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To convert degree measure

1. $\left(\frac{7\pi}{6}\right)^c = \frac{7\pi}{6} \times 1^c = \frac{7\pi}{6} \times \frac{180^{30}}{\pi}$ $\quad 1^c = \frac{180^\circ}{\pi}$

$= 210^\circ$

2. $\left(\frac{11}{16}\right)^c = \frac{11}{16} \times 1^c = \frac{11}{16_4} \times \frac{180^{45}}{\pi}$

$= \frac{11 \times 45 \times 7}{4 \times 22 2}$

$= \frac{315}{8}$

$8\overline{)315}$ (39)
24
75
72
3

$= \left(39\frac{3}{8}\right)^\circ = 39^\circ \frac{3}{8}^\circ$

$= \cancel{390^\circ} = 39^\circ(3/8 \times 60)$ $\quad 1^\circ = 60'$

$= 39^\circ \frac{180}{8}'$

$\cancel{180}\ 45$
$\cancel{128}\ 2$
$2\overline{)45}$
4
5
4
1

$= 39^\circ\left(22\ \frac{1}{2}\right)'$

$= 39^\circ 22'(1/2 \times 60)''$

$= 39^\circ 22' 30''$

3. $\left(\frac{\pi}{10}\right)^c = \frac{\pi}{10} \times 1^c = \frac{\pi}{10} \times \frac{180}{\pi}$

$= 18^\circ$.

4. $\left(\frac{\pi}{8}\right)^c = \frac{\pi}{8} \times 1^c = \frac{\cancel{\pi}}{8} \times \frac{180^\circ}{\cancel{\pi}} = \frac{180}{8}$

$= \left(22\ 1/2\right)^\circ = 22^\circ(1/2 \times 60)$

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$= 22^\circ 30'$

To convert radian measure.

1. $340^\circ$

$340^\circ = 340 \times 1^\circ \qquad 1^\circ = \left(\frac{\pi}{180}\right)^c$

$= \cancel{340}^{17} \times \frac{\pi}{\cancel{180}_{9}}$

$= \left(\frac{17\pi}{9}\right)^c$

$= \frac{17\pi}{9}$ radian.

2. $75^\circ = \cancel{75}^{\cancel{15}\,5} \times \frac{\pi}{\cancel{180}_{\cancel{36}\,12}} = \left(\frac{5\pi}{12}\right)^c$

$= \frac{5\pi}{12}$ radian

3. $-37^\circ 30' = -\left(37 + \frac{30}{60}\right)^\circ$

$= -\left(37 + \frac{1}{2}\right)^\circ$

$= -\left(\frac{74+1}{2}\right)^\circ = -\frac{75}{2}^\circ$

$= -\frac{\cancel{75}^{\cancel{25}\,5}}{2} \times \left(\frac{\pi}{\cancel{180}_{\cancel{60}\,12}}\right)^c = \left(\frac{5\pi}{24}\right)^c$

$= \frac{5\pi}{24}$ radian

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1. $\sin\alpha = 2/5$ $\cos\alpha, \tan\alpha$ ?

$\cos^2\alpha = 1-\sin^2\alpha = 1-(\sin\alpha)^2$

$= 1-(2/5)^2 = 1-4/25$

$= \frac{25-4}{25} = \frac{21}{25}$

$\therefore \cos\alpha = \sqrt{21/25} = \sqrt{21}/\sqrt{25} = \frac{\sqrt{21}}{5}$ //.

$\therefore \tan\alpha = \frac{\sin\alpha}{\cos\alpha} = \frac{2/5}{\sqrt{21}/5}$

$= \frac{2}{\cancel{5}} \times \frac{5}{\sqrt{21}} = 2/\sqrt{21}$

$\tan\alpha = 3$.

$\sec^2\alpha = 1+\tan^2\alpha = 1+(\tan\alpha)^2$

$= 1+3^2 = 1+9 = 10$

$\therefore \sec\alpha = \sqrt{10}$ //.

$\therefore \cos\alpha = \frac{1}{\sec\alpha} = \frac{1}{\sqrt{10}}$ //.

