CHAPTER : Angles in Quadrants (signs)
Teaching Task

1. Given $\sin\alpha + \cos ec\alpha = 2$

$\Rightarrow \sin\alpha + \dfrac{1}{\sin\alpha} = 2$

$\Rightarrow \sin^2\alpha + 1 = 2\sin\alpha$

$\Rightarrow \sin^2\alpha - 2\sin\alpha + 1 = 0$

$\Rightarrow (\sin\alpha - 1) = 0$

$\Rightarrow \sin\alpha = 1$

$\Rightarrow \alpha = \dfrac{\pi}{2}$

Now $\sin^n\alpha + \cos ec^n\alpha = \sin^n\dfrac{\pi}{2} + \cos ec^n\dfrac{\pi}{2} = (1)^n + (1)^n = 2$

Ans : C

2. $\tan(855^0) = \tan(2^2 \times 360^0 + 135^0)$
$= \tan 135^0$
$= \tan(180^0 - 45^0)$
$= -\tan 45^0$
$= -1$

Ans : B

3. given $\alpha = n\pi - \theta$
Now $\sin\alpha = \sin(n\pi - \theta)$
$= (-1)^{n+1}\sin\theta$
Ans : A

4. $\cos\left[(2n+1)\dfrac{\pi}{2} - \theta\right] = (-1)^n.\sin\theta$

Ans : B

5. $\alpha = \theta - \dfrac{13\pi}{2}$

$\cot\alpha = \cot\left(\theta - \dfrac{13\pi}{2}\right)$

$= -\cot\left(\dfrac{13\pi}{2} - \theta\right)$

$= -\tan\theta$

= since $\cot\left((2n+1)\frac{\pi}{2}-\theta\right)=\tan\theta$

Ans : C

6. Given $\sin\theta = \frac{4}{5}$, which is positive value

$\Rightarrow \theta \in Q_1 \ or \ Q_2$

But given $\theta \notin Q_1$, therefore $\theta \in Q_2$

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

Ans : C

7. Given θ is any angle

complement of θ is $\frac{\pi}{2}-\theta$

suplement of θ is $\pi-\theta$

$\therefore sum = \frac{\pi}{2}-\theta+\pi-\theta$

$= \frac{3\pi}{2}-2\theta$

Ans : D

8. $\sin\left(\frac{-11\pi}{3}\right) = -\sin\left(\frac{11\pi}{3}\right) = -\sin\left(4\pi-\frac{\pi}{3}\right)$

$\sin\frac{\pi}{3} = \frac{\sqrt{3}}{2}$

$\tan\left(\frac{35\pi}{6}\right) = \tan\left(6\pi-\frac{\pi}{6}\right) = -\tan\frac{\pi}{6} = -\frac{1}{\sqrt{3}}$

$\sec\left(-\frac{7\pi}{6}\right) = \sec\left(\frac{7\pi}{66}\right) = \sec\left(\pi+\frac{\pi}{6}\right) = -\sec\frac{\pi}{6} = -\frac{2}{\sqrt{3}}$

$\cos\left(\frac{5\pi}{4}\right) = \cos\left(\pi+\frac{\pi}{4}\right) = -\cos\frac{\pi}{4} = -\frac{1}{\sqrt{2}}$

$\cos ec\left(\frac{7\pi}{4}\right) = \cos ec\left(2\pi-\frac{\pi}{4}\right) = -\cos ec\frac{\pi}{4} = -\sqrt{2}$

$\cos\left(\frac{17\pi}{6}\right) = \cos\left(2\pi+\frac{5\pi}{6}\right) = \cos\frac{5\pi}{6} = \cos\left(\pi-\frac{\pi}{6}\right)$

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

Given problem $=\dfrac{\left(\frac{\sqrt{3}}{2}\right)\left(\frac{-1}{\sqrt{3}}\right)\left(-\frac{2}{\sqrt{3}}\right)}{\left(\frac{-1}{\sqrt{2}}\right)\left(\sqrt{2}\right)\left(\frac{-\sqrt{3}}{2}\right)}$

