SpeedLabs

MATHS

CBSE 11th

TEEVRA EDUTECH PVT. LTD.

1. $\sin^2\frac{\pi}{6}+\cos^2\frac{\pi}{3}-\tan^2\frac{\pi}{4}=-\frac{1}{2}$

Ans. $\sin^2\frac{\pi}{6}+\cos^2\frac{\pi}{3}-\tan^2\frac{\pi}{4}$

$\text{L.H.S.}=\sin^2\frac{\pi}{6}+\cos^2\frac{\pi}{3}-\tan^2\frac{\pi}{4}$

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

$=\frac{1}{4}+\frac{1}{4}-1=-\frac{1}{2}$

R.H.S

2. Prove that $2\sin^2\frac{\pi}{6}+\operatorname{cosec}^2\frac{7\pi}{6}\cos^2\frac{\pi}{3}=\frac{3}{2}$

Ans. $\text{L.H.S}=2\sin^2\frac{\pi}{6}+\operatorname{cosec}^2\frac{7\pi}{6}\cos^2\frac{\pi}{3}$

$=2\left(\frac{1}{2}\right)^2+\operatorname{cosec}^2\left(\pi+\frac{\pi}{6}\right)\left(\frac{1}{2}\right)^2$

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

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

$=\text{R.H.S}$

3. Prove that $\cot^2\frac{\pi}{6}+\operatorname{cosec}\frac{5\pi}{6}3\tan^2\frac{\pi}{6}=6$

Ans. $\text{L.H.S}=\cot^2\frac{\pi}{6}+\operatorname{cosec}\frac{5\pi}{6}3\tan^2\frac{\pi}{6}$

$=\left(\sqrt{3}\right)^2+\operatorname{cosec}^2\left(\pi-\frac{\pi}{6}\right)+3\left(\frac{1}{\sqrt{3}}\right)^2$

$=3+\operatorname{cosec}\frac{\pi}{6}+3\times\frac{1}{3}$

$=3+2+1=6$

$=\text{R.H.S}$

4. Prove that $2\sin^2\frac{3\pi}{4}+2\cos^2\frac{\pi}{3}+2\sec^2\frac{\pi}{3}=10$

Ans. $\text{L.H.S}=2\sin^2\frac{3\pi}{4}+2\cos^2\frac{\pi}{3}+2\sec^2\frac{\pi}{3}$

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

$$=2\left\{\sin\frac{\pi}{4}\right\}^2+2\times\frac{1}{2}+8$$

$$=2\left(\frac{1}{\sqrt{2}}\right)^2+1+8$$

$$=1+1+8$$

$$=10$$

$$=\text{R.H.S}$$

$$=$$

5. Find the value of: (i) sin 75° (ii) tan 15°

Ans. (i) sin 75° = sin (45° + 30°)

= sin 45° cos 30° + cos 45° sin 30°

[sin (x + y) = sin x cos y + cos x sin y]

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

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

(ii) tan 15° = tan (45° – 30°)

$$=\frac{\tan 45^\circ-\tan 30^\circ}{1+\tan 45^\circ\tan 30^\circ} \qquad \left[\tan(x-y)=\frac{\tan x-\tan y}{1+\tan x\tan y}\right]$$

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

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

$$= \frac{4-2\sqrt{3}}{3-1} = 2-\sqrt{3}$$

6. Prove that: $\cos\left(\frac{\pi}{4}-x\right)\cos\left(\frac{\pi}{4}-y\right)-\sin\left(\frac{\pi}{4}-x\right)\sin\left(\frac{\pi}{4}-y\right)=\sin(x+y)$

