Jawapan

Praktis 6

Praktis Formatif

1 (a) $245° = 245° \times \dfrac{\pi \text{ rad}}{180°}$
$= 4.276 \text{ rad}$

(b) $-145° = -145° \times \dfrac{\pi \text{ rad}}{180°}$
$= -2.531 \text{ rad}$

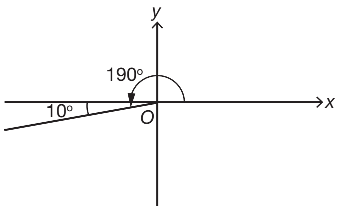
(c) $750° = 750° \times \dfrac{\pi \text{ rad}}{180°}$
$= 13.090 \text{ rad}$

2 (a) $-0.5\pi \text{ rad} = -0.5\pi \text{ rad} \times \dfrac{180°}{\pi \text{ rad}}$
$= -90°$

(b) $\dfrac{7}{2}\pi \text{ rad} = \dfrac{7}{2}\pi \text{ rad} \times \dfrac{180°}{\pi \text{ rad}}$
$= 630°$

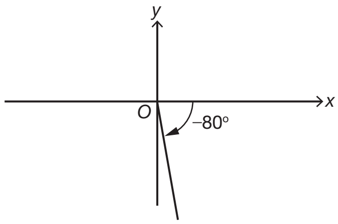
(c) $1.6 \text{ rad} = 1.6 \text{ rad} \times \dfrac{180°}{\pi \text{ rad}}$
$= 91.7°$

3 (a) 190°



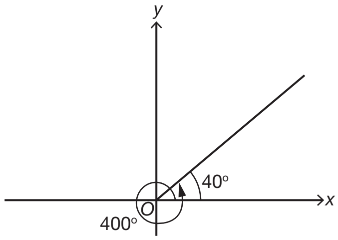
Sudut rujukan/*Reference angle* = 10°

(b) −80°



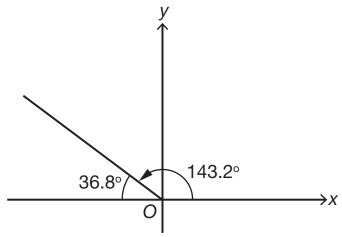
Sudut rujukan/*Reference angle* = 80°

(c) 400°



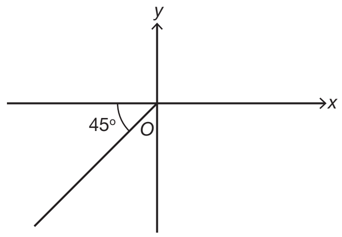
Sudut rujukan/*Reference angle* = 40°

(d) $\dfrac{5}{2} \text{ rad} = \dfrac{5}{2} \text{ rad} \times \dfrac{180°}{\pi \text{ rad}}$
$= 143.2°$



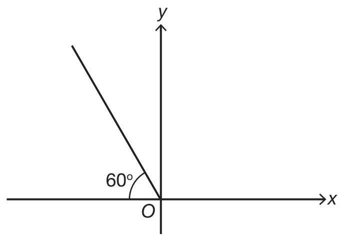
Sudut rujukan/*Reference angle* = 36.8°

4 (a) 45°, Sukuan/*Quadrant* III



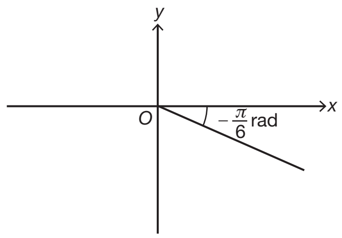
$180° + 45° = 225°$
$225° + 360° = 585°$
$-(180° - 45°) = -135°$
$-135° - 360° = -495°$

(b) 60°, Sukuan/*Quadrant* II



$180° - 60° = 120°$
$120° + 360° = 480°$
$-(180° + 60°) = -240°$
$-240° - 360° = -600°$

(c) $\dfrac{\pi}{6}$ rad, Sukuan/*Quadrant* IV



$\left(2\pi - \frac{\pi}{6}\right) = \text{rad} = \frac{11\pi}{6}$ rad

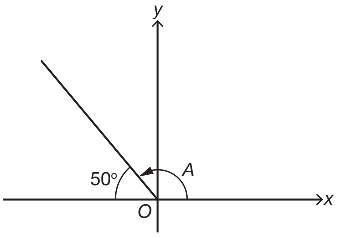
$\left(\frac{11\pi}{6} + 2\pi\right)$ rad $= \frac{23\pi}{6}$ rad

$-\frac{\pi}{6}$ rad

$\left(-\frac{\pi}{6} - 2\pi\right)$ rad $= -\frac{13\pi}{6}$ rad

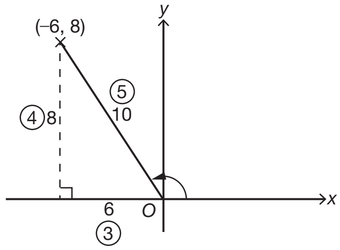
5 $840° = n(360°) + 120°$
$n = 2$, Sukuan/*Quadrant* II

6



$180° - 50° = 130°$
$A = 130°, 130° - 360°$
$= 130°, -230°$

7 (a)



(i) $\sin \theta = \frac{4}{5}$

(ii) kos/*cos* $\theta = -\frac{3}{5}$

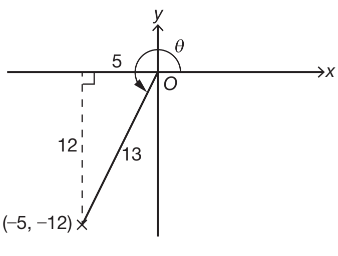
(iii) $\tan \theta = -\frac{4}{3}$

(iv) sek/*sec* $\theta = -\frac{5}{3}$

(v) kosek/*cosec* $\theta = \frac{5}{4}$

(vi) kot/*cot* $\theta = -\frac{3}{4}$

(b)



(i) $\sin \theta = -\frac{12}{13}$

(ii) kos/*cos* $\theta = -\frac{5}{13}$

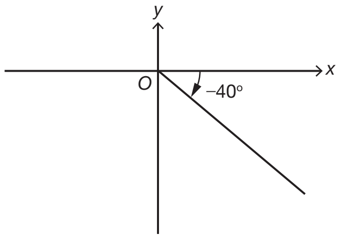
(iii) $\tan \theta = \frac{12}{5}$

(iv) sek/*sec* $\theta = -\frac{13}{5}$

(v) kosek/*cosec* $\theta = -\frac{13}{12}$

(vi) kot/*cot* $\theta = \frac{5}{12}$

(c)



(i) $\sin(-40°) = -\sin 40°$
$= -0.6428$

(ii) kos/*cos* $(-40°) =$ kos 40°/*cos* 40°
$= 0.7660$

(iii) $\tan(-40°) = -\tan 40°$
$= -0.8391$

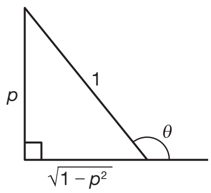
(iv) sek $(-40°) = \frac{1}{\text{kos}(-40°)} = 1.3055$

sec $(-40°) = \frac{1}{\cos(-40°)} = 1.3055$

(v) kosek/*cosec* $(-40°) = \frac{1}{\sin(-40°)}$
$= -1.5557$

(vi) kot/*cot* $(-40°) = \frac{1}{\tan(-40°)}$
$= -1.1918$

8 θ ialah sudut cakah, maka hanya $\sin \theta$ positif.
θ is an obtuse angle, therefore only $\sin \theta$ is positive.
$\sin \theta = p$ kos/*cos* $\theta = -\sqrt{1 - p^2}$ $\tan \theta = -\sqrt{1 - p^2}$