$\sin^2\alpha = 1-\cos^2\alpha = 1-(\cos\alpha)^2$

$= 1-\left(\frac{1}{\sqrt{10}}\right)^2 = 1-\frac{1}{10} = \frac{10-1}{10}$

$= 9/10$

$\sin\alpha = \sqrt{9/10} = 3/\sqrt{10}$.

$\operatorname{cosec}\alpha = \frac{1}{\sin\alpha} = \frac{1}{3/\sqrt{10}} = \sqrt{10}/3$

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(a) $\sin A \cot A$ = L.H.S.

L.H.S = $\sin A \times \frac{\cos A}{\sin A}$ = $\cos A$ = R.H.S.

L.H.S = R.H.S.

(b) $\sin^2 A - \cos^2 A$ = L.H.S.

L.H.S = $\sin^2 A - \cos^2 A$

$= (1 - \cos^2 A) - \cos^2 A$

$= 1 - \cos^2 A - \cos^2 A$

$= 1 - 2\cos^2 A$ = R.H.S.

L.H.S = R.H.S

(c) $(\sin A + \cos A)^2$ = L.H.S.

L.H.S = $(\sin A + \cos A)^2$

$= (\sin A)^2 + 2\sin A \cos A + (\cos A)^2.$

$= \sin^2 A + 2\sin A \cos A + \cos^2 A$

$= \sin^2 A + \cos^2 A + 2\sin A \cos A$

$= 1 + 2\sin A \cos A$ = R.H.S

L.H.S = R.H.S.

$\frac{1+\sin\theta}{\cos\theta}$ = L.H.S.

L.H.S = $\frac{1+\sin\theta}{\cos\theta}$

Numerator and denominator multiplied by $1-\sin\theta$.

$L.H.S = \dfrac{(1+\sin\theta)(1-\sin\theta)}{\cos\theta(1-\sin\theta)}$

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

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

$= \dfrac{\cos\theta \cdot \cos\theta}{\cos\theta(1-\sin\theta)} = \dfrac{\cos\theta}{1-\sin\theta} = R.H.S.$

5 $\dfrac{1+\cos\theta}{\sin\theta} + \dfrac{\sin\theta}{1+\cos\theta}.$

$= \dfrac{(1+\cos\theta)(1+\cos\theta) + \sin\theta \cdot \sin\theta}{\sin\theta(1+\cos\theta)}.$

$= \dfrac{1+\cos\theta+\cos\theta+\cos^2\theta+\sin^2\theta}{\sin\theta(1+\cos\theta)}.$

$= \dfrac{1+2\cos\theta+1}{\sin\theta(1+\cos\theta)} = \dfrac{2+2\cos\theta}{\sin\theta(1+\cos\theta)}$

$= \dfrac{2(1+\cos\theta)}{\sin\theta(1+\cos\theta)} = \dfrac{2}{\sin\theta}.$

$= 2 \cdot \operatorname{cosec}\theta.$

$\sin\theta = \dfrac{1}{\operatorname{cosec}\theta}$

$\operatorname{cosec}\theta = \dfrac{1}{\sin\theta}$

6. $\dfrac{\cos A}{1-\tan A} + \dfrac{\sin A}{1-\cot A}$

$$= \frac{\cos A}{1-\frac{\sin A}{\cos A}} + \frac{\sin A}{1-\frac{\cos A}{\sin A}}$$

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

$$= \frac{\cos A \cdot \cos A}{\cos A - \sin A} + \frac{\sin A \cdot \sin A}{\sin A - \cos A}.$$

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

$$= \cancel{\cos^2 A - \sin^2 A}$$

$$= \frac{(\cos A - \sin A)\cos^2 A - (\cos A - \sin A)\sin^2 A}{(\cos A - \sin A)(\cos A - \sin A)}$$

$$= \frac{\cancel{(\cos A - \sin A)}(\cos^2 A - \sin^2 A)}{\cancel{(\cos A - \sin A)}(\cos A - \sin A)}$$

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

$$= \frac{(\cos A - \sin A)(\cos A + \sin A)}{\cos A - \sin A}$$

$$= \cos A + \sin A.$$