Ans. $\cos\left(\frac{\pi}{4}-x\right)\cos\left(\frac{\pi}{4}-y\right)-\sin\left(\frac{\pi}{4}-x\right)\sin\left(\frac{\pi}{4}-y\right)$

$$\frac{1}{2}\left[2\cos\left(\frac{\pi}{4}-x\right)\cos\left(\frac{\pi}{4}-y\right)\right]+\frac{1}{2}\left[-2\sin\left(\frac{\pi}{4}-x\right)\sin\left(\frac{\pi}{4}-y\right)\right]$$

$$=\frac{1}{2}\left[\cos\left\{\left(\frac{\pi}{4}-x\right)+\left(\frac{\pi}{4}-x\right)\right\}+\cos\left\{\left(\frac{\pi}{4}-x\right)-\left(\frac{\pi}{4}-y\right)\right\}\right]$$

$$+\frac{1}{2}\left[\cos\left\{\left(\frac{\pi}{4}-x\right)+\left(\frac{\pi}{4}-y\right)\right\}-\cos\left\{\left(\frac{\pi}{4}-x\right)-\left(\frac{\pi}{4}-y\right)\right\}\right]$$

$$\left[\begin{array}{l}\therefore 2\cos A\cos B=\cos(A+B)+\cos(A-B)\\ -2\sin A\sin B=\cos(A+B)-\cos(A-B)\end{array}\right]$$

$$=\cos\left[\frac{\pi}{2}-(x+y)\right]$$

$$=\sin(x+y)$$

$$=\text{R.H.S}$$

7. Prove that: $\frac{\tan\left(\frac{\pi}{4}+x\right)}{\tan\left(\frac{\pi}{4}-x\right)}=\left(\frac{1+\tan x}{1-\tan x}\right)^2$

Ans. It is known that

$$\tan(A+B)=\frac{\tan A+\tan B}{1-\tan A\tan B} \text{ and } \tan(A-B)=\frac{\tan A-\tan B}{1+\tan A\tan B}$$

$$\frac{\tan\left(\frac{\pi}{4}+x\right)}{\tan\left(\frac{\pi}{4}-x\right)}=\frac{\left[\dfrac{\tan\frac{\pi}{4}+\tan x}{1-\tan\frac{\pi}{4}\tan x}\right]}{\left[\dfrac{\tan\frac{\pi}{4}-\tan x}{1+\tan\frac{\pi}{4}\tan x}\right]}=\left(\frac{\dfrac{1+\tan x}{1-\tan x}}{\dfrac{1-\tan x}{1+\tan x}}\right)=\left(\frac{1+\tan x}{1-\tan x}\right)^2=\text{R.H.S}$$

8. $$\frac{\cos(\pi+x)\cos(-x)}{\sin(\pi-x)\cos\left(\frac{\pi}{2}+x\right)}=\cot^2$$

Ans. $$\text{L.H.S.}=\frac{\cos(\pi+x)\cos(-x)}{\sin(\pi-x)\cos\left(\frac{\pi}{2}+x\right)}$$

$$=\frac{[-\cos x][\cos x]}{(\sin x)(-\sin x)}$$

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

$$=\cot^2 x$$

$$=\text{R.H.S}$$

9. $$\cos\left(\frac{3\pi}{2}+x\right)\cos(2x+x)\left[\cot\left(\frac{3\pi}{2}-x\right)+\cot(2x+x)\right]=1$$

Ans. It is known that

$$\text{L.H.S}=\cos\left(\frac{3\pi}{2}+x\right)\cos(2x+x)\left[\cot\left(\frac{3\pi}{2}-x\right)+\cot(2\pi+x)\right]$$

$$=\sin x\cos x\left[\frac{\sin x}{\cos x}+\frac{\cos x}{\sin x}\right]$$

$$=(\sin x\cos x)\left[\frac{\sin^2 x+\cos^2 x}{\sin x\cos x}\right]$$

$$=1=\text{R.H.S.}$$

10. Prove that sin (n + 1) x sin (n + 2) x + cos (n + 1) x cos (n + 2) x = cos x.

Ans. L.H.S. = sin (n + 1) x sin (n + 2) x + cos (n + 1) x cos (n + 2)x

$$=\frac{1}{2}\left[2\sin(n+1)x\sin(n+2)x+2\cos(n+1)x\cos(n+2)x\right]$$

$$=\frac{1}{2}\begin{bmatrix}\cos\{(n+1)x-(n+2)x\}-\cos\{(n+1)x+(n+2)x\}\\+\cos\{(n+1)x+(n+2)x\}+\cos\{(n+1)x-(n+2)x\}\end{bmatrix}$$

