Questions from Homework

⑤ b) $\sin^2\theta + \frac{1}{2}\sin\theta = 0$

$\left(\sin\theta\right)\left(\sin\theta + \frac{1}{2}\right) = 0$

$\sin\theta = 0$ | $\sin\theta + \frac{1}{2} = 0$

$\theta = 0°, 180°, 360°$ | $\sin\theta = -\frac{1}{2}$ ← sin is negative

$0 + 360°k, k \in I$

$180° + 360°k, k \in I$

ref = 30°

Q3	Q4
$\theta = 180° + 30°$	$\theta = 360° - 30°$
$\theta = 210°$	$\theta = 330°$

$210° + 360°k, k \in I$

$330° + 360°k, k \in I$

⑥ a) $\frac{3}{1 - 2\sin 45°}$

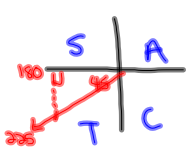
$\frac{3}{1 - 2\left(\frac{\sqrt{2}}{2}\right)}$

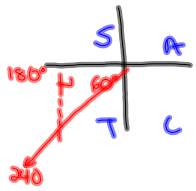
$\frac{3}{(1-\sqrt{2})}\frac{(1+\sqrt{2})}{(1+\sqrt{2})}$

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

$\boxed{-3-3\sqrt{2}}$

b) $\frac{\cos 225°}{\sin 240° + \cos 60°}$





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

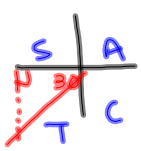
$\frac{-\sqrt{2}\left(\sqrt{3}-1\right)}{\left(\sqrt{3}+1\right)\left(-\sqrt{3}-1\right)}$

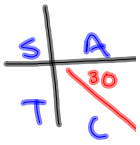
$\frac{\sqrt{6}+\sqrt{2}}{3-1}$

$\boxed{\frac{\sqrt{6}+\sqrt{2}}{2}}$

c) $\cos^2 210° + \sin^2(-30°)$

$\cos^2 210° + \sin^2 330°$





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

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

Trig Identities

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

$$\cot\theta = \frac{\cos\theta}{\sin\theta} \qquad \tan^2\theta + 1 = \sec^2\theta$$

$$1 + \cot^2\theta = \csc^2\theta$$

$$\csc\theta = \frac{1}{\sin\theta} \qquad \sin\theta = \frac{1}{\csc\theta}$$

$$\sec\theta = \frac{1}{\cos\theta} \qquad \cos\theta = \frac{1}{\sec\theta}$$

$$\cot\theta = \frac{1}{\tan\theta} \qquad \tan\theta = \frac{1}{\cot\theta}$$

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

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

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

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

$$\sin 2\theta = 2\sin\theta\cos\theta$$

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

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

$$\frac{1-\sin\theta+(1+\sin\theta)}{(1+\sin\theta)(1-\sin\theta)}$$

$$\frac{2}{1-\sin^2\theta}$$

$$\boxed{\frac{2}{\cos^2\theta}}$$

$$2\left(\frac{1}{\cos^2\theta}\right)$$

$$\boxed{\frac{2}{\cos^2\theta}}$$

$$\frac{1-\cos 2\theta}{1+\cos 2\theta} = \tan^2\theta$$

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

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

$$\frac{\sin^2\theta+\sin^2\theta}{\cos^2\theta+\cos^2\theta}$$

$$\frac{2\sin^2\theta}{2\cos^2\theta}$$

$$\frac{\sin^2\theta}{\cos^2\theta}$$

$$\frac{\sin^2\theta}{\cos^2\theta}$$

$$\tan^3\theta\sec^2\theta - \tan^3\theta = \tan^5\theta$$

$\tan^3\theta(\sec^2\theta - 1)$ | $\tan^5\theta$

$\tan^3\theta(\tan^2\theta)$

$\tan^5\theta$

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

$$\frac{(\cos x - \sin x)(\cos x + \sin x)}{\cos x (\cos x + \sin x)}$$

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

Identities Final Review:

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

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

$\sin^2 x\cos^2 y - \cos^2 x\sin^2 y$

$(1-\cos^2 x)\cos^2 y - \cos^2 x(1-\cos^2 y)$

$\cos^2 y - \cancel{\cos^2 x\cos^2 y} - \cos^2 x + \cancel{\cos^2 x\cos^2 y}$

$\boxed{\cos^2 y - \cos^2 x}$

$\boxed{\cos^2 y - \cos^2 x}$

④ $\cos^4\theta = \boxed{1 - 2\sin^2\theta + \sin^4\theta}$

$(\cos^2\theta)(\cos^2\theta)$

$(1-\sin^2\theta)(1-\sin^2\theta)$

$1 - \sin^2\theta - \sin^2\theta + \sin^4\theta$

$\boxed{1 - 2\sin^2\theta + \sin^4\theta}$