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

Ans : $-\frac{2}{3}$

9. Given $a\cos\theta-b\sin\theta=c$ .... (1)
let $a\sin\theta+b\cos\theta=x$ .... (2)
$(1)^2+(2)^2\Rightarrow a^2(\cos^2\theta+\sin^2\theta)+b^2(\sin^2\theta+\cos^2\theta)=c^2+x^2$
$\Rightarrow a^2+b^2=c^2+x^2$
$\Rightarrow x^2=a^2+b^2-c^2$
$\Rightarrow x=\pm\sqrt{a^2+b^2-c^2}$

ANS : D

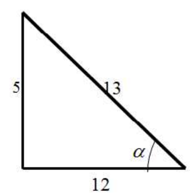
10. Given 8 tanA=-15
$\Rightarrow \tan A=-\frac{15}{8}$
25sin8=-7
$\Rightarrow \sin B=\frac{-7}{25}$
given neither A nor B is in the 4th Quadrant
therefore $A\in Q_2$ *and* $B\in Q_3$
we have $\sin A=\frac{15}{17},\cos A=-\frac{8}{17},\cos B=-\frac{24}{25}$
Now, sinA cosB+cosA.sinB
$=\frac{15}{17}.\frac{-24}{25}+\frac{-8}{17}.\frac{-7}{25}$

$$=-\frac{360}{425}+\frac{56}{425}=-\frac{304}{425}$$

Ans : C

11. given $\sin\alpha=\frac{5}{13}$ *and* $\frac{\pi}{2}<\alpha<\pi$

i.e α lies in the second quadrant



Now $=\dfrac{\sec\alpha+\tan\alpha}{\cos ec\alpha-\cot\alpha}$

$$=\frac{\left(\frac{-13}{12}\right)+\left(\frac{-5}{12}\right)}{\frac{13}{5}-\left(-\frac{12}{5}\right)} \qquad =-0.3$$

Ans : C

12. Given $\frac{D}{90}=\frac{G}{100}=\frac{2C}{\pi}$

$$\Rightarrow D=\frac{180C}{\pi},\ G=\frac{200C}{\pi}$$

Now G - D = $\frac{200C}{\pi}-\frac{180C}{\pi}=\frac{20C}{\pi}$

Ans : A

13. We have $\sin(90^0+\theta)=\cos\theta$

$\sin(90^0-\theta)=\cos\theta$

Ans : A,D

14. given $\sin^2\theta+\cos^2\theta=1$

Option A : $\frac{\sin\theta}{1-\cos\theta}\times\frac{1+\cos\theta}{1+\cos\theta}=\frac{\sin\theta(1+\cos\theta)}{1-\cos^2\theta}$

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

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

Option B : $\frac{\cos\theta}{1+\sin\theta}\times\frac{1-\sin\theta}{1-\sin\theta}=\frac{\cos\theta(1-\sin\theta)}{1-\sin^2\theta}$

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

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

Ans : A, B

15. Statement - I : l=rθ, is correct
State,emt - II : given l=15cm, θ=30^0

Now $r=\frac{l}{\theta}$

$$\Rightarrow r=\frac{15}{\left(\frac{\pi}{6}\right)}=\frac{15\times6}{\pi}=\frac{15\times6\times7}{22}$$

$$=\frac{315}{11}=28\frac{7}{11}$$

Ans : A

16. Statement -I $\frac{D}{90}=\frac{G}{100}=\frac{2C}{\pi}$, which is true
Statement - II given D=45^0
G=50

$$\therefore\frac{45}{90}=\frac{2C}{\pi}$$

$$\Rightarrow C=\frac{\pi}{4}=\frac{11}{4}$$

Ans : C

17. Statement I : Given A+B=90^0
$\Rightarrow$cot(A +B)=cot90^0

$$\Rightarrow\frac{\cot A\cot B-1}{\cot A+\cot B}=0$$

$\Rightarrow$cotA. cotB=1

statement II : $\cot\frac{\pi}{20}.\cot\frac{5\pi}{20}.\cot\frac{7\pi}{20}.\cot\frac{9\pi}{20}$