$$\begin{bmatrix}\therefore -2\sin A\sin B=\cos(A+B)-\cos(A-B)\\2\cos A\cos B=\cos(A+B)+\cos(A-B)\end{bmatrix}$$

$$=\frac{1}{2}\times 2\cos\{(n+1)x-(n+2)x\}$$

$$=\cos(-x)=\cos x=\text{R.H.S}$$

11. Prove that $\cos\left(\frac{3\pi}{4}+x\right)-\cos\left(\frac{3\pi}{4}-x\right)=-\sqrt{2}\sin x$

Ans. It is known that

$$\cos A-\cos B=-2\sin\left(\frac{A+B}{2}\right).\sin\left(\frac{A-B}{2}\right)$$

$$\therefore \text{L.H.S.}=\cos\left(\frac{3\pi}{4}+x\right)-\cos\left(\frac{3\pi}{4}-x\right)$$

$$=-2\sin\left\{\frac{\left(\frac{3\pi}{4}+x\right)+\left(\frac{3\pi}{4}-x\right)}{2}\right\}.\sin\left\{\frac{\left(\frac{3\pi}{4}+x\right)-\left(\frac{3\pi}{4}-x\right)}{2}\right\}$$

$$=-2\sin\left(\frac{3\pi}{4}\right)\sin x$$

$$=-2\sin\left(\pi\frac{\pi}{4}\right)\sin x$$

$$-2\sin\frac{\pi}{4}\sin x$$

$$=-2\frac{1}{\sqrt{2}}\times\sin x$$

$$=-\sqrt{2}\sin x$$

$$=\text{R.H.S}$$

11. Prove that sin2 6x – sin2 4x = sin 2x sin 10x

Ans. It is known that

$$\sin A+\sin B=2\sin\left(\frac{A+b}{2}\right)\cos\left(\frac{A-B}{2}\right),\sin A-\sin B=2\cos\left(\frac{A+B}{2}\right)\sin\left(\frac{A-B}{2}\right)$$

∴L.H.S. = sin26x – sin24x

= (sin 6x + sin 4x) (sin 6x – sin 4x)

$$=\left[2\sin\left(\frac{6x+4x}{2}\right)\cos\left(\frac{6x-4x}{2}\right)\right]2\cos\left[\left(\frac{6x+4x}{2}\right).\sin\left(\frac{6x-4x}{2}\right)\right]$$

= (2 sin 5x cos x) (2 cos 5x sin x)

= (2 sin 5x cos 5x) (2 sin x cos x)

= sin 10x sin 2x

= R.H.S.

13. Prove that cos2 2x – cos² 6x = sin 4x sin 8x

Ans. It is known that

$$\cos A+\cos B=2\cos\left(\frac{A+B}{2}\cos\left(\frac{A-B}{2}\right),\cos A-\cos B=-2\sin\left(\frac{A+B}{2}\right)\sin\left(\frac{A-B}{2}\right)\right)$$

∴L.H.S. = cos2 2x – cos2 6x

= (cos 2x + cos 6x) (cos 2x – 6x)

$$=\left[2\cos\left(\frac{2x+6x}{2}\right)\cos\left(\frac{2x-6x}{2}\right)\right]\left[-2\sin\left(\frac{2x+6x}{2}\right)\sin\left(\frac{2x-6x}{2}\right)\right]$$

$$=\left[2\cos 4x\cos(-2x)\right]\left[-2\sin 4x\sin(-2x)\right]$$

= [2 cos 4x cos 2x] [–2 sin 4x (–sin 2x)]

= (2 sin 4x cos 4x) (2 sin 2x cos 2x)

= sin 8x sin 4x

= R.H.S.

