{3\pi}{12}\right) &= \overset{\cos}{\cancel{\sin}} \left(-\frac{4\pi}{12} \cdot \cos \frac{3\pi}{12} + \sin \frac{4\pi}{12} \cdot \sin \frac{3\pi}{12}\right) \\
 &= \frac{1}{2} \cdot \frac{\sqrt{2}}{2} + \frac{\sqrt{3}}{2} \cdot \frac{\sqrt{2}}{2} \\
 &= \frac{\sqrt{2}}{4} + \frac{\sqrt{6}}{4} \\
 &= \frac{\sqrt{2} + \sqrt{6}}{4}
 \end{aligned}$$