$$=\cot\frac{\pi}{20}.\cot\frac{5\pi}{20}.\cot\left(\frac{\pi}{2}-\frac{3\pi}{20}\right).\cot\left(\frac{\pi}{2}-\frac{\pi}{20}\right)$$

$$=\cot\frac{\pi}{20}.\cot\frac{5\pi}{20}.\tan\frac{3\pi}{20}.\tan\frac{\pi}{20}$$

$$=\left(\cot\frac{\pi}{20}.\tan\frac{\pi}{20}\right).\cot\frac{\pi}{4}.\tan\frac{3\pi}{20}$$

$$=1\times1\times\tan\frac{3\pi}{20}=\tan\frac{3\pi}{20}$$

Ans : B

18. given x+y=25

we have $5^2+x^2 = y^2$

$\Rightarrow 25+x^2 = (25-x)^2$

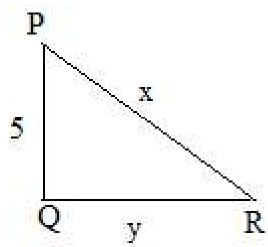
$\Rightarrow$ $25+x^2=625-50x+x^2$

$\Rightarrow 50x=600$

$\Rightarrow x=12$, y = 13

$\therefore$ PQ=5, QR = 12, pR = 13

QR= 12cm



Ans : B

19. $$\sin P=\frac{QR}{PR}=\frac{12}{13}$$

Ans ; B

20. $$\cos R=\frac{QR}{PR}=\frac{12}{13}$$

Ans : D

21. We have A+B+C= π

$\Rightarrow$ A+B= π -C

$\Rightarrow$ tan(A+B)=tan(π -c)

$$\frac{\tan A+\tan B}{1-\tan A.\tan B}=-\tan C$$

$\Rightarrow$ tanA+tanB = -tanC+tanA.tanB.tanC

$\Rightarrow$ tanA+tanB+tanC=tanA.tanB.tanC

$\Rightarrow$ tanA+tanB+tanC - tanA.tanB.tanC=0

22. a) $$\frac{\tan(180^0+A).\tan(270^0+A).\sin(360^0-A)}{\cos(180^0-A).\cot(90^0+A).\cos(-A)}$$

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

$$=\frac{1}{\cos A}$$

b) $$\frac{\sin(-A).\cos(180^0-A)}{\sin A}$$

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

c) $\sin^2(180^0-A)+\cos^2(180^0-A)$

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

$=1$

d) $$\frac{\sin\left(\frac{-11\pi}{3}\right).\sec\left(\frac{-7\pi}{3}\right)}{\cot\left(\frac{5\pi}{4}\right).\operatorname{cosec}\left(\frac{7\pi}{4}\right)}$$

$$=\frac{-\sin\left(\frac{11\pi}{3}\right).\sec\left(\frac{7\pi}{3}\right)}{\cot\left(\frac{5\pi}{4}\right).\operatorname{cosec}\left(\frac{7\pi}{4}\right)}$$

$$=\frac{-\sin\left(4\pi-\frac{\pi}{3}\right).\sec\left(2\pi+\frac{\pi}{3}\right)}{\cot\left(\pi+\frac{\pi}{4}\right).\operatorname{cosec}\left(2\pi-\frac{\pi}{4}\right)}$$

$$=\frac{\sin\frac{\pi}{3}.\sec\frac{\pi}{3}}{\cot\frac{\pi}{4}.-\operatorname{cosec}\frac{\pi}{4}}$$

