TRIGONOMETRY

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

$\sec\theta + \tan\theta = \dfrac{1}{\sec\theta - \tan\theta}$

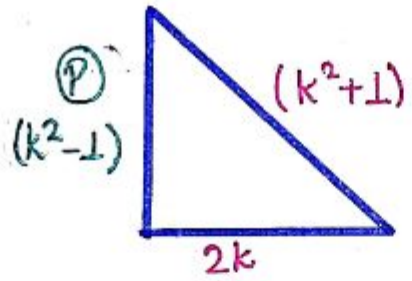
$\sec\theta + \tan\theta = k$

$\sec\theta - \tan\theta = \dfrac{1}{k}$

$+$

$2\sec\theta = k + \dfrac{1}{k} = \dfrac{k^2+1}{k}$

$$\boxed{\sec\theta = \frac{k^2+1}{2k}}$$



$P^2 = (k^2+1)^2 - (2k)^2$

$P^2 = k^4 + 1 + 2k^2 - 4k^2$

$k^4 + 1 - 2k^2$

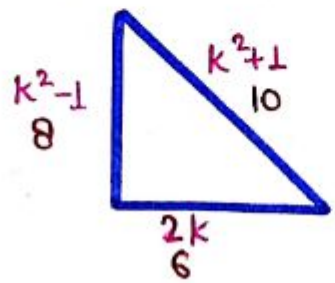
$P^2 = (k^2-1)^2$

$P = \boxed{k^2-1}$

Ex:-

$\sec\theta + \tan\theta = 3 \rightarrow (k)$

$\sin\theta = ?$

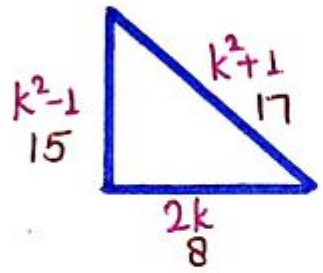


$\sin\theta = \dfrac{8}{10} \dfrac{4}{5}$

Ex:-

$\text{Cosec}\,\theta + \text{Cot}\,\theta = 4 \rightarrow (k)$

$\text{Cos}\,\theta = ?$



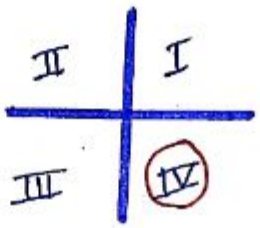
$\text{Cos}\,\theta = \frac{8}{17}$

SPECIAL CASE

$\text{Sec}\,\theta - \tan\theta = 3 \rightarrow (k)$

$\text{Sec}\,\theta + \tan\theta = \frac{1}{3}$

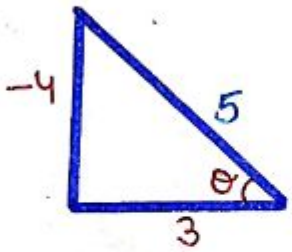
(+) (−)



$2\tan\theta = \frac{1}{3} - 3$

$2\tan\theta = -\frac{8}{3}$ 4

$\tan = -\frac{4}{3}$



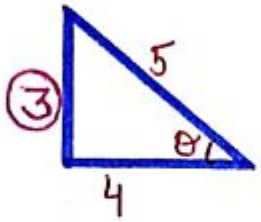
$\sin\theta = -\frac{4}{5}$

Q) If $\sec\theta = x + \frac{1}{4x}$ $(0° < \theta < 90°)$, then what will be $\sec\theta + \tan\theta$ equal to?

यदि $\sec\theta = x + \frac{1}{4x}$ $(0° < \theta < 90°)$ हों, तो $\sec\theta + \tan\theta$ किसके बराबर होगा ?

Put, $x=1$

$\sec\theta = 1+\frac{1}{4} = \frac{5}{4}$



$\sec\theta + \tan\theta$

$\frac{5}{4} + \frac{3}{4} = \frac{8}{4}$ ②

$2x = 2$

Q) If $\sec\theta + \tan\theta = 2+\sqrt{5}$, then what will be the value of $\sin\theta + \cos\theta$?

यदि $\sec\theta + \tan\theta = 2+\sqrt{5}$ हो, तो $\sin\theta + \cos\theta$ का मान क्या होगा?