(a) $\tan(-\theta) = -\tan \theta$
$= \frac{p}{\sqrt{1 - p^2}}$

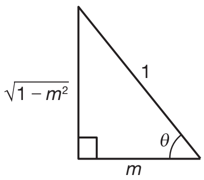
(b) $\sin(-\theta) = -\sin \theta$
$= -p$

(c) sek $(-\theta) = \frac{1}{\text{kos}(\theta)}$
$= \frac{1}{\text{kos}(\theta)}$
$= -\frac{1}{\sqrt{1 - p^2}}$

sec $(-\theta) = \frac{1}{\cos(\theta)}$
$= \frac{1}{\cos(\theta)}$
$= -\frac{1}{\sqrt{1 - p^2}}$

9 (a) kos/*cos* $(-\theta)$ = kos/*cos* θ

$= m$



(b) kos/*cos* $(90° - \theta)$

$= \sin \theta$ (sudut pelengkap/*complementary angles*)

$= \sqrt{1 - m^2}$

(c) kos $(180° - \theta)$/*cos* $(180° - \theta)$

= −kos θ (sudut penggenap)

−*cos* θ (*supplementary angle*)

$= -m$

10 (a) $A = 90° - 47°$

$= 43°$

(b) $20° + A = 90° - 36°$

$A = 54° - 20°$

$= 34°$

(c) $A - 25° = 90° - 15°$

$A = 75° + 25°$

$= 100°$

11 (a) sek $(-405°)$ = sek $(-45°)$

$= \dfrac{1}{\text{kos }(-45°)}$

$= \dfrac{1}{\text{kos }(45°)}$

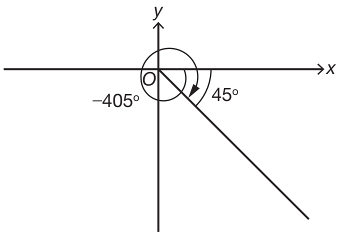
$= \sqrt{2}$

sec $(-405°)$ = *sec* $(-45°)$

$= \dfrac{1}{\cos(-45°)}$

$= \dfrac{1}{\cos(45°)}$

$= \sqrt{2}$

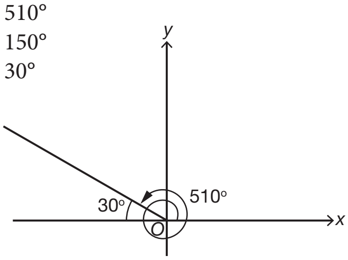


(b) $\sin\left(\dfrac{17\pi}{6}\right) = \sin 510°$

$= \sin 150°$

$= \sin 30°$

$= \dfrac{1}{2}$



(c) kot 1 140°

= kot [3(360°) + 60°]

= kot 60°

$= \dfrac{1}{\tan(60°)}$

$= \dfrac{1}{\sqrt{3}}$

cot 1 140°

= *cot* [3(360°) + 60°]

= *cot* 60°

$= \dfrac{1}{\tan(60°)}$

$= \dfrac{1}{\sqrt{3}}$

12 (a) kos/*cos* $A = \dfrac{\sin A}{\tan A}$

$= \dfrac{0.7547}{1.150}$

$= 0.6563$

(b) sek $A = \dfrac{1}{\text{kos } A}$

sec $A = \dfrac{1}{\cos A}$

$= \dfrac{1}{0.6563}$

$= 1.5237$

13 (a) kos $\left(\dfrac{\pi}{6}\right)$ + sek $\left(\dfrac{11\pi}{4}\right)$

= kos (30°) + sek (495°)

$= \dfrac{\sqrt{3}}{2} + \dfrac{1}{\text{kos } 135°}$

$= \dfrac{\sqrt{3}}{2} + \dfrac{1}{-\text{kos } 45°}$

$= \dfrac{\sqrt{3}}{2} - \sqrt{2}$

$= \dfrac{\sqrt{3} - 2\sqrt{2}}{2}$

cos $\left(\dfrac{\pi}{6}\right)$ + *sec* $\left(\dfrac{11\pi}{4}\right)$

= *cos* (30°) + *sec* (495°)

$= \dfrac{\sqrt{3}}{2} + \dfrac{1}{\cos 135°}$

$= \dfrac{\sqrt{3}}{2} + \dfrac{1}{-\cos 45°}$

$= \dfrac{\sqrt{3}}{2} - \sqrt{2}$

$= \dfrac{\sqrt{3} - 2\sqrt{2}}{2}$

(b) 2 sin 390° kot 225° − sin 90° kos 0

2 *sin* 390° *cot* 225° − *sin* 90° *cos* 0

$= 2 \sin 30° \dfrac{1}{\tan 225°} - (1)(1)$

$= 2\left(\dfrac{1}{2}\right)\left(\dfrac{1}{\tan 45°}\right) - 1$

$= 1 - 1$

$= 0$

(c) $\dfrac{\text{kot } 60° + \tan(-120°)}{\text{kos}^2 45°}$

$\dfrac{\cot 60° + \tan(-120°)}{\cos^2 45°}$

$= \dfrac{\dfrac{1}{\tan 60°} + \tan 60°}{\left(\dfrac{1}{\sqrt{2}}\right)^2}$

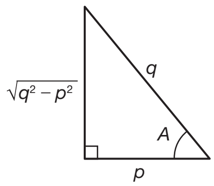
$= \left(\dfrac{1}{\sqrt{3}} + \sqrt{3}\right) \div \dfrac{1}{2}$

$= \left(\dfrac{1+3}{\sqrt{3}}\right) \times 2$

$= \dfrac{8\sqrt{3}}{3}$

14 kos/*cos* $A = \dfrac{p}{q}$, Sukuan/*Quadrant* IV

$\sin A = -\dfrac{\sqrt{q^2 - p^2}}{q}$ $\tan A = -\dfrac{\sqrt{q^2 - p^2}}{p}$

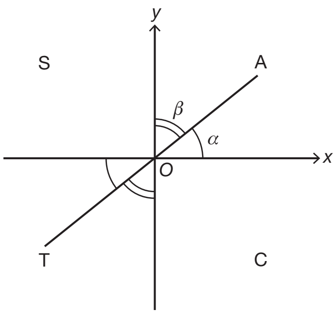


(a) $\sin(-A) = -\sin A$

$= \dfrac{\sqrt{q^2 - p^2}}{q}$

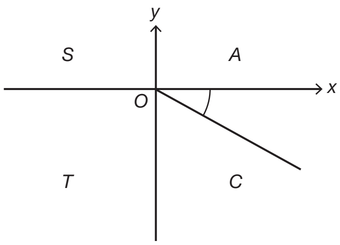
(b) $\tan A = -\frac{\sqrt{q^2 - p^2}}{p}$