$$=\frac{\left(\frac{\sqrt{3}}{2}\right).2}{1.-\sqrt{2}}=-\sqrt{\frac{3}{2}}$$

Ans : a-s, b-t, c-q,d-r

Learners Task

1. $135 = 135 \times 1^0$

$$=135\times\frac{\pi}{180}=\frac{3\pi}{4}\text{ radians}$$

Ans : C

2. 1 grades = 100 minutes

Ans : B

3. Given cos7A =sin(A-6)

$\Rightarrow$ 7A+A-6^0 = 90^0

$\Rightarrow$ 8A=96^0

$\Rightarrow$ A=12^0

Ans : A

4. cot(360^0-θ)=-cotθ

Ans : B

5. we have $\sec^2\theta$-$\tan^2\theta$=1

$\Rightarrow$ (secθ+tanθ)(secθ-tanθ)-1

$$\Rightarrow \sec\theta+\tan\theta=\frac{1}{\sec\theta-\tan\theta}$$

Ans : B

6. $\cot^2\theta-\cos ec^2\theta=-(\cos ec^2\theta-\cot^2\theta)$

= -1

Ans : D

7. Given cosecθ+cotθ=k

$$\Rightarrow \cos ec\theta-\cot\theta=\frac{1}{k}$$

$$\Rightarrow \cot\theta-\cos ec=\frac{-1}{k}$$

Ans : B

8. We know $\cos ec^2\theta-\cot^2\theta=1$

$$\Rightarrow \cos ec^2\theta=1+\cot^2\theta$$

$$\Rightarrow \cos ec\theta=\pm\sqrt{1+\cot^2\theta}$$

Ans : C

9. sinθ.cotθ+cosθ.tanθ

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

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

Ans : A

10. $\sin 30^0.\cos 60^0+\cos 30^0.\sin 60^0$

$=\sin(30^0+60^0)$

$=\sin 90^0$

$=1$

Ans :B

JEE MAINS

1. Given $\cot\theta=\frac{7}{8}$

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

$=\cot^2\theta$

$=\left(\frac{7}{8}\right)^2$

$=\frac{49}{64}$

Ans : A

2. Given $\cos ecA=\sqrt{10}$

we have $\cot^2A=\text{cosec}^2A-1$

$= 10-1$

$= 9$

$\therefore$ cotA=3

And : D

3. given $\sec\theta-\tan\theta=3$ ....(1)

$\Rightarrow \sec\theta-\tan\theta=\frac{1}{3}$ ....(2)

(1)+(2) $\Rightarrow 2\sec\theta=\frac{10}{3}\Rightarrow \sec\theta=\frac{5}{3}$

(1)-(2) $\Rightarrow -2\tan\theta=\frac{8}{3}\Rightarrow \tan\theta=-\frac{4}{3}$

$\sec\theta$ is +ve and $\tan\theta$ is -ve

$\therefore\theta$ belongs to 4^{th} quadrant

And : D

4. Given 'θ' is not in the 4^{th} quadrant

$\therefore \tan\theta=\frac{-4}{3}$ $\therefore \theta\in Q_2$

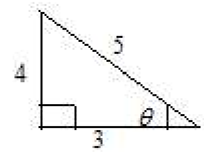
Now, $5\sin\theta+10\cos\theta+9\sec\theta$

$$= 5\left(\frac{4}{5}\right) + 10\left(\frac{-3}{5}\right) + 9\left(\frac{-5}{3}\right)$$

= 4 - 6 -15

= -17

Ans : C



5. $$\sec\left(\frac{13\pi}{3}\right)$$

$$= \sec\left(4\pi + \frac{\pi}{3}\right)$$

$$= \sec\frac{\pi}{3}$$

= 2

Ans : A

6. $$\cot\frac{\pi}{16}.\cot\frac{2\pi}{16}.\cot\frac{3\pi}{16}.\cot\frac{4\pi}{16}.\cot\frac{5\pi}{16}.\cot\frac{6\pi}{16}.\cot\frac{7\pi}{16}$$