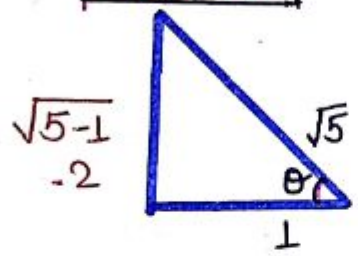
$\sec\theta + \tan\theta = \sqrt{5}+2$

$\sec\theta - \tan\theta = \frac{1}{\sqrt{5}+2} \times \frac{\sqrt{5}-2}{\sqrt{5}-2}$

$2\sec\theta = 2\sqrt{5}$

$\sec\theta = \sqrt{5}$

$\frac{\sqrt{5}-2}{5-4} = \sqrt{5}-2$



$\frac{2}{\sqrt{5}} + \frac{1}{\sqrt{5}}$

$\frac{3}{\sqrt{5}}$

Q) The numerical value of $\frac{1}{1+\cot^2\theta} + \frac{3}{1+\tan^2\theta} + 2\sin^2\theta$ is :

$\frac{1}{1+\cot^2\theta} + \frac{3}{1+\tan^2\theta} + 2\sin^2\theta$ का संख्यात्मक मान होगा।

$$\frac{1}{\text{cosec}^2\theta} + \frac{3}{\sec^2\theta} + 2\sin^2\theta$$

$$\sin^2\theta + 3\cos^2\theta + 2\sin^2\theta$$

$$3\sin^2\theta + 3\cos^2\theta$$

$$3(\sin^2\theta + \cos^2\theta)$$

$$3 \times 1 = 3$$

II nd Method Value Putting

{ θ की कोई भी Value रख सकते है। }

$\theta = 45^\circ$

{ $\frac{1}{0}, \frac{0}{1}$ की form नहीं बननी चाहिए }

$$\frac{1}{1+1} + \frac{3}{1+1} + 2\times\left(\frac{1}{\sqrt{2}}\right)^2$$

$$\frac{1}{2} + \frac{3}{2} + \cancel{2}\times\frac{1}{\cancel{2}}$$

$$2\frac{\cancel{4}}{\cancel{2}} + 1 = 3$$

Q) The value of $\frac{4}{1+\tan^2\alpha} + \frac{1}{1+\cot^2\alpha} + 3\sin^2\alpha$ is

$\frac{4}{1+\tan^2\alpha} + \frac{1}{1+\cot^2\alpha} + 3\sin^2\alpha$ का मान है।

$\theta = 45^\circ$

$$\frac{4}{1+1} + \frac{1}{1+1} + 3\times\left(\frac{1}{\sqrt{2}}\right)^2$$

$$\frac{4}{2} + \frac{1}{2} + 3\times\frac{1}{2}$$

$$\frac{5}{2} + \frac{3}{2} = \frac{\cancel{8}}{\cancel{2}}\ 4$$

II nd Method

$$\frac{4}{\sec^2\theta} + \frac{1}{\text{cosec}^2\theta} + 3\sin^2\alpha$$

$$4\cos^2\theta + \sin^2\theta + 3\sin^2\theta$$

$$4(\cos^2\theta + \sin^2\theta)$$

$$4 \times 1 = 4$$

Q) If $4x = \sec\theta$ and If $\frac{4}{x} = \tan\theta$, then what will be $8\left(x^2 - \frac{1}{x^2}\right)$?

यदि $4x = \sec\theta$ तथा $\frac{4}{x} = \tan\theta$ हो, तो $8\left(x^2 - \frac{1}{x^2}\right)$ क्या होगा?

$$x = \frac{\sec\theta}{4}, \quad \frac{1}{x} = \frac{\tan\theta}{4}$$

$$x^2 - \frac{1}{x^2} = \left(\frac{\sec^2\theta}{16} - \frac{\tan^2\theta}{16}\right)$$

$$\frac{1}{16}\left(\sec^2\theta - \tan^2\theta\right)$$

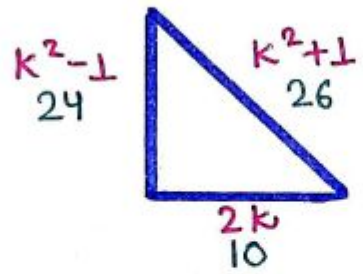
$$\frac{1}{16} \times 1 = \frac{1}{16}$$

$$8\left(x^2 - \frac{1}{x^2}\right)$$

$$\cancel{8} \times \frac{1}{\cancel{16}_2} = \frac{1}{2}$$

Q) If $\sec\theta + \tan\theta = 5$, then what will be the value of $\frac{\tan\theta + 1}{\tan\theta - 1}$?