15

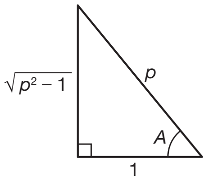


$\alpha + \beta = 90° + 360°n, n = 0, 1, 2, 3, \ldots$

16 sek/*sec* $A = p$ $\sin B = -q$



$\frac{1}{\text{kos}/\cos A} = p$



kos/*cos* $A = \frac{1}{p}$

$\sin A = -\frac{\sqrt{p^2 - 1}}{p}$

$\tan A = -\sqrt{p^2 - 1}$

(a) $\sin A + \sin B = \left(-\frac{\sqrt{p^2 - 1}}{p}\right) + (-q)$

$= -\left(\frac{\sqrt{p^2 - 1} + pq}{p}\right)$

(b) $\text{kosek}^2 B - \text{kot } A$

cosec^2 *B* – *cot A*

$= \frac{1}{\sin^2 B} - \frac{1}{\tan A}$

$= \frac{1}{(-q)^2} - \frac{1}{-\sqrt{p^2 - 1}}$

$= \frac{\sqrt{p^2 - 1} + q^2}{q^2\sqrt{p^2 - 1}}$

17

Fungsi/*Function*	(i)	(ii)	(iii)	(iv)	(v)
(a) $y = 3 \sin x - 1$	3	1	360°	$\begin{pmatrix} 0 \\ -1 \end{pmatrix}$	–
(b) $y = \text{kos } x + 2$ $y = \cos x + 2$	1	1	360°	$\begin{pmatrix} 0 \\ 2 \end{pmatrix}$	–
(c) $y = \tan x$	–	1	180°	$\begin{pmatrix} 0 \\ 0 \end{pmatrix}$	90°, 270°
(d) $y = -3 \text{ kos } 2x + 4$ $y = -3 \cos 2x + 4$	3	2	180°	$\begin{pmatrix} 0 \\ 4 \end{pmatrix}$	–
(e) $y = 2 - 3 \tan 2x$	–	2	90	$\begin{pmatrix} 0 \\ 2 \end{pmatrix}$	45°, 135°, 225°, 315°

18 (a) $y = 2 \sin 6x + 3$

(b) $y = 3 \text{ kos } \frac{2}{3}x + 1 \ldots$ ①

$y = 3 \cos \frac{2}{3}x + 1 \ldots$ ①

Gantikan (0, 4) ke dalam fungsi ①,

Substitute (0, 4) *into function* ①,

$4 = 3$ kos/*cos* $0 + c$

$c = 4 - 3$

$c = 1$

$\therefore y = 3 \text{ kos } \frac{2}{3}x + 1$

$y = 3 \cos \frac{2}{3}x + 1$

19 (a) $y = \text{kos } 3x - \frac{1}{2}$

$y = \cos 3x - \frac{1}{2}$

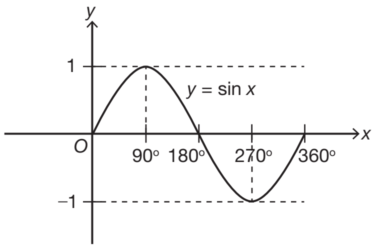
(b) $y = |2 \sin 2x| - 1$

(c) $y = -|\tan 2x| + 2$

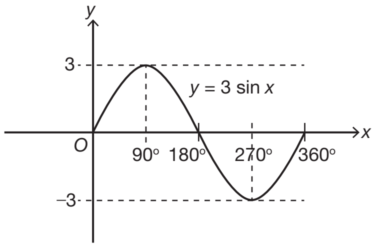
(d) $y = 2 \text{ kos } x$

$y = 2 \cos x$

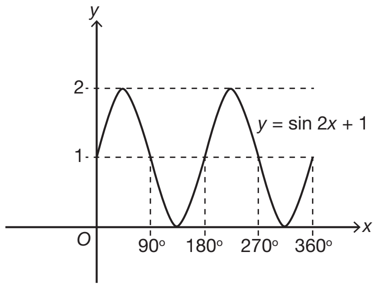
20 (a) $y = \sin x$



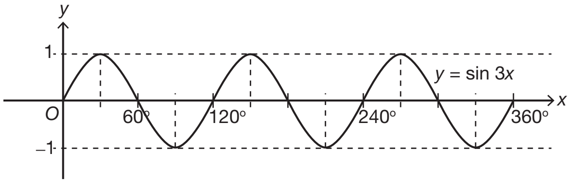
(b) $y = 3 \sin x$



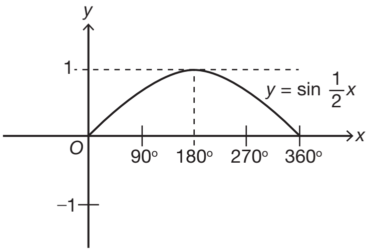
(c) $y = \sin 2x + 1$



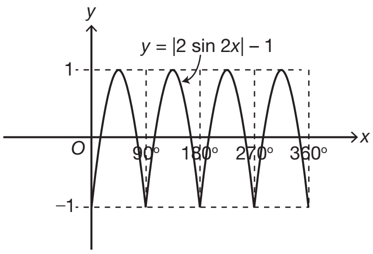
(d) $y = \sin 3x$



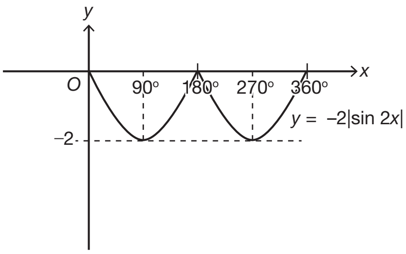
(e) $y = \sin \frac{1}{2}x$



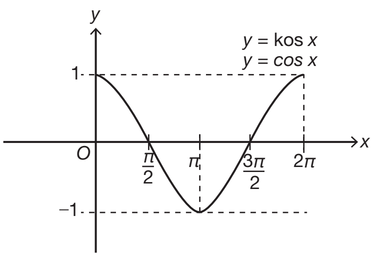
(f) $y = |2 \sin 2x| - 1$



(g) $y = -2\ |\sin x|$

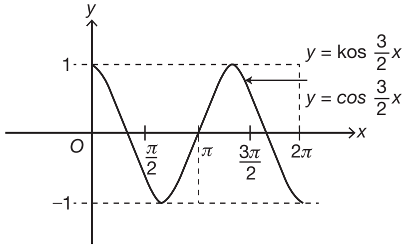


(h) $y = \text{kos } x$
$y = cos\ x$

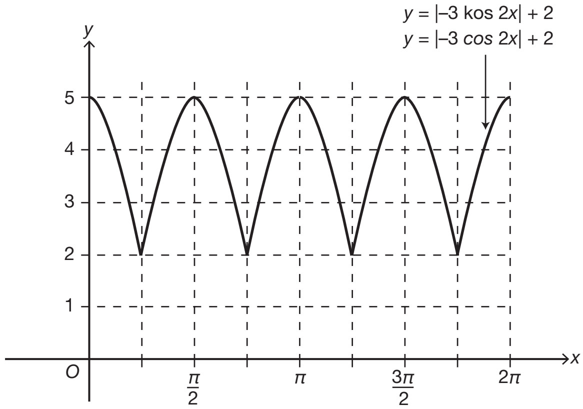


(i) $y = \text{kos } \frac{3}{2}x$

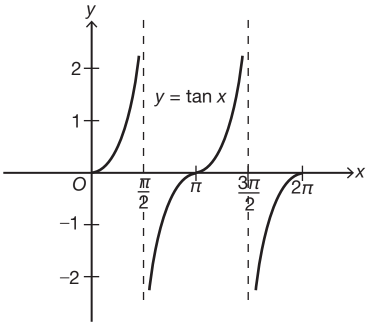
$y = cos\ \frac{3}{2}x$



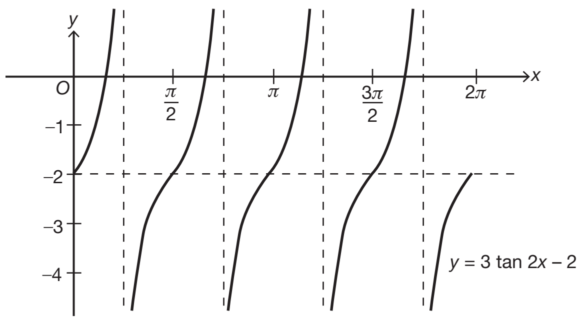
(j) $y = |-3 \text{ kos } 2x| + 2$
$y = |-3\ cos\ 2x| + 2$



