Subject

$\theta < 0$

واجب ص 27

$\csc\theta = -\sqrt{5}$

انطلاق ← مقام

$\frac{-1}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = -\frac{\sqrt{5}}{5}$

(1) $\sin\theta = \frac{-1}{\sqrt{5}} = \frac{-\sqrt{5}}{5}$

(2) $\cot\theta \Rightarrow 1 + \cot^2\theta = \csc^2\theta$

$\cot^2\theta = (-\sqrt{5})^2 - 1$ ←

$\cot^2\theta = 4 \rightarrow \cot\theta = \pm 2$

(3) $\cos 2\theta \Rightarrow \cos 2\theta = 1 - 2\sin^2\theta$

$\cos 2\theta = 1 - 2\left(\frac{-\sqrt{5}}{5}\right)^2$

$\cos 2\theta = 1 - 2\left(\frac{5}{25}\right)$

$\cos 2\theta = \frac{3}{5}$

Subject : _____ / /

واجب 1 ص 28

① $\cos^4 x$

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

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

$$= \frac{1}{4}\left(1 + 2\cos 2x + \frac{1}{2}(1+\cos 4x)\right)$$

$$= \frac{1}{4} + \frac{1}{2}\cos 2x + \frac{1}{8} + \frac{1}{8}\cos 4x$$

$$= \frac{3}{8} + \frac{\cos 2x}{2} + \frac{\cos 4x}{8}$$

واجب 1 ص28

2) $\sin^4 x \cos^2 x$

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

$$\frac{1}{4}(1-\cos 2x)^2 \cdot \frac{1}{2}(1+\cos 2x) = \frac{1}{8}\cdot(1-2\cos 2x+\cos^2 2x)(1+\cos 2x)$$

$$\frac{1}{8}\left[1-2\cos 2x+\cos^2 2x+\cos 2x-2\cdot\frac{1}{2}(1+\cos 4x)+\cos^3 2x\right]$$

($\frac{1}{2}(1+\cos 4x)$)

$$\frac{1}{8}\left[\cancel{X}-2\cos 2x+\cos^2 2x+\cos 2x-1-\cos 4x+\cos^3 2x\right]$$

$$\frac{1}{8}\left[-\cos 2x+\frac{1}{2}-\frac{1}{2}\cos 4x+\cos^3 2x\right]$$

$$\frac{1}{8}\left[-\cos 2x+\frac{1}{2}-\frac{1}{2}\cos 4x+\cos 2x\cdot\frac{1}{2}(1+\cos 4x)\right]$$

$$\frac{1}{8}\left\{-\cos 2x+\frac{1}{2}-\frac{1}{2}\cos 4x+\frac{1}{2}\cos 2x+\frac{\cos(2x)+\cos(6x)}{4}\right\}$$

$$-\frac{1}{8}\cos 2x+\frac{1}{16}-\frac{1}{16}\cos 4x+\frac{1}{16}\cos 2x+\frac{1}{32}\cos 2x+\frac{1}{32}\cos 6x$$

$$-\frac{\cos 2x}{32}-\frac{\cos 4x}{16}\times 2+\frac{\cos 6x}{32}+\frac{1}{16}\times 2$$

$$\frac{2+\cos 6x-2\cos 4x-\cos 2x}{32}$$

p.28 (واجب 1)

$$\sin^4 x \cos^2 x$$

$$= (\sin^2 x)^2 \cdot \cos^2 x$$

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

نفرض $\cos 2x = c$

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

$$= \frac{(1-c)^2(1+c)}{8}$$

$$= \frac{(1-2c+c^2)(1+c)}{8}$$

$$= \frac{1-c-c^2+c^3}{8}$$

$c = \cos 2x$

$c^2 = \frac{1+\cos 4x}{2}$

$c^3 = \cos^3(2x)$

$= \frac{\cos 6x + 3\cos 2x}{4}$

$= \frac{\cos 6x + 3c}{4}$

$$= \frac{1 - c - \frac{1+\cos 4x}{2} + \frac{3c+\cos 6x}{4}}{8}$$

$$= \frac{4 - 4c - 2 - 2\cos 4x + 3c + \cos 6x}{8.4}$$

ضرب الكل بـ 4

$$= \frac{2 - c - 2\cos 4x + \cos 6x}{32}$$

$$\sin^4 x \cos^2 x = \frac{2 - \cos 2x - 2\cos 4x + \cos 6x}{32}$$

واجب 2 ص 28 -8

1) $\frac{\cos(\frac{\pi}{2} - x)}{\csc x} - \cos^2 x$

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

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

$= \sin^2 x - (1 - \sin^2 x)$

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

$= -\cos 2x$ توصلنا

2) $\frac{\sec x - \cos x}{\sin x}$

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

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

$= \tan x$

DONE BY :
د. خيرية السقا

3) $(\sin^2 x - \cos^2 x)(\sin^2 x + \cos^2 x)$

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

$= -\cos 2x$

4) $\frac{2\tan 7x}{1 - \tan^2 7x}$

$\tan(\theta + \theta) = \frac{\tan\theta + \tan\theta}{1 - (\tan\theta)(\tan\theta)}$