यदि $\sec\theta + \tan\theta = 5$, तो $\frac{\tan\theta + 1}{\tan\theta - 1}$ का मान क्या होगा?



$$\frac{\frac{24}{10} + 1}{\frac{24}{10} - 1} \Rightarrow \frac{\frac{34}{\cancel{10}}}{\frac{14}{\cancel{10}}}$$

$$\frac{\cancel{34}}{\cancel{14}} \quad \frac{17}{7}$$

Q) What is the numerical value of $1+\frac{1}{\cot^2 63^\circ}-\sec^2 27^\circ+\frac{1}{\sin^2 63^\circ}-\frac{\operatorname{cosec}^2 27^\circ}{1}$

$1+\frac{1}{\cot^2 63^\circ}-\sec^2 27^\circ+\frac{1}{\sin^2 63^\circ}-\operatorname{cosec}^2 27^\circ$ का संख्यात्मक मान बताइए :

$$1+\tan^2 63-\sec^2 27+\operatorname{cosec}^2 63-\operatorname{cosec}^2 27$$

$\sec^2 27 \rightarrow \sec^2(90-63)$

$\operatorname{cosec}^2 27 \rightarrow \operatorname{cosec}^2(90-63)$

$$\cancel{\sec^2 63^\circ}-\cancel{\operatorname{cosec}^2 63}+\cancel{\operatorname{cosec}^2 63}-\cancel{\sec^2 63^\circ}$$

$$=0$$

Q) If θ be an acute angle and $7\sin^2\theta+3\cos^2\theta=4$, then the value of $\tan\theta$ is

यदि θ एक न्यूनकोण हो और $7\sin^2\theta+3\cos^2\theta=4$ हो, तो $\tan\theta$ का मान है ?

$$7\sin^2\theta+3(1-\sin^2\theta)=4$$
$$7\sin^2\theta+3-3\sin^2\theta=4$$
$$4\sin^2\theta=1$$
$$\sin^2\theta=\frac{1}{4}$$
$$\sin\theta=\sqrt{\frac{1}{4}}=+\frac{1}{2}$$
$$\boxed{\theta=30^\circ}$$

$\tan\theta$

$\tan 30^\circ=\frac{1}{\sqrt{3}}$

Q) If $\sec^2\theta+\tan^2\theta=\frac{7}{12}$, then $\sec^4\theta-\tan^4\theta=?$

यदि $\sec^2\theta+\tan^2\theta=\frac{7}{12}$, तो $\sec^4\theta-\tan^4\theta=?$

$\sec^4\theta-\tan^4\theta$

$(\sec^2\theta+\tan^2\theta)(\sec^2\theta-\tan^2\theta)$

$\frac{7}{12}\times 1$

$\frac{7}{12}$

Q) If $\sin\theta + \cos\theta = \sqrt{2}\cos\theta$, then $\sin\theta - \cos\theta = ?$

यदि $\sin\theta + \cos\theta = \sqrt{2}\cos\theta$, तो $(\sin\theta - \cos\theta = ?$