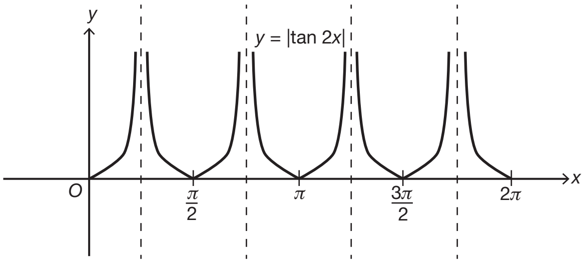
(k) $y = \tan x$



(l) $y = 3 \tan 2x - 2$



(m) $y = |\tan 2x|$

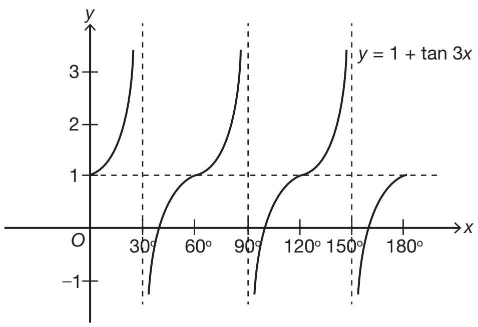


21 $a = \dfrac{5 - 1}{2}$
$= 2$

$b = \dfrac{360°}{120°}$
$= 3$

c = translasi dari 2 ke 5/*translation from* 2 *to* 5
$= 3$

22 Kala/*Period* $= \dfrac{180°}{3}$
$= 60°$



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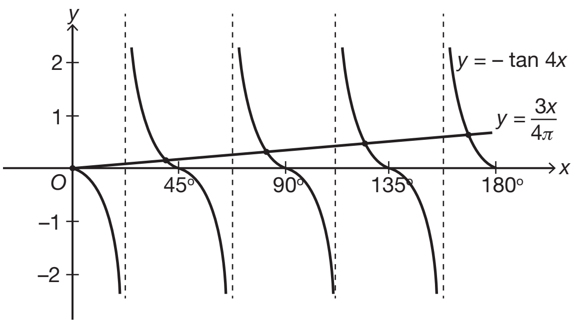


$\dfrac{3x}{\pi} = -4 \tan 4x$

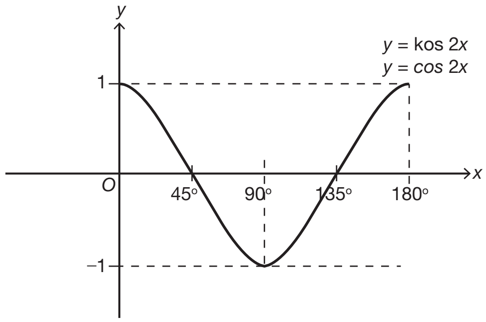
$\dfrac{3x}{4\pi} = -\tan 4x$

$y = \dfrac{3x}{4\pi}$

x	0	π
y	0	0.75

Bilangan penyelesaian/*Number of solutions* = 5

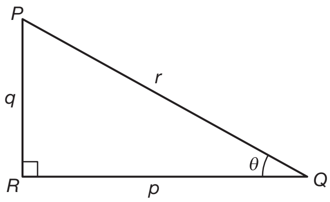
24



Julat/*Range* = $45° < x < 135°$

25 $\sin \theta = \dfrac{q}{r}$ kos/*cos* $\theta = \dfrac{p}{r}$ $\tan \theta = \dfrac{q}{p}$

kosek/*cosec* $\theta = \dfrac{r}{q}$ sek/*sec* $\theta = \dfrac{r}{p}$ kot/*cot* $\theta = \dfrac{p}{q}$



(a) $\sin^2 \theta + \text{kos}^2 \theta = \left(\dfrac{q}{r}\right)^2 + \left(\dfrac{p}{r}\right)^2$

$\sin^2 \theta + \cos^2 \theta = \left(\dfrac{q}{r}\right)^2 + \left(\dfrac{p}{r}\right)^2$

$= \dfrac{q^2 + p^2}{r^2}$

$= \dfrac{r^2}{r^2}$

$= 1$

(b) $1 + \tan^2 \theta = 1 + \left(\dfrac{q}{p}\right)^2$

$= \left(\dfrac{p^2 + q^2}{p^2}\right)$

$= \left(\dfrac{r^2}{p^2}\right)$

$= \left(\dfrac{r}{p}\right)^2$

$= \text{sek}^2/\sec^2 \theta$

(c) $1 + \text{kot}^2 \theta = 1 + \left(\dfrac{p}{q}\right)^2$

$1 + \cot^2 \theta = 1 + \left(\dfrac{p}{q}\right)^2$

$= \left(\dfrac{q^2 + p^2}{q^2}\right)$

$= \left(\dfrac{r^2}{q^2}\right)$

$= \left(\dfrac{r}{q}\right)^2$

$= \text{kosek}^2 \theta$
$\text{cosec}^2 \theta$

26 (a) (sek 35° – tan 35°)(sek 35° + tan 35°)
$= \text{sek}^2 35° - \tan^2 35°$
(sec 35° – tan 35°)(sec 35° + tan 35°) = $sec^2 35° - tan^2 35°$
$= 1 + \tan^2 35° - \tan^2 35°$
$= 1$

(b) $\sin^2\left(-\frac{\pi}{5}\right) + \text{kos}^2\left(-\frac{\pi}{5}\right) = 1$
$sin^2\left(-\frac{\pi}{5}\right) + cos^2\left(-\frac{\pi}{5}\right) = 1$

(c) $\text{kosek}^2 (410°) - \text{kot}^2 (410°) = 1 + \text{kot}^2 (410°) - \text{kot}^2 (410°) = 1$
$cosec^2 (410°) - cot^2 (410°) = 1 + cot^2 (410°) - cot^2 (410°) = 1$

27 (a) $4 - \text{kos}^2 x / 4 - cos^2 x = 4 - (1 - \sin^2 x)$
$= 4 - 1 + \sin^2 x$
$= 3 + \sin^2 x$

(b) kot x (kot x – tan x) | *cot x (cot x – tan x)*
$= \text{kot}^2 x - \text{kot } x \tan x$ | $= cot^2 x - cot\, x\, tan\, x$
$= \text{kosek}^2 x - 1 - 1$ | $= cosec^2 x - 1 - 1$
$= \text{kosek}^2 x - 2$ | $= cosec^2 x - 2$

(c) (sek x – tan x)(kosek x + 1)
$= \left(\frac{1}{\text{kos } x} - \frac{\sin x}{\text{kos } x}\right)\left(\frac{1}{\sin x} + 1\right)$
$= \left(\frac{1 - \sin x}{\text{kos } x}\right)\left(\frac{1 + \sin x}{\sin x}\right)$
$= \frac{1 - \sin^2 x}{\text{kos } x \sin x}$
$= \frac{\text{kos}^2 x}{\text{kos } x \sin x}$
$= \frac{\text{kos } x}{\sin x}$
$= \text{kot } x$

(sec x – tan x)(cosec x + 1)
$= \left(\frac{1}{cos\, x} - \frac{sin\, x}{cos\, x}\right)\left(\frac{1}{sin\, x} + 1\right)$
$= \left(\frac{1 - sin\, x}{cos\, x}\right)\left(\frac{1 + sin\, x}{sin\, x}\right)$
$= \frac{1 - sin^2 x}{cos\, x\, sin\, x}$
$= \frac{cos^2 x}{cos\, x\, sin\, x}$
$= \frac{cos\, x}{sin\, x}$
$= cot\, x$

