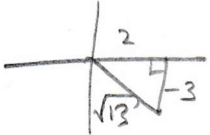
[2] $y = \tan^{-1}\left(-\frac{3}{2}\right) \longrightarrow \tan y = -\frac{3}{2}$ AND $y \in Q_4$ 2



$\sin 2y = 2\sin y\cos y = 2\left(\frac{-3}{\sqrt{13}}\right)\left(\frac{2}{\sqrt{13}}\right) = -\frac{12}{13}$

3 3 3 1

[3] $\cos 2(3x) = \underline{2\cos^2 3x - 1} = \underline{2(4\cos^3 x - 3\cos x)^2 - 1}$

3 FROM SECTION 5.5 4

LECTURE 2

$= 2(\underline{16\cos^6 x - 24\cos^4 x + 9\cos^2 x}) - 1$ 2

$= \underline{32\cos^6 x - 48\cos^4 x + 18\cos^2 x - 1}$ 2

[4] $y = \arcsin\left(-\frac{3}{4}\right) \longrightarrow \sin y = -\frac{3}{4}$ AND $y \in Q_4$ 2

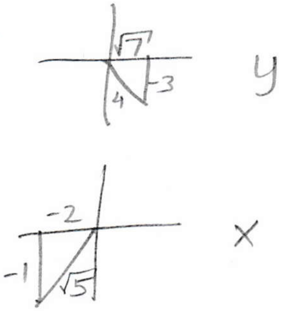
$\cos(x-y) = \cos x \cos y + \sin x \sin y$ 3

$= -\frac{2}{\sqrt{5}} \frac{\sqrt{7}}{4} + \frac{-1}{\sqrt{5}}\left(\frac{-3}{4}\right)$

3 3 3 1

$= \frac{3 - 2\sqrt{7}}{4\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{3\sqrt{5} - 2\sqrt{35}}{20}$

1 1



[5] $\dfrac{2\sin x - \sin 2x}{1 - \cos 2x} = \dfrac{2\sin x - \underline{2\sin x \cos x}_{3}}{1 - (\underline{1 - 2\sin^2 x})_{3}} = \dfrac{\underline{2\sin x(1-\cos x)}_{2}}{\underline{2\sin^2 x}_{1}}$

$= \dfrac{1-\cos x}{\underline{\sin x}_{1}} = \underline{\tan \frac{1}{2} x}_{1}$

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

$= \frac{1}{16}(1-\cos^2 2x)^2$ 2

$= \frac{1}{16}(\sin^2 2x)^2$ 2

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

$= \frac{1}{64}(1-2\cos 4x+\cos^2 4x)$ 2

$= \frac{1}{64}\left(1-2\cos 4x+\frac{1}{2}(1+\cos 8x)\right)$ 3

$= \frac{1}{128}(2-4\cos 4x+1+\cos 8x)$

$= \frac{1}{128}(3-4\cos 4x+\cos 8x)$ 2

[7] [a] LET $t = \frac{x}{2} \longrightarrow x = 2t$ SO $0 \le x < 2\pi \longrightarrow 0 \le 2t < 2\pi$

$0 \le t < \pi$ 2

$3\cos 2t - 2\sin t + 1 = 0$ 3

$3(1 - 2\sin^2 t) - 2\sin t + 1 = 0$ 3

$3 - 6\sin^2 t - 2\sin t + 1 = 0$

$0 = 6\sin^2 t + 2\sin t - 4$ 2

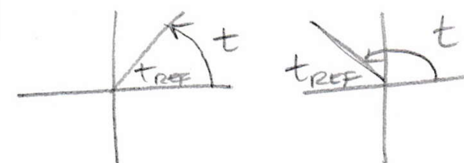
$0 = 2(3\sin^2 t + \sin t - 2)$

$0 = 2(3\sin t - 2)(\sin t + 1)$ 2

$\sin t = \frac{2}{3}$ OR $\cancel{-1}$ 2 BUT $0 \le t < \pi \longrightarrow t \in Q_1, Q_2$

SO $\sin t \ge 0$ 1

$t_{REF} = \sin^{-1}\frac{2}{3}$

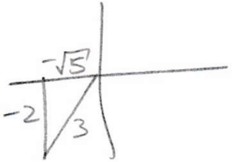


$\frac{x}{2} = t = \sin^{-1}\frac{2}{3}$ 1 OR $\pi - \sin^{-1}\frac{2}{3}$ 2

$x = 2\sin^{-1}\frac{2}{3}$ OR $2\pi - 2\sin^{-1}\frac{2}{3}$ 2

[b] $x \approx 1.4595$ OR 4.8237 2

[8]



$$\frac{1-\cos x}{\sin x} = \frac{1+\frac{\sqrt{5}}{3}}{-\frac{2}{3}} \cdot \frac{3}{3} = -\frac{3+\sqrt{5}}{2}$$

3 2 1