14. Prove that sin 2x + 2sin 4x + sin 6x = 4cos2 x sin 4x.

Ans. L.H.S. = sin 2*x* + 2 sin 4*x* + sin 6*x*

= [sin 2*x* + sin 6*x*] + 2 sin 4*x*

$$=\left[2\sin\left(\frac{2x+6x}{2}\right)\left(\frac{2x-6x}{2}\right)\right]+2\sin 4x$$

$$\left[\therefore \sin A+\sin B=2\sin\left(\frac{A+B}{2}\right)\cos\left(\frac{A-B}{2}\right)\right]$$

= 2 sin 4x cos (– 2x) + 2 sin 4x

= 2 sin 4x cos 2x + 2 sin 4x

= 2 sin 4x (cos 2x + 1)

= 2 sin 4x (2 cos2 x – 1 + 1)

= 2 sin 4x (2 cos2 x)

= 4cos² x sin 4x = R.H.S.

15. Prove that cot 4x (sin 5x + sin 3x) = cot x (sin 5x – sin 3x)

Ans. L.H.S = cot 4x (sin 5x + sin 3x)

$$=\frac{\cot 4x}{\sin 4x}\left[2\sin\left(\frac{5x+3x}{2}\right)\cos\left(\frac{5x-3x}{2}\right)\right]$$

$$\left[\therefore \sin A+\sin B=2\sin\left(\frac{A+B}{2}\right)\cos\left(\frac{A-B}{2}\right)\right]$$

= 2 cos 4x cos x

R.H.S. = cot x (sin 5x – sin 3x)

$$= \frac{\cot x}{\sin x}\left[2\cos\left(\frac{5x+3x}{2}\right)\sin\left(\frac{5x-3x}{2}\right)\right]$$

$$\left[\therefore \sin A + \sin B = 2\cos\left(\frac{A+B}{2}\right)\cos\left(\frac{A-B}{2}\right)\right]$$

$$\frac{\cos x}{\sin x}\left[2\cos 4x \sin x\right]$$

= 2 cos 4x. cos x

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

16. Prove that $\frac{\cos 9x - \cos 5x}{\sin 17x - \sin 3x} = -\frac{\sin 2x}{\cos 10x}$

Ans. It is known that

$$\cos A - \cos B = -2\sin\left(\frac{A+B}{2}\right)\sin\left(\frac{A-B}{2}\right), \sin A - \sin B = 2\cos\left(\frac{A+B}{2}\right)\sin\left(\frac{A-B}{2}\right)$$

$$\therefore \text{L.H.S.} = \frac{\cos 9x - \cos 5x}{\sin 17x - \sin 3x}$$

$$= \frac{-2\sin\left(\frac{9x+5x}{2}\right).\sin\left(\frac{9x-5x}{2}\right)}{2\cos\left(\frac{17x+3x}{2}\right).\sin\left(\frac{17x-3x}{2}\right)}$$

$$= \frac{-2\sin 7x.\sin 2x}{2\cos 10x.\sin 7x}$$

$$= -\frac{\sin 2x}{\cos 10x}$$

$$= \text{R.H.S}$$

17. Prove that $\frac{\sin 5x + \sin 3x}{\cos 5x + \cos 3x} = \tan 4x$

Ans. It is known that

$$\sin A + \sin B = 2\sin\left(\frac{A+B}{2}\right)\cos\left(\frac{A-B}{2}\right), \cos A + \cos B = 2\cos\left(\frac{A+B}{2}\right)\cos\left(\frac{A-B}{2}\right)$$

$$\therefore \text{L.H.S.} = \frac{\sin 5x + \sin 3x}{\cos 5x + \cos 3x}$$

$$= \frac{2\sin\left(\frac{5x+3x}{2}\right).\cos\left(\frac{5x-3x}{2}\right)}{2\cos\left(\frac{5x+3x}{2}\right).\cos\left(\frac{5x-3x}{2}\right)}$$

$$= \frac{2\sin 4x.\cos x}{2\cos 4x.\cos x}$$

$$= \frac{\sin 4x}{\cos 4x}$$
$$= \tan 4x = R.H.S$$

18. Prove that $\frac{\sin x - \sin y}{\cos x + \cos y} = \tan \frac{x-y}{2}$

Ans. It is known that

$$\sin A - \sin B = 2\cos\left(\frac{A+B}{2}\right)\sin\left(\frac{A-B}{2}\right), \cos A + \cos B = 2\cos\left(\frac{A+B}{2}\right)\cos\left(\frac{A-B}{2}\right)$$