(d) $\text{kot}^2 x - \text{kos}^2 x$
$= \frac{\text{kos}^2 x}{\sin^2 x} - \text{kos}^2 x$
$= \frac{\text{kos}^2 x - \text{kos}^2 x \sin^2 x}{\sin^2 x}$
$= \frac{\text{kos}^2 x(1 - \sin^2 x)}{\sin^2 x}$
$= \text{kot}^2 x\, \text{kos}^2 x$

$cot^2 x - cos^2 x$
$= \frac{cos^2 x}{sin^2 x} - cos^2 x$
$= \frac{cos^2 x - cos^2 x\, sin^2 x}{sin^2 x}$
$= \frac{cos^2 x(1 - sin^2 x)}{sin^2 x}$
$= cot^2 x\, cos^2 x$

(e) $\frac{\text{kos } x \sin x}{\tan x}$ | $\frac{cos\, x\, sin\, x}{tan\, x}$
$= \frac{\text{kos}^2 x \sin x}{\sin x}$ | $= \frac{cos^2 x\, sin\, x}{sin\, x}$
$= \text{kos}^2 x$ | $= cos^2 x$
$= 1 - \sin^2 x$ | $= 1 - sin^2 x$

(f) $(\text{kosek } x - \text{kot } x)^2$ | $(cosec\, x - cot\, x)^2$
$= \left(\frac{1}{\sin x} - \frac{\text{kos } x}{\sin x}\right)^2$ | $= \left(\frac{1}{sin\, x} - \frac{cos\, x}{sin\, x}\right)^2$
$= \frac{(1 - \text{kos } x)^2}{\sin^2 x}$ | $= \frac{(1 - cos\, x)^2}{sin^2 x}$
$= \frac{(1 - \text{kos } x)^2}{1 - \text{kos}^2 x}$ | $= \frac{(1 - cos\, x)^2}{1 - cos^2 x}$
$= \frac{(1 - \text{kos } x)^2}{(1 - \text{kos } x)(1 + \text{kos } x)}$ | $= \frac{(1 - cos\, x)^2}{(1 - cos\, x)(1 + cos\, x)}$
$= \frac{1 - \text{kos } x}{1 + \text{kos } x}$ | $= \frac{1 - cos\, x}{1 + cos\, x}$

(g) kosek x – kot x | *cosec x – cot x*
$= \frac{1}{\sin x} - \frac{\text{kos } x}{\sin x}$ | $= \frac{1}{sin\, x} - \frac{cos\, x}{sin\, x}$
$= \frac{1 - \text{kos } x}{\sin x}$ | $= \frac{1 - cos\, x}{sin\, x}$
$= \frac{(1 - \text{kos } x) \sin x}{\sin^2 x}$ | $= \frac{(1 - cos\, x)\, sin\, x}{sin^2 x}$
$= \frac{(1 - \text{kos } x) \sin x}{1 - \text{kos}^2 x}$ | $= \frac{(1 - cos\, x)\, sin\, x}{1 - cos^2 x}$
$= \frac{(1 - \text{kos } x) \sin x}{(1 + \text{kos } x)(1 - \text{kos } x)}$ | $= \frac{(1 - cos\, x)\, sin\, x}{(1 + cos\, x)(1 - cos\, x)}$
$= \frac{\sin x}{1 + \text{kos } x}$ | $= \frac{sin\, x}{1 + cos\, x}$

(h) $(\sin x + \text{kos } x)(1 - \sin x\, \text{kos } x)$
$= \sin x - \sin^2 x\, \text{kos } x + \text{kos } x - \sin x\, \text{kos}^2 x$
$= \sin x\, (1 - \text{kos}^2 x) + \text{kos } x\, (1 - \sin^2 x)$
$= \sin x\, (\sin^2 x) + \text{kos } x\, (\text{kos}^2 x)$
$= \sin^3 x + \text{kos}^3 x$

$(sin\, x + cos\, x)(1 - sin\, x\, cos\, x)$
$= sin\, x - sin^2 x\, cos\, x + cos\, x - sin\, x\, cos^2 x$
$= sin\, x\, (1 - cos^2 x) + cos\, x\, (1 - sin^2 x)$
$= sin\, x\, (sin^2 x) + cos\, x\, (cos^2 x)$
$= sin^3 x + cos^3 x$

(i) $\text{kosek}^2 x + \text{kot}^2 x$ | $cosec^2 x + cot^2 x$
$= \frac{1}{\sin^2 x} + \frac{\text{kos}^2 x}{\sin^2 x}$ | $= \frac{1}{sin^2 x} + \frac{cos^2 x}{sin^2 x}$
$= \frac{1 + \text{kos}^2 x}{\sin^2 x}$ | $= \frac{1 + cos^2 x}{sin^2 x}$
$= \frac{1 + 1 - \sin^2 x}{\sin^2 x}$ | $= \frac{1 + 1 - sin^2 x}{sin^2 x}$
$= \frac{2 - \sin^2 x}{\sin^2 x}$ | $= \frac{2 - sin^2 x}{sin^2 x}$
$= \frac{2}{\sin^2 x} - \frac{\sin^2 x}{\sin^2 x}$ | $= \frac{2}{sin^2 x} - \frac{sin^2 x}{sin^2 x}$
$= 2\, \text{kosek}^2 x - 1$ | $= 2\, cosec^2 x - 1$

(j) $\frac{1}{\text{kos}^2 x} + \frac{1}{\sin^2 x}$
$= \frac{\sin^2 x + \text{kos}^2 x}{\text{kos}^2 x \sin^2 x}$
$= \frac{1}{\text{kos}^2 x \sin^2 x}$
$= \frac{1}{\sin^2 x}\left(\frac{1}{\text{kos}^2 x}\right)$
$= \text{kosek}^2 x \text{ sek}^2 x$

$\frac{1}{\cos^2 x} + \frac{1}{\sin^2 x}$
$= \frac{\sin^2 x + \cos^2 x}{\cos^2 \sin^2 x}$
$= \frac{1}{\cos^2 \sin^2 x}$
$= \frac{1}{\sin^2 x}\left(\frac{1}{\cos^2 x}\right)$
$= \text{cosec}^2 x \sec^2 x$

(k) $3 \tan^2 x + \text{sek}^2 x$
$= 3\left(\frac{\sin^2 x}{\text{kos}^2 x}\right) + \frac{1}{\text{kos}^2 x}$
$= \frac{3 \sin^2 x + 1}{\text{kos}^2 x}$
$= \frac{3(1 - \text{kos}^2 x) + 1}{\text{kos}^2 x}$
$= \frac{3 - 3 \text{ kos}^2 x + 1}{\text{kos}^2 x}$
$= \frac{4}{\text{kos}^2 x} - \frac{3 \text{ kos}^2 x}{\text{kos}^2 x}$
$= 4 \text{ sek}^2 x - 3$

$3 \tan^2 x + \sec^2 x$
$= 3\left(\frac{\sin^2 x}{\cos^2 x}\right) + \frac{1}{\cos^2 x}$
$= \frac{3 \sin^2 x + 1}{\cos^2 x}$
$= \frac{3(1 - \cos^2 x) + 1}{\cos^2 x}$
$= \frac{3 - 3 \cos^2 x + 1}{\cos^2 x}$
$= \frac{4}{\cos^2 x} - \frac{3 \cos^2 x}{\cos^2 x}$
$= 4 \sec^2 x - 3$

28 (a) $\text{kos}^2 A$
$\cos^2 A$
$= 1 - \sin^2 x$
$= 1 - p^2$

(b) $\text{sek}^2 A \text{ kosek}^2$
$= \frac{1}{\text{kos}^2 x}\left(\frac{1}{\sin^2 x}\right)$
$= \frac{1}{p^2(1 - p^2)}$