Now, $\cot\frac{5\pi}{16} = \cot\left(\frac{\pi}{2} - \frac{3\pi}{16}\right) = \tan\frac{3\pi}{16}$

$$= \cot\frac{6\pi}{16} = \cot\left(\frac{\pi}{2} - \frac{2\pi}{16}\right) = \tan\frac{2\pi}{16}$$

$$= \cot\frac{7\pi}{16} = \cot\left(\frac{\pi}{2} - \frac{\pi}{16}\right) = \tan\frac{\pi}{16}$$

clearly $\cot\frac{4\pi}{16} = \cot\frac{\pi}{4} = 1$

$$\therefore \cot\frac{\pi}{16}.\cot\frac{2\pi}{16}.\cot\frac{3\pi}{16}.1\tan\frac{2\pi}{16}.\tan\frac{\pi}{16}$$

$$= \left(\cot\frac{\pi}{16}.\tan\frac{\pi}{16}\right)\left(\cot\frac{2\pi}{16}.\tan\frac{2\pi}{16}\right)\left(\cot\frac{3\pi}{16}.\tan\frac{3\pi}{16}\right)$$

= 1 x 1 x 1= 1

7. $$\frac{\cos(\pi - A).\cot\left(\frac{\pi}{2} + A\right).\cos(-A)}{\tan(\pi + A).\tan\left(\frac{3\pi}{2} + A\right).\sin(2\pi - A)}$$

$= \frac{-\cos A. - \tan A.\cos A}{\tan A. - \cot A. - \sin A}$ = cosA   Ans : C

8. given cosA=cosB= $\frac{-1}{2}$

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

$\Rightarrow A \in Q_2 \ \ or \ \ Q_3$

given $A \notin Q_2$

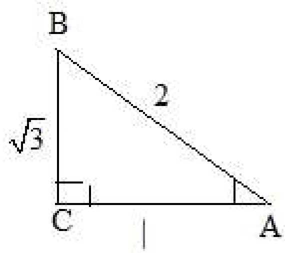
$\therefore A \in Q_3$

now cosB=-$\frac{1}{2}$

$\Rightarrow B \in Q_2 \ or \ Q_3$

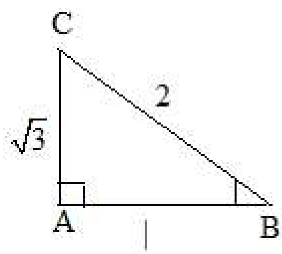
given $B \notin Q_3$

$\therefore B \in Q_2$



Now $\cos A = \frac{-1}{2}$

$\sin A = \frac{-\sqrt{3}}{2}$



also $\cos B = \frac{-1}{2}$

$\sin B = \frac{\sqrt{3}}{2}$

$\tan B = -\sqrt{3}$

now $\frac{4\sin B - 3\tan A}{\tan B + \sin A} = \frac{4\left(\frac{\sqrt{3}}{2}\right) - 3(\sqrt{3})}{\left(-\sqrt{3})\right) + \left(\frac{-\sqrt{3}}{2}\right)}$

$= \frac{-\sqrt{3}}{-\left(\frac{3\sqrt{3}}{2}\right)} = \frac{2}{3}$

Ans : B

9. given $3\sin\theta + 4\cos\theta = 5$ ....(1)

Let $4\sin\theta - 3\cos\theta = x$ ....(2)

$(1)^2+(2)^2 \Rightarrow 9(\sin^2\theta + \cos^2\theta) + 16(\sin^2\theta + \cos^2\theta) = 25 + x^2$

