HW 6.7

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1a) $90°+45°$
$180°+45°$

b) $180°+45°$
$270°-45°$

c) $30°+90°$
$60°+60°$
$180°-60°$

d) $180°+60°$
$270°-30°$

e) $90°+60°$
$180°-30°$

f) $30°+180°$
$270°-60°$

g) $30°+270°$
$300°+60°$
$360°-60°$

h) $30°+300°$
$60°+270°$
$360°-30°$

i) $45°+270°$
$360°-45°$

j) $60°+180°$
$270°-30°$

2a) $\sin(90+30) = \sin 90\cdot\cos 30 + \sin 30\cdot\cos 90$
$= 1\cdot\frac{\sqrt{3}}{2} + \frac{1}{2}\cdot 0$
$= \frac{1+\sqrt{3}}{2}$

b) $\cos(180+45) = \cos 180\cdot\cos 45 - \sin 180\cdot\sin 45$
$= -1\cdot\frac{1}{\sqrt{2}} - 0\cdot\frac{1}{\sqrt{2}}$
$= -\frac{1}{\sqrt{2}}$

c) $\sin(360-60) = \sin 360\cdot\cos 60 - \cos 360\cdot\sin 60$
$= 0\cdot\frac{1}{2} - 1\cdot\frac{\sqrt{3}}{2}$
$= -\frac{\sqrt{3}}{2}$

d) $\sin(30+180) = \sin 30\cdot\cos 180 + \sin 180\cdot\cos 30$
$= \frac{1}{2}\cdot -1 + 0\cdot\frac{\sqrt{3}}{2}$
$= -\frac{1}{2}$

e) $0\cdot\frac{1}{2} + -1\cdot\frac{\sqrt{3}}{2}$
$= -\frac{\sqrt{3}}{2}$

f) $0\cdot\frac{1}{2} - 1\cdot\frac{\sqrt{3}}{2}$
$= \frac{\sqrt{3}}{2}$

g) $1\cdot\frac{1}{\sqrt{2}} + 0\cdot\frac{1}{\sqrt{2}}$
$= \frac{1}{\sqrt{2}}$

h) $0\cdot\frac{1}{2} + -1\cdot\frac{\sqrt{3}}{2}$
$= -\frac{\sqrt{3}}{2}$

i) $-1\cdot\frac{1}{2} + 0\cdot\frac{\sqrt{3}}{2}$
$= -\frac{1}{2}$

j) $1\cdot\frac{1}{2} + 0\cdot\frac{\sqrt{3}}{2}$
$= \frac{1}{2}$

3a) $= \cos(120) = \cos(90+30)$
$= \cos 90\cos 30 - \sin 90\sin 30$
$= 0\cdot\frac{\sqrt{3}}{2} - 1\cdot\frac{1}{2}$
$= -\frac{1}{2}$

b) $-\frac{1}{\sqrt{2}}$

c) $\frac{1}{2}$

4)

S	A
T	C

$\sin a = \frac{3}{5}$ $\cos a = \frac{2}{5}$ $\sin b = \frac{2}{5}$ $\cos b = -\frac{3}{5}$

$\sin(a+b) = -\frac{1}{5}$

$\sin(a-b) = -\frac{13}{26}$

5) $\sin a = \frac{2}{3}$ $\cos a = -\frac{\sqrt{5}}{3}$
$\sin b = -\frac{\sqrt{7}}{4}$ $\cos b = -\frac{3}{4}$

$\cos(a+b) = \frac{2\sqrt{7}+3\sqrt{5}}{12}$

$\cos(a-b) = \frac{3\sqrt{5}-2\sqrt{7}}{12}$

6) $\tan a = -\frac{5}{7}$ $\tan b = -\frac{5}{6}$
$\sin a = \frac{5}{\sqrt{74}}$ $\sin b = -\frac{5}{\sqrt{61}}$
$\cos a = -\frac{7}{\sqrt{74}}$ $\cos b = \frac{6}{\sqrt{61}}$

$\sin(a+b) = \frac{65\sqrt{74}\sqrt{61}}{4514}$

$\cos(a+b) = -\frac{17\sqrt{74}\sqrt{61}}{4514}$

1. $-\cos(10+x)$

$\cos a = \frac{-7}{\sqrt{74}}$ $\cos b = \frac{6}{\sqrt{61}}$ $\cos(a+b) = \frac{\cdots}{4514}$

7a) 

$45 - 38 = 7°$

1 : 1 : $\sqrt{2}$

7b) 

1 : $\sqrt{3}$: 2

$\frac{1}{2} = \cos(10+x)$

$60 - 10 = 50°$

8) $\sin 2x = 2\sin x \cos x$

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

9) $\cos 2x = (\cos x)(\cos x) - (\sin x)(\sin x)$

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

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

$\left(\frac{A}{H}\right)^2 + \left(\frac{O}{H}\right)^2 = 1 \rightarrow \frac{H^2}{H^2} = 1$

10) $\cos(2x) = (\cos x)(\cos x) - (\sin x)(\sin x)$

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

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

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

11) $\sin(45+x) = (\sin 45)(\cos x) + (\sin x)(\cos 45)$

$\sin(45+x) = \frac{\sqrt{2}}{2}(\cos x) + \frac{\sqrt{2}}{2}(\sin x)$

$\sin(45-x) = (\sin 45)(\cos x) - (\sin x)(\cos 45)$

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

$\frac{\sqrt{2}}{2}(\cos x) + \frac{\sqrt{2}}{2}(\sin x) + \frac{\sqrt{2}}{2}(\cos x) - \frac{\sqrt{2}}{2}(\sin x) = \sin(45+x) + \sin(45-x)$

↳ $\sqrt{2}(\cos x) = \sin(45+x) + \sin(45-x)$

12) $a = 30+x \quad b = 30-x$

$\cos(a+b) \rightarrow \cos((30+x)+(30-x)) \rightarrow \cos(60) \rightarrow \frac{1}{2}$

13) $\sin a = \frac{1}{3}$

$\cos a = \frac{\sqrt{8}}{3}$

$\sin(2a) = \sin(a+a) = \left(\frac{1}{3} \cdot \frac{\sqrt{8}}{3}\right)^2 = \left(\frac{\sqrt{8}}{9}\right)^2 = \frac{8}{81}$

14) $\cos(x+90) = (\cos x)(\cos 90) - (\sin x)(\sin 90)$

c) $-2\sin(x)$