$\sec^2 A \text{ cosec}^2 A$
$= \frac{1}{\cos^2 x}\left(\frac{1}{\sin^2 x}\right)$
$= \frac{1}{p^2(1 - p^2)}$

29 $\sin^2 x + 4 \text{ kos } x + 2$
$= 1 - \text{kos}^2 x + 4 \text{ kos } x + 2$
$= 3 - (\text{kos}^2 x - 4 \text{ kos } x)$
$= 3 - [(\text{kos } x - 2)^2 - 4]$
$= 3 - (\text{kos } x - 2)^2 + 4$
$= 7 - (\text{kos } x - 2)^2$

$\sin^2 x + 4 \cos x + 2$
$= 1 - \cos^2 + 4 \cos x + 2$
$= 3 - (\cos^2 - 4 \cos x)$
$= 3 - [(\cos x - 2)^2 - 4]$
$= 3 - (\cos x - 2)^2 + 4$
$= 7 - (\cos x - 2)^2$

Diketahui bahawa $-1 \leqslant \text{kos } x \leqslant 1$.
It is known that $-1 \leqslant \cos x \leqslant 1$.
Minimum: $\sin^2 x + 4$ kos/*cos* $x + 2$
$= 7 - (-1 - 2)^2$
$= 7 - 9$
$= -2$
Maksimum/*Maximum*: $\sin^2 x + 4$ kos/*cos* $x + 2$
$= 7 - (1 - 2)^2$
$= 7 - 1$
$= 6$

30 $(3 + 2 \sin x)^2 + (3 - 2 \sin x)^2 + 8 \text{ kos}^2 x$
$= 9 + 12 \sin x + 4 \sin^2 x + 9 - 12 \sin x + 4 \sin^2 x + 8 \text{ kos}^2 x$
$= 18 + 8 \sin^2 x + 8 \text{ kos}^2 x$
$= 18 + 8(\sin^2 x + \text{kos}^2 x)$
$= 18 + 8$
$= 26$
$(3 + 2 \sin x)^2 + (3 - 2 \sin x)^2 + 8 \cos^2 x$
$= 9 + 12 \sin x + 4 \sin^2 x + 9 - 12 \sin x + 4 \sin^2 x + 8 \cos^2 x$
$= 18 + 8 \sin^2 x + 8 \cos^2 x$
$= 18 + 8(\sin^2 x + \cos^2 x)$
$= 18 + 8$
$= 26$

31 $\text{kos } \theta \text{ kot } \theta + \sin \theta$
$= \text{kos } \theta\left(\frac{\text{kos } \theta}{\sin \theta}\right) + \sin \theta$
$= \frac{\text{kos}^2 \theta + \sin^2 \theta}{\sin \theta}$
$= \frac{1}{\sin \theta}$
$= \text{kosek } \theta$

$\cos \theta \cot \theta + \sin \theta$
$= \cos \theta\left(\frac{\cos \theta}{\sin \theta}\right) + \sin \theta$
$= \frac{\cos^2 \theta + \sin^2 \theta}{\sin \theta}$
$= \frac{1}{\sin \theta}$
$= \text{cosec } \theta$

$\text{kos } \theta \text{ kot } \theta + \sin \theta = 4$
$\text{kosek } \theta = 4$
$\frac{1}{\sin \theta} = 4$
$\sin \theta = 0.25$
$\theta = 14.5°$

$\cos \theta \cot \theta + \sin \theta = 4$
$\text{cosec } \theta = 4$
$\frac{1}{\sin \theta} = 4$
$\sin \theta = 0.25$
$\theta = 14.5°$

32 (a) $\sin 75° = \sin (30° + 45)$
$= \sin 30° \text{ kos } 45° + \sin 45° \text{ kos } 30°$
$\sin 30° \cos 45° + \sin 45° \cos 30°$
$= \frac{1}{2}\left(\frac{1}{\sqrt{2}}\right) + \frac{1}{\sqrt{2}}\left(\frac{\sqrt{3}}{2}\right)$
$= \frac{1 + \sqrt{3}}{2\sqrt{2}}$

(b) kos 105°
cos 105°
$= \text{kos } (60° + 45°)$
$\cos (60° + 45°)$
$= \text{kos } 60° \text{ kos } 45° - \sin 60° \sin 45°$
$\cos 60° \cos 45° - \sin 60° \sin 45°$
$= \frac{1}{2}\left(\frac{1}{\sqrt{2}}\right) - \frac{\sqrt{3}}{2}\left(\frac{1}{\sqrt{2}}\right)$
$= \frac{1 - \sqrt{3}}{2\sqrt{2}}$

(c) $\tan 210° = \tan (180° + 30°)$
$= \frac{\tan 180° + \tan 30°}{1 - \tan 180° \tan 30°}$
$= \frac{0 + \frac{1}{\sqrt{3}}}{1 - 0\left(\frac{1}{\sqrt{3}}\right)}$
$= \frac{1}{\sqrt{3}}$

(d) kos 15°
$= \text{kos } (60° - 45°)$
$= \text{kos } 60° \text{ kos } 45° + \sin 60° \sin 45°$
$= \frac{1}{2}\left(\frac{1}{\sqrt{2}}\right) + \frac{\sqrt{3}}{2}\left(\frac{1}{\sqrt{2}}\right)$
$= \frac{1 + \sqrt{3}}{2\sqrt{2}}$
cos 15°
$= \cos (60° - 45°)$
$= \cos 60° \cos 45° + \sin 60° \sin 45°$
$= \frac{1}{2}\left(\frac{1}{\sqrt{2}}\right) + \frac{\sqrt{3}}{2}\left(\frac{1}{\sqrt{2}}\right)$
$= \frac{1 + \sqrt{3}}{2\sqrt{2}}$

(e) $\sin(-15°) = \sin(45° - 60°)$

$= \sin 45° \text{ kos } 60° - \sin 60° \text{ kos } 45°$

sin 45° *cos* 60° – *sin* 45° *cos* 60°

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

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

(f) $\tan 300° = \tan(360° - 60°)$

$= \frac{\tan 360° - \tan 60°}{1 + \tan 360° \tan 60°}$

$= \frac{0 - \sqrt{3}}{1 + 0(\sqrt{3})}$

$= -\sqrt{3}$

33 (a) sin 39° kos/*cos* 21° + sin 21° kos/*cos* 39°

$= \sin(39° + 21°)$

$= \sin 60°$

$= \frac{\sqrt{3}}{2}$

(b) sin 142° kos/*cos* 22° – sin 22° kos/*cos* 142°

$= \sin(142° - 22°)$

$= \sin 120°$

$= \sin 60°$

$= \frac{\sqrt{3}}{2}$

(c) kos/*cos* 48° kos/*cos* 78° + sin 48 °sin 78°

= kos/*cos* (48° – 78°)

$= \text{kos}(-30°)$

$= \text{kos } 30°$

$= \frac{\sqrt{3}}{2}$

(d) kos 190° kos 125° – sin 190° sin 125°

$= \text{kos}(190° + 125°)$

$= \text{kos}(315°)$

$= \text{kos } 45°$

$= \frac{1}{\sqrt{2}}$

cos 190° *cos* 125° – *sin* 190° *sin* 125°

$= \cos(190° + 125°)$

$= \cos 315°$

$= \cos 45°$

$= \frac{1}{\sqrt{2}}$

(e) $\frac{\tan 100° + \tan 140°}{1 - \tan 100° \tan 140°} = \tan(100° + 140°)$

$= \tan 240°$

$= \tan 60°$

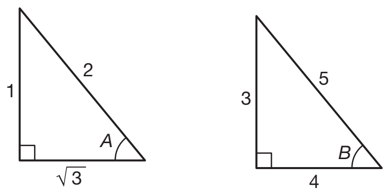
$= \sqrt{3}$

(f) $\frac{\tan 80° - \tan 35°}{1 + \tan 80° \tan 35°} = \tan(80° - 35°)$

$= \tan 45°$

$= 1$

34 (a)