$\Rightarrow 9+16=25+x^2$

$\Rightarrow x=0$

Ans : C

10. given $\dfrac{\cos A}{\cos B}=n \quad and \dfrac{\sin A}{\sin B}-m$

$\Rightarrow \cos A = n\cos B \qquad$ and $\qquad \sin A = m \sin B$

$\Rightarrow \cos^2 n^2 \cos^2 B \qquad$ and $\qquad \sin^2 A = m^2 \sin^2 B$

$\Rightarrow \cos^2 A + \sin^2 B = n^2 \cos^2 B + m^2 \sin^2 B$

$\Rightarrow 1 = n^2(1-\sin^2 B) + m^2 \sin^2 B$

$\Rightarrow 1 = n^2 - n^2 \sin^2 B + m^2 \sin^2 B$

$\Rightarrow 1 = n^2 + (m^2 - n^2) \sin^2 B$

$\Rightarrow (m^2 - n^2) \sin^2 B = 1 - n^2$

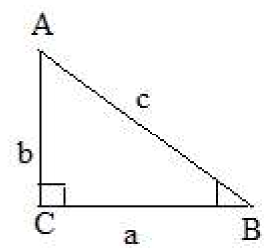
Ans : A

11. $\tan A + \tan B$

$= \dfrac{a}{b} + \dfrac{b}{a}$

$= \dfrac{a^2+b^2}{ab}$

$= \dfrac{c^2}{ab}$



Ans ; B

12. given 1 minute $\rightarrow$ 360 revolutians

we have 1 revolutions $\rightarrow 2\pi$ readians

360 revolutions $\rightarrow 720\pi$ radians

$\therefore$ 1 minutes $\rightarrow 720\pi$

60 seconds $\rightarrow 720\pi$

$1 \sec ond \rightarrow \dfrac{720\pi}{60}$ radians

1 second $\rightarrow 12\pi$

Ans : D

13. Given $\dfrac{2\sin\theta}{1+\cos\theta+\sin\theta}=x$

$$\Rightarrow \frac{2\sin\theta}{(1+\sin\theta)+\cos\theta} \times \frac{(1+\sin\theta)-\cos\theta}{(1+\sin\theta)-\cos\theta} = x$$

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

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

$$\Rightarrow \frac{1+\sin\theta-\cos\theta}{1+\sin\theta}=x$$

Ans : A

14. $\cos^4\alpha+2\cos^2\alpha(\sec^2\alpha-1)$

$=\cos^4\alpha+2\cos^2\alpha.\tan^2\alpha$

$=\cos^4\alpha+2\cos^2\alpha$

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

$=1+\sin^4\alpha-2\sin^2\alpha+2\sin^2\alpha$

$=1+\sin^4\alpha$

Ans : A

15. Given tan20^0 = λ

tan160^0 =tan(180^0-20^0) =-tan20^0 =-$\lambda\tau$

tan11^0 =tan(90^0+20^0) =-cot20^0 $=-\frac{1}{\lambda}$

Now, $\frac{\tan 160^0-\tan 110^0}{1+\tan 160^0.\tan 110^0}=\frac{(-\lambda)-\left(-\frac{1}{\lambda}\right)}{1+(-\lambda)\left(-\frac{1}{\lambda}\right)}$

$=\frac{1-\lambda^2}{2\lambda}$

Ans : C

16. given cosθ>0

given m =tanθ+sinθ

n = tanθ-sinθ

now, m+n=2tanθ, m-n = 2sinθ

now m^2 - n^2 = (m+n)(m-n)

=4 tanθ.sinθ ...(1)

Option C $4\sqrt{mn}=4\sqrt{\tan^2\theta-\sin^2\theta}$

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

$= 4\sqrt{\frac{\sin^2\theta(1-\cos^2\theta)}{\cos^2\theta}}$

$= 4\sqrt{\tan^2\theta.\sin^2\theta}$

$= 4\sqrt{mn}$ ......(2)

from (1) and (2)