$$\therefore L.H.S. = \frac{\sin x - \sin y}{\cos x + \cos y}$$
$$= 2\cos\frac{\left(\frac{x+y}{2}\right).\sin\left(\frac{x-y}{2}\right)}{2\cos\left(\frac{x+y}{2}\right).\cos\left(\frac{x-y}{2}\right)}$$
$$= \frac{\sin\left(\frac{x-y}{2}\right)}{\cos\left(\frac{x-y}{2}\right)}$$
$$= \tan\left(\frac{x-y}{2}\right) = R.H.S.$$

19. Prove that $\frac{\sin x + \sin 3x}{\cos x + \cos 3x} = \tan 2x$

Ans. It is known that

$$\sin A + \sin B = 2\sin\left(\frac{A+B}{2}\right)\cos\left(\frac{A-B}{2}\right), \cos A + \cos B = 2\cos\left(\frac{A+B}{2}\right)\cos\left(\frac{A-B}{2}\right)$$

$$\therefore L.H.S. = \frac{\sin x + \sin 3x}{\cos x + \cos 3x}$$
$$= \frac{2\sin\left(\frac{x+3x}{2}\right)\cos\left(\frac{x-3x}{2}\right)}{2\cos\left(\frac{x+3x}{2}\right)\cos\left(\frac{x-3x}{2}\right)}$$
$$= \frac{\sin 2x}{\cos 2x}$$
$$= \tan 2x$$
$$= R.H.S$$

20. Prove that $\frac{\sin x-\sin 3x}{\sin^2 x-\cos^2 x}=2\sin x$

Ans. It is known that

$$\sin A-\sin B=2\cos\left(\frac{A+B}{2}\right)\sin\left(\frac{A-B}{2}\right), \cos^2 A-\sin^2 A=\cos 2A$$

$$\therefore \text{L.H.S.}=\frac{\sin x-\sin 3x}{\sin^2 x-\cos^2 x}$$

$$=\frac{2\cos\left(\frac{x+3x}{2}\right)\sin\left(\frac{x-3x}{2}\right)}{-\cos 2x}$$

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

$$=-2\times(-\sin x)$$

$$=2\sin x=\text{R.H.S.}$$

21. Prove that $\frac{\sin x-\sin 3x}{\sin^2 x-\cos^2 x}=2\sin x$

Ans. It is known that

$$\sin A-\sin B=2\cos\left(\frac{A+B}{2}\right)\sin\left(\frac{A-B}{2}\right), \cos^2 A-\sin^2 A=\cos 2A$$

$$\therefore \text{L.H.S.}=\frac{\sin x-\sin 3x}{\sin^2 x-\cos^2 x}$$

$$=\frac{2\cos\left(\frac{x+3x}{2}\right)\sin\left(\frac{x-3x}{2}\right)}{-\cos 2x}$$

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

$$=-2\times(-\sin x)$$

$$=2\sin x=\text{RH.S.}$$

22. Prove that $\frac{\cos 4x+\cos 3x+\cos 2x}{\sin 4x+\sin 3x+\sin 2x}$

Ans. $\text{L.H.S.}=\frac{\cos 4x+\cos 3x+\cos 2x}{\sin 4x+\sin 3x+\sin 2x}$

$$\frac{(\cos 4x+\cos 2x)+\cos 3x}{(\sin 4x+\sin 2x)+\sin 3x}$$

$$=\frac{2\cos\left(\frac{4x+2x}{2}\right)\cos\left(\frac{4x-2x}{2}\right)+\cos 3x}{2\sin\left(\frac{4x+2x}{2}\right)\cos\left(\frac{4x-2x}{2}\right)+\sin 3x}$$

