Problem 1 (without calculator) *[6 marks]*

Assuming θ is in the *fourth* sector, and $\sin(\theta)=-\sqrt{\frac{3}{7}}$, give the exact expression for

i) $\cos(\theta)$, **ii)** $\tan(\theta)$, **iii)** $\cos(2\theta)$, **iv)** $\sin(2\theta)$, **v)** $\tan(2\theta)$

Problem 2 (without calculator) *[13 marks]*

Solve the following trigonometric equations:)

1) $\sin(3x)=\frac{\sqrt{2}}{2}$ *for* $0\leqslant x<360^0$ *[4 marks]*

2) $\cos(4x)=\frac{\sqrt{3}}{2}$ *for* $0\leqslant x<2\pi$ *(radian)* *[4 marks]*

3) $6\cos(2x)-4\cos^2(x)=0$, for $0\leqslant x<3\pi$ *(radian)* *[5 marks]*

Problem 3 (with calculator) *[8 marks]*

Consider the trigonometric equation $5\cos(2\theta)=3(\cos(\theta)+1)-4$

i) Show it can be written as

$a\cos^2(\theta)+b\cos(\theta)+c=0$ *(find a, b, c)* *[4 marks]*

ii) Hence find the solutions of this equation, for $0\leqslant x<2\pi$ (radian) *[4 marks]*

$10\cos^2(\theta)-3\cos(\theta)-4$ $a=10,\ b=-3,\ c=-4,\ \Delta=49$ $x=\frac{-3\pm 7}{20}$

$S=\{\frac{\pi}{3}+2\pi k\}\cup\{\frac{5\pi}{3}+2\pi k\}\cup\{\frac{5\pi}{3}+2\pi k\}\cup\{\arccos(\frac{1}{5})+2\pi k\}\cup\{2\pi-\arccos(\frac{1}{5})+2\pi k\}$