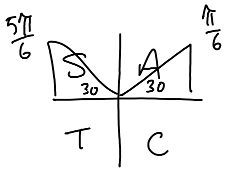
1. $4\sin 2x = 2 \qquad 0 \leq x \leq \pi$

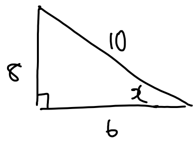
$\sin 2x = \frac{1}{2}$

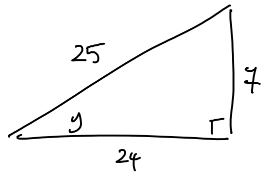
acute angle $= \frac{\pi}{6}$



$2x = \frac{\pi}{6}, \frac{5\pi}{6}$

$x = \frac{\pi}{12}, \frac{5\pi}{12}$

2. 



(a) $\sin x = \frac{8}{10} \qquad \cos y = \frac{24}{25}$

$\sin x = \frac{4}{5}$

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

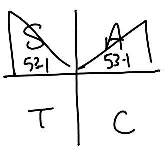
$= \frac{4}{5} \cdot \frac{24}{25} + \frac{3}{5} \cdot \frac{7}{25}$

$= \frac{96}{125} + \frac{21}{125}$

$= \frac{117}{125}$

3. $\sin x^\circ \cos 20^\circ + \cos x^\circ \sin 20^\circ = \frac{4}{5}$

$\sin(x+20)^\circ = \frac{4}{5}$



acute angle $= 53.1^\circ$

$(x+20)^\circ = 53.1, 126.9^\circ$

$x^\circ = 33.1^\circ, 106.9^\circ$

4. $k\sin(x-a)^\circ = k\underline{\sin x^\circ}\cos a^\circ - k\underline{\underline{\cos x^\circ}}\sin a^\circ$

$2\underline{\sin x^\circ} - 4\underline{\underline{\cos x^\circ}}$

$k\cos a^\circ = 2$

$-k\sin a^\circ = -4$

$k\sin a^\circ = 4$

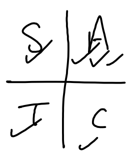
$k^2 = (2)^2 + (4)^2$

$k^2 = 4 + 16$

$k^2 = 20$

$\tan a^\circ = \frac{k\sin a^\circ}{k\cos a^\circ}$

$\tan a^\circ = \frac{4}{2}$



$\tan a^\circ = 2$

acute angle $= 63.4^\circ$

$k = \sqrt{20}$

a° is in 1st quadrant

$\Rightarrow \quad a^\circ = 63.4^\circ$

$\Rightarrow \quad 2\sin x^\circ - 4\cos x^\circ = \sqrt{20}\sin(x - 63.4)^\circ$

5. $\quad 3\cos 2x = 11\cos x - 6 \qquad 0 \leq x \leq 2\pi$

$3\cos 2x - 11\cos x + 6 = 0$

$3(2\cos^2 x - 1) - 11\cos x + 6 = 0$

$6\cos^2 x - 11\cos x + 3 = 0 \qquad 6x^2 - 11x + 3$

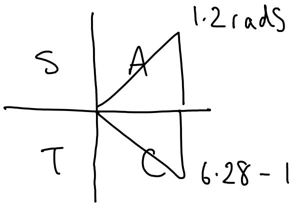
$(3\cos x - 1)(2\cos x - 3) = 0 \qquad (3x-1)(2x-3)$

$3\cos x - 1 = 0$ or $2\cos x - 3 = 0$

$\cos x = \frac{1}{3} \qquad \cos x = \frac{3}{2}$

acute angle $= 1.2$ rads $\qquad$ undefined

$x = 1.2, 5.1$ radians



$6.28 - 1.2$

$= 5.08$

$= 5.1$

6(a) Prove $(\sin x + \cos x)^2 = 1 + \sin 2x$

$\Rightarrow \quad (\sin x + \cos x)^2$

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

$= \underline{\sin^2 x} + \sin x\cos x + \sin x \cos x + \underline{\cos^2 x}$

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

$= 1 + \sin 2x$

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

$y = 3(1 + \sin 2x)$

$y = 3 + 3\sin 2x$

max value $= 6$