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when n is an odd integer, $n = 1, 3, 5, \ldots$

$\sin(n \cdot 90 \pm \theta) = \pm \cos\theta$.

$\cos(n \cdot 90 \pm \theta) = \pm \sin\theta$

$\tan(n \cdot 90 \pm \theta) = \pm \cot\theta$.

when n is an even integer, $n = 2, 4, 6, \ldots$

$\sin(n \cdot 90 \pm \theta) = \pm \sin\theta$

$\cos(n \cdot 90 \pm \theta) = \pm \cos\theta$

$\tan(n \cdot 90 \pm \theta) = \pm \tan\theta$.

positive or negative sign depends on the quadrant in which the angle lies.

Evaluate the following.

1. $\sin 120^\circ = \sin(90 + 30)$

$= \cancel{\sin\theta}$

$= \cos 30 = \sqrt{3}/2$.

$\boxed{\text{or}}$

$\sin(120)^\circ = \sin(180 - 60)$

$= \sin 60^\circ$

$= \sqrt{3}/2$

2. $\cos 135^\circ = \cos(90 + 45)$

$= -\sin 45 = -1/\sqrt{2}$

$\boxed{\text{or}}$

$\cos 135^\circ = \cos(180 - 45)$

$= -\cos 45 = -1/\sqrt{2}$

3. $\sin 300^\circ = \sin(360-60)$
$= -\sin 60 = -\sqrt{3}/2$

$\boxed{\text{or}}$

$\sin 300^\circ = \sin(270+30^\circ)$
$= -\cos 30^\circ = -\sqrt{3}/2$

4. $\cos 330^\circ = \cos(360-30)$
$= \cos 30 = \sqrt{3}/2$

$\boxed{\text{or}}$

$\cos 330^\circ = \cos(270+60)$
$= \sin 60 = \sqrt{3}/2$

5. $\tan 150^\circ = \tan(90+60)$
$= -\cot 60 = -1/\sqrt{3}$

$\boxed{\text{or}}$

$\tan 150^\circ = \tan(180-30)$
$= -\tan 30 = -1/\sqrt{3}$

6. $\operatorname{cosec} 120^\circ = \frac{\cancel{\sin t}}{\cancel{\cos t}} = \frac{1}{\sin 120^\circ}$

$= \frac{1}{\sin(180-60)} = \frac{1}{\sin 60}$

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

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7. $\sin 450^\circ = \sin(360+90)$
$= \sin 90 = 1$ //

8. $\cos 510^\circ = \cos(360+150)$
$= \cos 150$
$= \cos(90+60)$
$= -\sin 60$
$= -\sqrt{3}/2$ //

9. $\sin 510^\circ = \sin(360+150)$
$= \sin 150$
$= \sin(90+60)$
$= \cos 60 = 1/2$ //

10. $\sec 750 = \frac{1}{\cos 750}$

$= \frac{1}{\cos(360+360+30)}$

$= \frac{1}{\cos(360+30)}$

$= \frac{1}{\cos 30} = \frac{1}{\sqrt{3}/2} = 2/\sqrt{3}$

Note

1. $\sin(\theta-90) = \sin-(90-\theta)$
$= -\sin(90-\theta)$
$= -\cos\theta$

2. $\cos(\theta-90) = \cos-(90-\theta)$

$= \cos(90-\alpha)$

$= \sin\alpha$

3. $\tan(\alpha - 270) = \tan -(270-\alpha)$

$= -\tan(270-\alpha)$

$= -\cot\alpha$

1. Evaluate $\sin 120^\circ \cos 330^\circ + \cos 240^\circ \sin 330^\circ$

$\sin 120^\circ = \sin(90+30^\circ)$

$= \cos 30^\circ = \sqrt{3}/2$

$\cos 330^\circ = \cos(360-30)$

$= \cos 30 = \sqrt{3}/2$

$\cos 240^\circ = \cos(180+60)$

$= -\cos 60 = -1/2$

$\sin 330^\circ = \sin(360-30)$

$= -\sin 30 = -1/2$

$\sin 120^\circ \cos 330^\circ + \cos 240^\circ \sin 330^\circ$

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

$= \frac{3}{4} + \frac{1}{4} = \frac{4}{4} = 1$

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$= \cos(90 - \theta)$

$= \sin\theta$

3. $\tan(\theta - 270) = \tan - (270 - \theta)$

$= -\tan(270 - \theta)$

$= -\cot\theta$

1. Evaluate $\sin 120^\circ \cos 330^\circ + \cos 240^\circ \sin 330^\circ$

$\sin 120^\circ = \sin(90 + 30^\circ)$

$= \cos 30^\circ = \sqrt{3}/2$

$\cos 330^\circ = \cos(360 - 30)$

$= \cos 30 = \sqrt{3}/2$

$\cos 240^\circ = \cos(180 + 60)$

$= -\cos 60 = -1/2$

$\sin 330^\circ = \sin(360 - 30)$

$= -\sin 30 = -1/2$

$\sin 120^\circ \cos 330^\circ + \cos 240^\circ \sin 330^\circ$

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

$= \cancel{\frac{9}{4}}\ \frac{3}{4} + \frac{1}{4} = \frac{4}{4} = 1$

2. Evaluate $\cos 570^\circ \sin 510^\circ - \sin 330 \cos 390^\circ$

$\cos 570^\circ = \cos(360 + 210)$

$= \cos 210$

$= \cos(270 - 60)$

$= -\sin 60 = -\sqrt{3}/2.$

$\sin 510 = \sin(360 + 150)$

$= \sin 150$

$= \sin(90 + 60)$

$= \cos 60 = 1/2$

$\sin 330 = \sin(360 - 30)$

$= -\sin 30$

$= -1/2.$

$\cos 390 = \cos(360 + 30)$

$= \cos 30$

$= \sqrt{3}/2.$

$\cos 570^\circ \sin 510^\circ - \sin 330 \cos 390$

$= -\sqrt{3}/2 \times 1/2 - -\frac{1}{2} \times \sqrt{3}/2.$

$= -\frac{\sqrt{3}}{4} + \frac{\sqrt{3}}{4} = 0$

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3. Simplify $\dfrac{\sin(180+A)\cos(90-A)\tan(270+A)}{\cos(90+A)\cos(360+A)}$.

$\sin(180+A) = -\sin A$

$\cos(90-A) = \sin A$

$\tan(270+A) = -\cot A$

$\cos(90+A) = -\sin A$

$\cos(360+A) = \cos A$.

$$\frac{\sin(180+A)\cos(90-A)\tan(270+A)}{\cos(90+A)\cos(360+A)}$$

$$= \frac{\cancel{-}\sin A \times \cancel{\sin A} \times -\cot A}{\cancel{-}\cancel{\sin A} \times \cos A}.$$

$$= -\frac{\sin A \times \cot A}{\cos A}$$

$$= \frac{-\sin A \times \frac{\cos A}{\sin A}}{\cos A}$$

$$= \frac{-\sin A \times \cos A}{\sin A \times \cos A}$$

$$= \underline{\underline{-1}}.$$

$$\frac{a/b}{c}$$

$$= \frac{\frac{a}{bc}}{}.$$

$$a \div (b/c)$$

$$= \underline{\underline{\frac{ac}{b}}}.$$