$\sin(A + B) = \sin A \text{ kos } B + \sin B \text{ kos } A$

$\sin(A + B) = \sin A \cos B + \sin B \cos A$

$= \frac{1}{2}\left(\frac{4}{5}\right) + \frac{3}{5}\left(\frac{\sqrt{3}}{2}\right)$

$= \frac{4 + 3\sqrt{3}}{10}$

(b) $\text{kos}(A + B) = \text{kos } A \text{ kos } B - \sin A \sin B$

$\cos(A + B) = \cos A \cos B - \sin A \sin B$

$= \frac{\sqrt{3}}{2}\left(\frac{4}{5}\right) - \frac{1}{2}\left(\frac{3}{5}\right)$

$= \frac{4\sqrt{3} - 3}{10}$

(c) $\tan(B - A) = \frac{\tan B - \tan A}{1 + \tan B \tan A}$

$= \left(\frac{3}{4} - \frac{1}{\sqrt{3}}\right) \div \left[1 + \frac{3}{4}\left(\frac{1}{\sqrt{3}}\right)\right]$

$= \frac{3\sqrt{3} - 4}{4\sqrt{3}} \times \frac{4\sqrt{3}}{4\sqrt{3} + 3}$

$= \frac{3\sqrt{3} - 4}{4\sqrt{3} + 3}$

$= \frac{(3\sqrt{3} - 4)(4\sqrt{3} - 3)}{16(3) - 9}$

$= \frac{12(3) - 9\sqrt{3} - 16\sqrt{3} + 12}{39}$

$= \frac{48 - 25\sqrt{3}}{39}$

35 (a) 2 sin 22.5° kos 22.5°

2 *sin* 22.5° *cos* 22.5°

$= \sin 2(22.5°)$

$= \sin 45°$

$= \frac{1}{\sqrt{2}}$

(b) $\text{kos}^2 15° - \sin^2 15°$ | $\cos^2 15° - \sin^2 15°$

$= \text{kos } 2(15°)$ | $= \cos 2(15°)$

$= \text{kos } 30°$ | $= \cos 30°$

$= \frac{\sqrt{3}}{2}$ | $= \frac{\sqrt{3}}{2}$

(c) $2 \text{ kos}^2 105° - 1$ | $2 \cos^2 105° - 1$

$= \text{kos } 2(105°)$ | $= \cos 2(105°)$

$= \text{kos } 210°$ | $= \cos 210°$

$= -\text{ kos } 30°$ | $= -\cos 30°$

$= -\frac{\sqrt{3}}{2}$ | $= -\frac{\sqrt{3}}{2}$

(d) $1 - 2\sin^2 75°$ | $1 - 2\sin^2 75°$

$= \text{kos } 2(75°)$ | $= \cos 2(75°)$

$= \text{kos } 150°$ | $= \cos 150°$

$= -\text{ kos } 30°$ | $= -\cos 30°$

$= -\frac{\sqrt{3}}{2}$ | $= = -\frac{\sqrt{3}}{2}$

(e) $\frac{2\tan 165°}{1 - \tan^2 165°} = \tan 2(165°)$

$= \tan 330°$

$= -\tan 30°$

$= -\frac{1}{\sqrt{3}}$

36 (a) $(\text{kos } A + \sin A)(\text{kos } B - \sin B)$

$= \text{kos } A \text{ kos } B - \sin B \text{ kos } A + \sin A \text{ kos } B - \sin A \sin B$

$= (\text{kos } A \text{ kos } B - \sin A \sin B) + (\sin A \text{ kos } B - \sin B \text{ kos } A)$

$= \text{kos } (A + B) + \sin (A - B)$

$(\cos A + \sin A)(\cos B - \sin B)$

$= \cos A \cos B - \sin B \cos A + \sin A \cos B - \sin A \sin B$

$= (\cos A \cos B - \sin A \sin B) + (\sin A \cos B - \sin B \cos A)$

$= \cos (A + B) + \sin (A - B)$

(b) $\dfrac{\tan 2x}{1 - \text{sek } 2x}$

$= \dfrac{\sin 2x}{\text{kos } 2x} \div \left(1 - \dfrac{1}{\text{kos } 2x}\right)$

$= \dfrac{\sin 2x}{\text{kos } 2x} \times \dfrac{\text{kos } 2x}{\text{kos } 2x - 1}$

$= \dfrac{2 \sin x \text{ kos } x}{1 - 2\sin^2 x - 1}$

$= \dfrac{2 \sin x \text{ kos } x}{-2 \sin^2 x}$

$= -\text{ kot } x$

$\dfrac{\tan 2x}{1 - \sec 2x}$

$= \dfrac{\sin 2x}{\cos 2x} \div \left(1 - \dfrac{1}{\cos 2x}\right)$

$= \dfrac{\sin 2x}{\cos 2x} \times \dfrac{\cos 2x}{\cos 2x - 1}$

$= \dfrac{2 \sin x \cos x}{1 - 2\sin^2 x - 1}$

$= \dfrac{2 \sin x \cos x}{-2 \sin^2 x}$

$= -\cot x$

(c) $\tan x - \text{kot } x$

$= \tan x - \dfrac{1}{\tan x}$

$= \dfrac{\tan^2 x - 1}{\tan x}$

$= \dfrac{-2(\tan^2 x - 1)}{-2 \tan x}$

$= \dfrac{-2(1 - \tan^2 x)}{2 \tan x}$

$= -\text{ 2 kot } 2x$

$\tan x - \cot x$

$= \tan x - \dfrac{1}{\tan x}$

$= \dfrac{\tan^2 x - 1}{\tan x}$

$= \dfrac{-2(\tan^2 x - 1)}{-2 \tan x}$

$= \dfrac{-2(1 \tan^2 x)}{2 \tan x}$

$= -2 \cot 2x$

(d) $(2 \sin x - \text{kosek } x)(\tan 2x)$

$= \left(2 \sin x - \dfrac{1}{\sin x}\right)\left(\dfrac{2 \tan x}{1 - \tan^2 x}\right)$

$= \left(\dfrac{2 \sin^2 x - 1}{\sin x}\right)\left(\dfrac{2 \sin x}{\text{kos } x}\right) \div \left(1 - \dfrac{\sin^2 x}{\text{kos}^2 x}\right)$

$= \left(\dfrac{2 \sin^2 x - 1}{\sin x}\right)\left(\dfrac{2 \sin x}{\text{kos } x}\right)\left(\dfrac{\text{kos}^2 x}{\text{kos}^2 x - \sin^2 x}\right)$

$= (2 \sin^2 x - 1)\left(\dfrac{2 \text{ kos } x}{\text{kos}^2 x - \sin^2 x}\right)$

$= -(1 - 2 \sin^2 x)\left(\dfrac{2 \text{ kos } x}{\text{kos } 2x}\right)$

$= -(\text{kos } 2x)\left(\dfrac{2 \text{ kos } x}{\text{kos } 2x}\right)$

$= -2 \text{ kos } x$

$(2 \sin x - \text{cosec } x)(\tan 2x)$

$= \left(2 \sin x - \dfrac{1}{\sin x}\right)\left(\dfrac{2 \tan x}{1 - \tan^2 x}\right)$