$= \frac{2\tan\theta}{1 - \tan^2\theta} = \tan 14x$

وهو نفس السؤال أمامنا

-8 واجب ص 14

1) $\sin\frac{\theta}{2} = +\sqrt{\frac{1-\cos\theta}{2}} = \sqrt{\frac{1-\frac{12}{13}}{2}} = \sqrt{\frac{\frac{1}{13}}{2}} = \frac{1}{\sqrt{26}}$

من $\cos^2\theta+\sin^2\theta=1$

$\cos^2\theta + \frac{25}{169} = 1 \rightarrow \boxed{\cos\theta = \frac{12}{13}}$

DONE BY :
د. خيرية السقا

2) $\cos\frac{\theta}{2} = +\sqrt{\frac{1+\cos\theta}{2}} = \sqrt{\frac{1+\frac{12}{13}}{2}} = \frac{5}{\sqrt{26}}$

3) $\sec 2\theta = \frac{1}{\cos 2\theta} = \frac{1}{2\cos^2\theta - 1} = \frac{1}{2\left(\frac{144}{169}\right)-1} = \frac{1}{\frac{119}{169}} = \frac{169}{119}$

واجب ص 30 -8

1) 1) $3\cos 4x \cos 7x = \frac{3}{2}\left(\cos(-3x) + \cos(11x)\right)$

$= \frac{3}{2}\left(\cos 3x + \cos 11x\right)$

2) $8\cos 3x \sin 6x = 8\sin 6x \cos 3x = \frac{8}{2}\left(\sin(3x) + \sin(9x)\right)$

$= 4\left(\sin 3x + \sin 9x\right)$

2) 1) $\sin 3x + \sin 4x = 2\sin\left(\frac{7}{2}x\right)\cos\left(\frac{-1}{2}x\right) = 2\sin\frac{7}{2}x\cos\frac{x}{2}$

2) $\cos 3x + \cos 2x = 2\cos\frac{5}{2}x\cos\frac{x}{2}$

DONE BY :
د. خيرية السقا

① $\dfrac{\tan(20^\circ)+\tan(25^\circ)}{1-\tan(20^\circ)\tan(25^\circ)} = \tan(20^\circ+25^\circ)$

واجب ص 71

$= \tan(45^\circ) = 1$

---

② $\cos\left(\frac{5\pi}{12}\right)\cos\left(\frac{7\pi}{12}\right) - \sin\left(\frac{5\pi}{12}\right)\sin\left(\frac{7\pi}{12}\right)$

$= \cos\left(\frac{5\pi}{12}+\frac{7\pi}{12}\right) = \cos(\pi) = -1$

---

③ $\sin\left(\frac{7\pi}{12}\right) = \sin\left(\frac{\pi}{4}+\frac{\pi}{3}\right)$

$= \sin\frac{\pi}{4}\cos\frac{\pi}{3} + \cos\frac{\pi}{4}\sin\frac{\pi}{3}$

$\frac{\sqrt{2}}{2}\cdot\frac{1}{2} + \frac{\sqrt{2}}{2}\cdot\frac{\sqrt{3}}{2} = \frac{\sqrt{2}+\sqrt{6}}{4}$

---

④ $\sin 75^\circ \sin 15^\circ$

$\frac{1}{2}\left[\cos(75^\circ-15) - \cos(75^\circ+15^\circ)\right]$

$\frac{1}{2}\left[\cos(60^\circ) - \cos(90^\circ)\right] = \frac{1}{2}\left[\frac{1}{2}-0\right] = \frac{1}{4}$

---

⑤ $\cos\left(\frac{23\pi}{12}\right) \Rightarrow \cos(2\pi - x) = \cos(x)$

$\cos\left(\frac{23\pi}{12}\right) = \cos\left(\frac{\pi}{12}\right) \Rightarrow \cos\left(\frac{\pi}{3}-\frac{\pi}{4}\right)$

$\cos\frac{\pi}{3}\cos\frac{\pi}{4} + \sin\frac{\pi}{3}\sin\frac{\pi}{4} = \frac{1}{2}\cdot\frac{\sqrt{2}}{2} + \frac{\sqrt{3}}{2}\cdot\frac{\sqrt{2}}{2} = \frac{\sqrt{6}+\sqrt{2}}{4}$

---

⑥ $\tan 202.5^\circ = \tan(180^\circ+22.5^\circ) \rightarrow \tan(180^\circ+x) = \tan x$

$\tan 202.5^\circ = \tan 22.5^\circ$ $\quad \theta = 45^\circ$

$\tan 22.5 = \dfrac{1-\cos 45^\circ}{\sin 45^\circ} = \dfrac{1-\frac{\sqrt{2}}{2}}{\frac{\sqrt{2}}{2}} = \dfrac{\frac{2-\sqrt{2}}{2}}{\frac{\sqrt{2}}{2}} = \dfrac{4-2\sqrt{2}}{2\sqrt{2}}\cdot\dfrac{\sqrt{2}}{\sqrt{2}}$

$\dfrac{4\sqrt{2}-2\cdot 2}{2\cdot 2} = \dfrac{4\sqrt{2}-4}{4} = \dfrac{4(\sqrt{2}-1)}{4} = \sqrt{2}-1$