$$(\sin\theta + \cos\theta = \sqrt{2}\cos\theta)^2$$

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

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

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

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

$$1 - (2\cos^2\theta - 1)$$

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

$$2(1 - \cos^2\theta)$$

$$2\sin^2\theta$$

$$\sin\theta - \cos\theta = \sqrt{2\sin^2\theta}$$

$$\pm\ 2\sin\theta$$

Q) $\sqrt{\dfrac{1}{\sin^4(90+A)} + \dfrac{1}{\cos^2(90+A) - 1}} = ?$

$$= \sqrt{\frac{1}{\cos^4 A} + \frac{1}{\sin^2 A - 1}}$$

$$= \sqrt{\frac{1}{\cos^4 A} + \frac{1}{-\cos^2 A}}$$

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

$$= \sqrt{\frac{1}{\cos^2 A}\left[\frac{1}{\cos^2 A} - 1\right]}$$

$$= \frac{1}{\cos A}\sqrt{\frac{\sin^2 A}{\cos^2 A}}$$

$$= \frac{1}{\cos A}\sqrt{\tan^2 A}$$

$$\sec A \times \tan A$$

Q) $a^2\sin^2 x + b^2\cos^2 x = c^2$

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

$$a^2\sin^2x + b^2(1-\sin^2x) = c^2$$

$$a^2\sin^2x + b^2 - b^2\sin^2x = c^2$$

$$\sin^2x\,(a^2-b^2) = c^2-b^2$$

$$\boxed{\sin^2x = \frac{c^2-b^2}{a^2-b^2}}$$

$$\cos^2x = 1-\sin^2x \Rightarrow 1-\frac{c^2-b^2}{a^2-b^2}$$

$$\frac{a^2-b^2-c^2+b^2}{a^2-b^2} = \frac{a^2-c^2}{a^2-b^2}$$

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

$$2\left(\frac{c^2-b^2}{a^2-b^2}\right) - \frac{a^2-c^2}{a^2-b^2}$$

$$\frac{2c^2-2b^2-a^2+c^2}{a^2-b^2}$$

$$\frac{3c^2-2b^2-a^2}{a^2-b^2}$$

1. What is the least value of $9\sin^2\theta + 16\cos^2\theta$?
$9\sin^2\theta + 16\cos^2\theta$ का न्यूनतम मान क्या है?
(a) 0
(b) 9
(c) 16
(d) 25

2. If $\operatorname{cosec}\theta - \sin\theta = m$ and $\sec\theta - \cos\theta = n$, then what is $m^{\frac{4}{3}}n^{\frac{2}{3}} + m^{\frac{2}{3}}n^{\frac{4}{3}}$ equal to?
यदि $\operatorname{cosec}\theta - \sin\theta = m$ तथा $\sec\theta - \cos\theta = n$, तो $m^{\frac{4}{3}}n^{\frac{2}{3}} + m^{\frac{2}{3}}n^{\frac{4}{3}}$ किसके बराबर है?
(a) 0
(b) 1
(c) mn
(d) m^2n^2

3. $\frac{\cos^2\theta}{1-\tan\theta} + \frac{\sin^3\theta}{\sin\theta-\cos\theta} = ?$
(a) $1 - \sin\theta\cos\theta$
(b) $1 + \sin\theta\cos\theta$
(c) $1 + \sin\theta$
(d) None of these

4. What will be the value of $(1 + \sin^4 A - \cos^4 A)\operatorname{cosec}^2 A$?
$(1 + \sin^4 A - \cos^4 A)\operatorname{cosec}^2 A$ का मान क्या होगा?
(a) -2
(o) 2
(c) -1
(d) 1

5. Find the value of $\frac{\operatorname{cosec}\theta}{\operatorname{cosec}\theta-1} + \frac{\operatorname{cosec}\theta}{\operatorname{cosec}\theta+1} - \tan^2\theta, 0^\circ < \theta < 90^\circ.$
$\frac{\operatorname{cosec}\theta}{\operatorname{cosec}\theta-1} + \frac{\operatorname{cosec}\theta}{\operatorname{cosec}\theta+1} - \tan^2\theta, 0^\circ < \theta < 90^\circ,$ का मान ज्ञात करें।
(a) $2\sec^2\theta$
(b) $\sec^2\theta + 1$
(c) $\sec^2\theta$
(d) $1 - \tan^2\theta$

6. If $x + y = 90^\circ$, then what is $\sqrt{\cos x\operatorname{cosec} y - \cos x\sin y}$ equal to?

यदि $x + y = 90°$, तो $\sqrt{\cos x \operatorname{cosec} y - \cos x \sin y}$ किसके बराबर है?

(a) $\cos x$ (b) $\sin x$

(c) $\sqrt{\cos x}$ (d) $\sqrt{\sin x}$

7. $\frac{[1-\tan(90-\theta)+\sec(90-\theta)]}{[\tan(90-\theta)+\sec(90-\theta)+1]}$ What is the value of "of"?/का मान क्या है ?

(a) $\cot\frac{\theta}{2}$ (b) $\tan\frac{\theta}{2}$

(c) $\sin\theta$ (d) $\cos\theta$

8. If $p = \cot\theta + \tan\theta$ and $q = \sec\theta - \cos\theta$, then $(p^2p)^{\frac{2}{3}}(q^2p)^{\frac{2}{3}}$ is equal to

यदि $p = \cot\theta + \tan\theta$ तथा $q = \sec\theta - \cos\theta$, तो $((p^2p)^{\frac{2}{3}}(q^2p)^{\frac{2}{3}}$ बराबर है

(a) 0 (b) 1

(c) 2 (d) 3

9. Consider the following :

निम्न पर विचार करें :

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

II. $\frac{1+\sin\theta}{1-\sin\theta} = (\tan\theta+\sec\theta)^2$

Which of the statements given above is/are correct?