$$\left[\therefore \cos A+\cos B=2\cos\left(\frac{A+B}{2}\right)\cos\left(\frac{A-B2}{2}\right), \sin A+\sin B=2\sin\left(\frac{A+B}{2}\right)\cos\left(\frac{A-B}{2}\right)\right]$$

$$=\frac{2\cos 3x\cos x+\cos x}{2\sin 3x\cos x+\sin 3x}$$

$$=\frac{\cos 3x(2\cos x+1)}{2\sin 3x(2\cos x+1)}$$

$$=\cot 3x=\text{R.H.S.}$$

23. Prove that $\cot x\cot 2x-\cot 2x\cot 3x-\cot 3x\cot x=1$

Ans. L.H.S. = cot x cot 2x – cot 2x cot 3x – cot 3x cot x

= cot x cot 2x – cot 3x (cot 2x + cot x)

= cot x cot 2x – cot (2x + x) (cot 2x + cot x)

$$=\cot x\cot 2x-\left[\frac{\cot 2x\cot x-1}{\cot x+\cot 2x}\right](\cot 2x+\cot x)$$

$$\left[\therefore \cot(A+B)=\frac{\cot A\cot B-1}{\cot A+\cot B}\right]$$

$$=\cot x\cot 2x-(\cot 2x\cot x-1)$$

$$=1=\text{R.H.S.}$$

24. Prove that $\tan 4x=\frac{4\tan x(1-\tan^2 x)}{1-6\tan^2 x+\tan^4 x}$

Ans. It is known that

$$\tan 2A=\frac{2\tan A}{1-\tan^2 A}$$

$$\therefore \text{L.H.S.}=\tan 4x=\tan 2(2x)$$

$$=\frac{2\tan 2x}{1-\tan^2(2x)}$$

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

$$= \frac{\left(\frac{4\tan x}{1-\tan^2 x}\right)}{1-\left(\frac{4\tan^2 x}{(1-\tan^2 x)^2}\right)}$$

$$= \frac{\left(\frac{4\tan x}{1-\tan^2 x}\right)}{\left[\frac{(1-\tan^2 x)^2 - 4\tan^2 x}{(1-\tan^2 x)^2}\right]}$$

$$= \frac{4\tan x(1-\tan^2 x)}{(1-\tan^2 x)^2 - 4\tan^2 x}$$

$$= \frac{4\tan x(1-\tan^2 x)}{1+\tan^4 x - 2\tan^2 x - 4\tan^2 x}$$

$$= \frac{4\tan x(1-\tan^2 x)}{1-6\tan^2 x + \tan^4 x} = \text{R.H.S.}$$

25. Prove that cos 4x = 1 – 8sin2 x cos2 x

Ans. L.H.S. = cos 4x

= cos 2(2 x)

= 1 – 2 sin2 2x [cos 2A = 1 – 2 sin2 A]

= 1 – 2(2 sin x cos x)2 [sin2A = 2sin A cos A]

= 1 – 8 sin2x cos2x

= R.H.S.

26. Prove that: cos 6x = 32 cos6 x – 48 cos4 x + 18 cos2 x – 1

Ans. L.H.S. = cos 6x

= cos 3(2x)

= 4 $\cos^3$ 2x – 3 cos 2x [cos ^{3}A = 4 $\cos^3$ A – 3 cos A]

= 4 [(2 $\cos^2$ x – 1)3 – 3 (2 $\cos^2$ x – 1) [cos 2x = 2 $\cos^2$ x – 1]

= 4 [(2 $\cos^2$ x)3 – (1)3 – 3 (2 $\cos^2$ x)2 + 3 (2 $\cos^2$ x)] – 6$\cos^2$ x + 3

= 4 [8 $\cos^6$x – 1 – 12 $\cos^4$x + 6 $\cos^2$x] – 6 $\cos^2$x + 3

= 32 $\cos^6$x – 4 – 48 $\cos^4$x + 24 $\cos^2$ x – 6 $\cos^2$x + 3

= 32 $\cos^6$x – 48 $\cos^4$x + 18 $\cos^2$x – 1

= R.H.S.