(1) (a) $4\cos x + 8\sin x = k\sin(x-a)$

$(4)\cos x + 8\sin x = k\sin x\cos a - k\cos x\sin a$

$-k\sin a = 4$ $k\cos a = 8$

$k\sin a = -4$

$$h^2 = (-4)^2 + 8^2$$
$$= 16 + 64$$
$$= 80$$
$$\underline{h = \sqrt{80}}$$

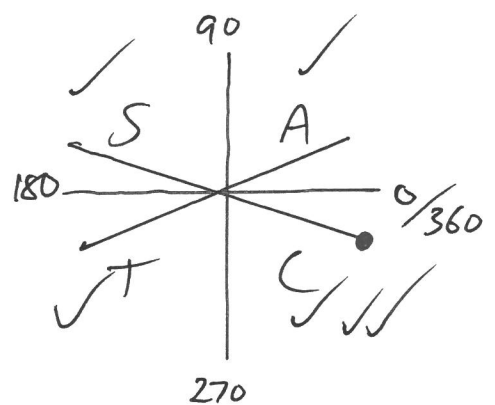$$\frac{k\sin a}{k\cos a} = \frac{-4}{8} = \frac{-1}{2}$$

$$\tan a = -\frac{1}{2}$$

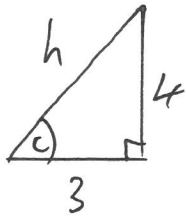Related Acute Angle $\tan^{-1}\left(\frac{1}{2}\right)$ $= 26\cdot6°$
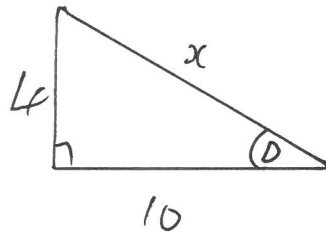

$$a = 360 - 26\cdot6$$
$$= \underline{\underline{333\cdot4°}}$$

② @ $\cos(C - D) = \cos C \cos D + \sin C \sin D$

h 4

c 3

$h^2 = 3^2 + 4^2$

$\quad = 25$

$h = \sqrt{25}$

$\quad = \underline{5}$

4   x D 10

$x^2 = 4^2 + 10^2$

$\quad = 116$

$x = \sqrt{116}$

$\cos(C - D) = \left(\dfrac{3}{5} \times \dfrac{10}{\sqrt{116}}\right) + \left(\dfrac{4}{5} \times \dfrac{4}{\sqrt{116}}\right)$

$\qquad\qquad = \dfrac{30}{5\sqrt{116}} + \dfrac{16}{5\sqrt{116}}$

$\qquad\qquad = \dfrac{46}{5\sqrt{116}}$

$\sqrt{116} = \sqrt{4}\sqrt{29}$
$\qquad\quad = 2\sqrt{29}$

$\qquad\qquad = \dfrac{46}{10\sqrt{29}} = \underline{\underline{\dfrac{23}{5\sqrt{29}}}}$

③ @ $\text{LHS} = (7 - 4\sin x)(7 + 4\sin x)$
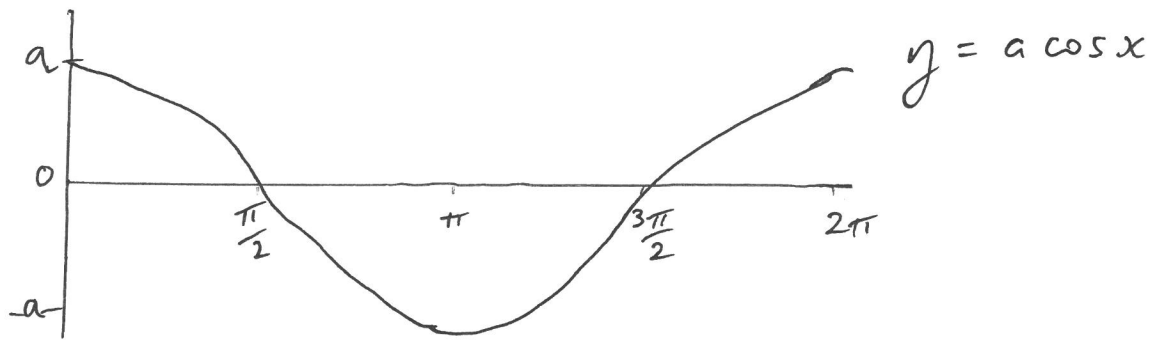
$\qquad\quad = 49 + 28\sin x - 28\sin x - 16\sin^2 x$