उपर्युक्त में से कौन सा/से कथन सही है/हैं?

(a) Only I

(b) Only II

(c) Both I and II

(d) Neither I nor II

10. If $\tan^2\theta - 3\sec\theta + 3 = 0, 0° < \theta < 90°$, then the value of $(\sin\theta + \cot\theta)$ is:

यदि $\tan^2\theta - 3\sec\theta + 3 = 0, 0° < \theta < 90°$, है, तो $(\sin\theta + \cot\theta)$ का मान है :

(a) $\frac{5\sqrt{3}}{6}$ (b) $2\sqrt{3}$

(c) $\frac{5\sqrt{3}}{3}$ (d) $3\sqrt{3}$

ANSWER SHEET

1	2	3	4	5	6	7	8	9	10
B	B	B	B	B	B	B	B	C	A

Worksheet solution

sol 1

$$y = 9\sin^2\theta + 16\cos^2\theta$$
$$= 9(\sin^2\theta + \cos^2\theta) + 7\cos^2\theta$$
$$= 9 + 7(0) = 9$$

sol 2

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

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

$$m^{\frac{4}{3}} \cdot n^{\frac{2}{3}} + m^{\frac{2}{3}} \cdot n^{\frac{4}{3}} = (m\cdot n)^{\frac{2}{3}} \cdot \{m^{\frac{2}{3}} + n^{\frac{2}{3}}\}$$

$$= \left(\frac{\cos^2\theta}{\sin\theta} \cdot \frac{\sin^2\theta}{\cos\theta}\right)^{\frac{2}{3}} \cdot \left\{\left(\frac{\cos^2\theta}{\sin\theta}\right)^{\frac{2}{3}} + \left(\frac{\sin^2\theta}{\cos\theta}\right)^{\frac{2}{3}}\right\}$$

$$= (\sin\theta\cdot\cos\theta)^{\frac{2}{3}} \cdot \left\{\frac{(\cos^3\theta)^{\frac{2}{3}} + (\sin^3\theta)^{\frac{2}{3}}}{(\sin\theta\cdot\cos\theta)^{\frac{2}{3}}}\right\}$$

$$= (\sin\theta\cdot\cos\theta)^{\frac{2}{3}} \cdot \left\{\frac{\cos^2\theta + \sin^2\theta}{(\sin\theta\cdot\cos\theta)^{\frac{2}{3}}}\right\}$$

$$= 1$$

sol 3

$$= \frac{\cos^2\theta}{1-\tan\theta} + \frac{\sin^3\theta}{\sin\theta-\cos\theta}$$

$$= \frac{\cos^2\theta}{1-\frac{\sin\theta}{\cos\theta}} + \frac{\sin^3\theta}{\sin\theta-\cos\theta}$$

$$= \frac{\cos^3\theta}{\cos\theta-\sin\theta} + \frac{\sin^3\theta}{\cos\theta-\sin\theta}$$

$$= \frac{[\cos\theta - \sin\theta][\cos^2\theta + \sin^2\theta + \cos\theta\sin\theta]}{(\cos\theta - \sin\theta)}$$

$$= 1 + \cos\theta\sin\theta$$

sol 4

$$= \left(1 + \sin^4 A - \cos^4 A\right) \operatorname{cosec}^2 A$$

$$= \left[1 + (\sin^2 A)^2 - (\cos^2 A)^2\right] \operatorname{cosec}^2 A$$

$$= \left[1 + (\sin^2 A - \cos^2 A)(\sin^2 A + \cos^2 A)\right] \operatorname{cosec}^2 A$$

$$= \left[1 + \sin^2 A - \cos^2 A\right] \operatorname{cosec}^2 A$$

$$= 2\sin^2 A \times \operatorname{cosec}^2 A = 2$$

sol 5

$$= \frac{\operatorname{cosec}\theta}{\operatorname{cosec}\theta - 1} + \frac{\operatorname{cosec}\theta}{\operatorname{cosec}\theta + 1} - \tan^2\theta$$

$$= \frac{\operatorname{cosec}\theta\,(\operatorname{cosec}\theta + 1 + \operatorname{cosec}\theta - 1)}{(\operatorname{cosec}\theta - 1)(\operatorname{cosec}\theta + 1)} - \tan^2\theta$$