$m^2 - n^2 = 4\sqrt{mn}$

Ans : C

ADVANCED LEVEL QUESTION

17. Given $1+\tan^2\theta = \sec^2\theta$

Option A : $\sec\theta = \pm\sqrt{1+\tan^2\theta}$, true

Option B : $1+\tan^2\theta = \sec^2\theta$

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

$\Rightarrow \tan\theta = \pm\sqrt{\sec^2\theta - 1}$, true

Option C : $1+\tan^2\theta = \sec^2\theta$

$\Rightarrow \tan^2\theta - \sec^2\theta = -1$, true

Option D: $1+\tan^2\theta = \sec^2\theta$

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

$\Rightarrow (\sec\theta + \tan\theta)(\sec\theta - \tan\theta) = 1$

$\Rightarrow \sec\theta + \tan\theta = \frac{1}{\sec\theta - \tan\theta}$, true

Ans : A,B,C,D

18. Given $\alpha = n\pi + \theta$

$\Rightarrow \cos\theta = (-1)^n.\cos\theta$

Now, $\cos(3\pi+\theta) = (-1)^3.\cos\theta$

$-\cos\theta$

Ans : B

$\alpha = n\pi - \theta$

$\tan\alpha = -\tan\theta$

19. $\tan(11\pi - \theta) = -\tan\theta$

Ans : C

20. $\cos(4\pi+\theta).\tan(4\pi-\theta)$

$(-1)^4.\cos\theta - \tan\theta = -\cos\theta.\tan\theta$

$= -\sin\theta$

Ans : A

21. $\sec\theta(1-\sin\theta)(\sec\theta+\tan\theta)$

$=\left(\sec\theta-\sec\theta.\sin\theta\right)(\sec\theta+\tan\theta)$

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

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

$=1$

Ans : 1

22. given 4 cot A=3

$\Rightarrow \cot A=\frac{3}{4}$

Now, $\frac{\sin A+\cos A}{\sin A-\cos A}$

$=\frac{1+\cot A}{1-\cot A}$

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

$=7$

Ans : 7

23. a) We know $\sin^2\theta+\cos^2\theta=1$

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

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

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

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

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

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

$\Rightarrow \tan\theta=\sqrt{\sec^2\theta-1}$

d) $\cos ec\theta=\frac{1}{\sin\theta}$

$=\frac{\sec\theta}{\sqrt{\sec^2\theta-1}}$

a-t, b-s, c-p, d-r

Additional Practice Question for students

1. Given secA+tanA=3 ....(1)

$\Rightarrow \sec A - \tan A = \frac{1}{3}$ ....(2)

(1) +(2) $\Rightarrow 2\sec A = \frac{10}{3}$

$\Rightarrow \sec A = \frac{5}{3}$

Ans : B

2. Given $\tan^2\theta = 1 - e^2$

$\Rightarrow \sec^2\theta - 1 = 1 - e^2$

$\Rightarrow \sec^2\theta = 2 - e^2$

Now $\sec\theta + \tan^3\theta.\operatorname{cosec}\theta$

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

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

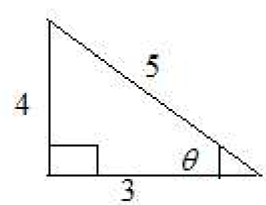
$= \frac{\cos^2\theta + \sin^2\theta}{\cos^3\theta} = \frac{1}{\cos^3\theta}$

$= \sec^3\theta$

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

ANS : D

3. Given $\tan\theta = -\frac{4}{3}$



$\Rightarrow \theta \in Q_2 \ (or) Q_4$

$If \ \ \theta \in \theta_2 \ then \ \sin\theta = \frac{4}{5}$

$If \ \ \theta \in \theta_4 \ then \ \sin\theta = -\frac{4}{5}$

Ans : B

4. $4(\sin^4 30^0+\cos^4 60^0)$ **-**$3(\cos^2 45^0-\sin^2 90^0)$

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

$= 4\left(\frac{1}{16}+\frac{1}{16}\right)-3\left(\frac{1}{2}-1\right)$

$= 4\left(\frac{1}{8}\right)+\frac{3}{2}$

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

$= 2$

Ans : 2

THE END