$\qquad\quad = 49 - 16\sin^2 x$

$\qquad\quad = 49 - 16(1 - \cos^2 x)$

$\qquad\quad = 49 - 16 + 16\cos^2 x$

$\qquad\quad = \underline{\underline{16\cos^2 x + 33}} \quad = \text{RHS}$

(4a)

$y = a \cos x$

$y = a \cos x$	$y = a \cos\left(x + \frac{\pi}{3}\right)$	
$(0, a)$	$\left(-\frac{\pi}{3}, a\right)$	$= \left(-\frac{\pi}{3}, a\right)$
$\left(\frac{\pi}{2}, 0\right)$	$\left(\frac{\pi}{2} - \frac{\pi}{3}, 0\right)$	$= \left(\frac{\pi}{6}, 0\right)$
$(\pi, -a)$	$\left(\pi - \frac{\pi}{3}, -a\right)$	$= \left(\frac{2\pi}{3}, -a\right)$
$\left(\frac{3\pi}{2}, 0\right)$	$\left(\frac{3\pi}{2} - \frac{\pi}{3}, 0\right)$	$= \left(\frac{7\pi}{6}, 0\right)$
$(2\pi, a)$	$\left(2\pi - \frac{\pi}{3}, a\right)$	$= \left(\frac{5\pi}{3}, a\right)$

$\left(\frac{5\pi}{3}, a\right)$

$y = a \cos\left(x + \frac{\pi}{3}\right)$

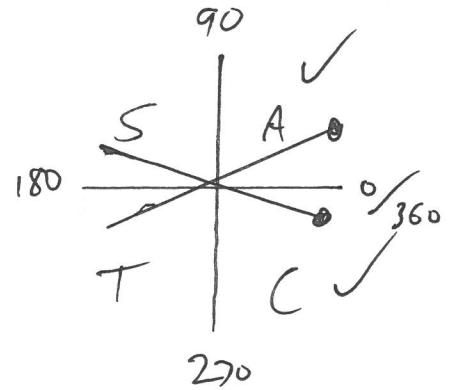$\left(\frac{2\pi}{3}, -a\right)$

⑤ⓐ $a = 2$, $b = 2$, $c = -1$

⑥ⓐ $2\cos 2x = \sqrt{3}$

$\cos 2x = \dfrac{\sqrt{3}}{2}$

$2x = \cos^{-1}\left(\dfrac{\sqrt{3}}{2}\right)$

$2x = 30, \; 330$

$\underline{x = 15°, \; 165°}$

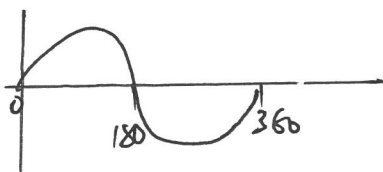⑦ⓐ $2\sin 2t - \sin t = 0$

$2(2\sin t \cos t) - \sin t = 0$

$4\sin t \cos t - \sin t = 0$

$\sin t (4\cos t - 1) = 0$

$\sin t = 0$

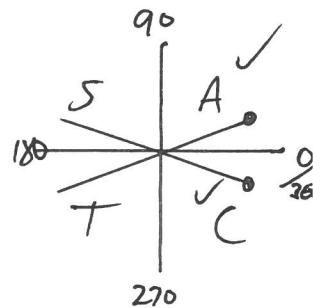$\underline{t = 0, \; 180,\; \cancel{360}}$

$4\cos t - 1 = 0$

$4\cos t = 1$

$\cos t = \dfrac{1}{4}$

$t = \cos^{-1}\left(\dfrac{1}{4}\right)$

$= 75.5°, \; 360 - 75.5$

$= \underline{75.5°, \; 284.5°}$

⑧ⓐ

$$\sqrt{3}\cos x + \sin x = \sqrt{2}$$

$$2\cos(x - 30) = \sqrt{2}$$

$$\cos(x - 30) = \frac{\sqrt{2}}{2}$$

$$(x - 30) = \cos^{-1}\left(\frac{\sqrt{2}}{2}\right)$$

$$= 45, \quad 360 - 45$$

$$= 45°, \ 315°$$

$$\underline{\underline{x = \quad 75°, \ 345°}}$$