$$= \frac{\operatorname{cosec}\theta \cdot 2\operatorname{cosec}\theta}{\operatorname{cosec}^2\theta - 1} - \tan^2\theta$$

$$= \frac{2\operatorname{cosec}^2\theta}{\cot^2\theta} - \tan^2\theta$$

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

$$= 2\sec^2\theta - \tan^2\theta$$

$$= \sec^2\theta + (\sec^2\theta - \tan^2\theta)$$

$$= \sec^2\theta + 1$$

sol 6

$$= \sqrt{\cos x \operatorname{cosec} y - \cos x \sin y} \qquad (\because x+y = 90^\circ)$$

$$= \sqrt{\cos x \cdot \operatorname{cosec}(90^\circ - x) - \cos x \cdot \sin(90^\circ - x)}$$

$$= \sqrt{\cos x \cdot \sec x - \cos^2 x}$$

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

sol 7

$$= \frac{[1 - \tan(90-\theta) + \sec(90-\theta)]}{[\tan(90-\theta) + \sec(90-\theta) + 1]}$$

$$= \frac{1 - \cot\theta + \operatorname{cosec}\theta}{\cot\theta + \operatorname{cosec}\theta + 1}$$

$$= \frac{(\operatorname{cosec}^2\theta - \cot^2\theta) + (\operatorname{cosec}\theta - \cot\theta)}{\cot\theta + \operatorname{cosec}\theta + 1}$$

$$= \frac{(\operatorname{cosec}\theta - \cot\theta)(\operatorname{cosec}\theta + \cot\theta) + (\operatorname{cosec}\theta - \cot\theta)}{\cot\theta + \operatorname{cosec}\theta + 1}$$

$$= \frac{(\operatorname{cosec}\theta - \cot\theta)(\operatorname{cosec}\theta + \cot\theta + 1)}{\cot\theta + \operatorname{cosec}\theta + 1}$$

$$= \operatorname{cosec}\theta - \cot\theta$$

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

$$= \frac{\sin\frac{\theta}{2}}{\cos\frac{\theta}{2}} = \tan\frac{\theta}{2}$$

sol 8

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

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

$$= (p^2q)^{\frac{2}{3}} - (q^2p)^{\frac{2}{3}}$$

$$= \left(\frac{1}{\sin^2\theta\cdot\cos^2\theta} \times \frac{\sin^2\theta}{\cos\theta}\right)^{\frac{2}{3}} - \left(\frac{\sin^4\theta}{\cos^2\theta} \times \frac{1}{\sin\theta\cos\theta}\right)^{\frac{2}{3}}$$

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

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

sol 9

(I) R.H.S $\cos^2\theta\,(1+\tan\theta)(1-\tan\theta)$

$$= \cos^2\theta\,(1-\tan^2\theta)$$

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

$$= \frac{\cos^2\theta - \sin^2\theta}{\cos^2\theta + \sin^2\theta} = \text{L.H.S}$$

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

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

$$= (\sec\theta + \tan\theta)^2$$

option (c) Both (i) and (ii)

Sol 10

$\Rightarrow \tan^2\theta - 3\sec\theta + 3 = 0$

$\Rightarrow \sec^2\theta - 1 - 3\sec\theta + 3 = 0$

$\Rightarrow \sec^2\theta - 3\sec\theta + 2 = 0$

$\Rightarrow \sec^2\theta - 2\sec\theta - \sec\theta + 2 = 0$

$\Rightarrow \sec\theta(\sec\theta - 2) - 1(\sec\theta - 2) = 0$

$\Rightarrow (\sec\theta - 1)(\sec\theta - 2) = 0$

$\sec\theta = 2 \qquad \sec\theta \neq 1 \quad (0^\circ < \theta < 90^\circ)$

$\sec\theta = 2 \Rightarrow \sec\theta = \sec 60^\circ$

$\theta = 60^\circ$

$= (\sin\theta + \cot\theta)$

$= \sin 60^\circ + \cot 60^\circ$

$= \frac{\sqrt{3}}{2} + \frac{1}{\sqrt{3}} = \frac{3+2}{2\sqrt{3}} = \frac{5}{2\sqrt{3}}$

$= \frac{5\sqrt{3}}{2\sqrt{3} \times \sqrt{3}} = \frac{5\sqrt{3}}{6}$