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

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

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

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

$= -(\cos 2x)\left(\dfrac{2 \cos x}{\cos 2x}\right)$

$= -2 \cos x$

(e) $\dfrac{1}{\text{sek } x + 1} + \dfrac{1}{\text{sek } x - 1}$

$= \dfrac{\text{sek } x - 1 + \text{sek } x + 1}{\text{sek}^2 x - 1}$

$= \dfrac{2 \text{ sek } x}{\tan^2 x}$

$= \dfrac{2}{\text{kos } x\left(\dfrac{\sin^2 x}{\text{kos}^2 x}\right)}$

$= \dfrac{2}{\sin x\left(\dfrac{\sin x}{\text{kos } x}\right)}$

$= \dfrac{2}{\sin x \tan x}$

$= 2 \text{ kosek } x \text{ kot } x$

$\dfrac{1}{\sec x + 1} + \dfrac{1}{\sec x - 1}$

$= \dfrac{\sec x - 1 + \sec x + 1}{\sec^2 x - 1}$

$= \dfrac{2 \sec x}{\tan^2 x}$

$= \dfrac{2}{\cos x\left(\dfrac{\sin^2 x}{\cos^2 x}\right)}$

$= \dfrac{2}{\sin x\left(\dfrac{\sin x}{\cos x}\right)}$

$= \dfrac{2}{\sin x \tan x}$

$= 2 \text{ cosec } x \cot x$

(f) $\text{kos}^3 \theta - 3 \sin^2 \theta \text{ kos } \theta$

$= \text{kos } \theta (\text{kos}^2 \theta - 3 \sin^2 \theta)$

$= \text{kos } \theta (\text{kos}^2 \theta - \sin^2 \theta - 2 \sin^2 \theta)$

$= \text{kos } \theta (\text{kos } 2\theta) - 2 \sin^2 \theta \text{ kos } \theta$

$= \text{kos } \theta (\text{kos } 2\theta) - \sin \theta (\sin 2\theta)$

$= \text{kos } (\theta + 2\theta)$

$= \text{kos } 3\theta$

$\cos^3 \theta - 3 \sin^2 \theta \cos \theta$

$= \cos \theta (\cos^2 \theta - 3 \sin^2 \theta)$

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

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

$= \cos \theta (\cos 2\theta) - \sin \theta (\sin 2\theta)$

$= \cos (\theta + 2\theta)$

$= \cos 3\theta$

(g) $\tan x = \tan 2\left(\dfrac{x}{2}\right)$

$= \dfrac{2 \tan \left(\dfrac{x}{2}\right)}{1 - \tan^2 \left(\dfrac{x}{2}\right)}$

(h) $\text{kosek } 2x - \tan x$

$= \dfrac{1}{\sin 2x} - \dfrac{\sin x}{\text{kos } x}$

$= \dfrac{1}{2 \sin x \text{ kos } x} - \dfrac{\sin x}{\text{kos } x}$

$= \dfrac{1 - 2 \sin^2 x}{2 \sin x \text{ kos } x}$

$= \dfrac{\text{kos } 2x}{\sin 2x}$

$= \text{kot } 2x$

$\text{cosec } 2x - \tan x$

$= \dfrac{1}{\sin 2x} - \dfrac{\sin x}{\cos x}$

$= \dfrac{1}{2 \sin x \cos x} - \dfrac{\sin x}{\cos x}$

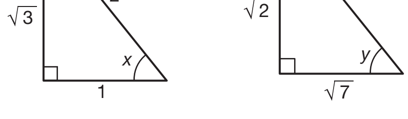
$= \dfrac{1 - 2 \sin^2 x}{2 \sin x \cos x}$

$= \dfrac{\cos 2x}{\sin 2x}$

$= \cot 2x$

37 (a) Diberi $\text{kos } x = -\dfrac{1}{2}$, $\sin y = -\dfrac{\sqrt{2}}{3}$ dan kedua-dua sudut x dan y berada dalam Sukuan III.

Given $\cos x = -\dfrac{1}{2}$, $\sin y = -\dfrac{\sqrt{2}}{3}$ and both angles x and y lie in Quadrant III.



(i) $\tan 2x = \dfrac{2 \tan x}{1 - \tan^2 x}$

$= \dfrac{2\sqrt{3}}{1 - (\sqrt{3})^2}$

$= \dfrac{2\sqrt{3}}{-2}$

$= -\sqrt{3}$

(ii) kos $(x + y)$
cos $(x + y)$
$= \text{kos } x \text{ kos } y - \sin x \sin y$
cos x cos y – sin x sin y

$= \left(-\dfrac{1}{2}\right)\left(-\dfrac{\sqrt{7}}{3}\right) - \left(-\dfrac{\sqrt{3}}{2}\right)\left(-\dfrac{\sqrt{2}}{3}\right)$

$= \dfrac{\sqrt{7} - \sqrt{6}}{6}$

(iii) $\sin \dfrac{x}{2}$

$\text{kos } 2\left(\dfrac{x}{2}\right) = 1 - 2\sin^2\left(\dfrac{x}{2}\right)$ $\quad cos\ 2\left(\dfrac{x}{2}\right) = 1 - 2\ sin^2\left(\dfrac{x}{2}\right)$

$\sin \dfrac{x}{2} = \sqrt{\dfrac{1 - \text{kos } x}{2}}$ $\quad sin\ \dfrac{x}{2} = \sqrt{\dfrac{1 - cos\ x}{2}}$

$= \sqrt{\dfrac{1 + \dfrac{1}{2}}{2}}$ $\quad = \sqrt{\dfrac{1 + \dfrac{1}{2}}{2}}$

$= \sqrt{\dfrac{3}{4}}$ $\quad = \sqrt{\dfrac{3}{4}}$

$= \dfrac{\sqrt{3}}{2}$ $\quad = \dfrac{\sqrt{3}}{2}$

(b) (i) kos $2x$
cos $2x$
$= 2 \text{ kos}^2 x - 1$
$2\ cos^2 x - 1$

$= 2\left(\dfrac{7}{13}\right)^2 - 1$

$= -\dfrac{71}{169}$

(ii) kos/*cos* $4x$
$= 2 \text{ kos}^2/cos^2\ (2x) - 1$

$= 2\left(-\dfrac{71}{169}\right)^2 - 1$

$= -\dfrac{18\,479}{28\,561}$

38 $\tan (A + 45°) + \tan (A - 45°)$

$= \dfrac{\tan A + \tan 45°}{1 - \tan A \tan 45°} + \dfrac{\tan A - \tan 45°}{1 + \tan A \tan 45°}$

$= \dfrac{\tan A + 1}{1 - \tan A} + \dfrac{\tan A - 1}{1 + \tan A}$

$= \dfrac{(\tan A + 1)^2 + (1 - \tan A)(\tan A - 1)}{1 - \tan^2 A}$

$= \dfrac{\tan^2 A + 2 \tan A + 1 + \tan A - 1 - \tan^2 A + \tan A}{1 - \tan^2 A}$

$= \dfrac{4 \tan A}{1 - \tan^2 A}$

$= \dfrac{2(2 \tan A)}{1 - \tan^2 A}$

$= 2 \tan 2A$

39 $180° \leqslant A \leqslant 270°, 180° \leqslant B \leqslant 270°$
$\therefore 360° \leqslant A + B \leqslant 540°$

40 $\dfrac{\sin (A - B)}{\sin (A + B)} = \dfrac{2}{7}$

$\dfrac{\sin A \text{ kos } B - \sin B \text{ kos } A}{\sin A \text{ kos } B + \sin B \text{ kos } A} = \dfrac{2}{7},$

$7 \sin A \text{ kos } B - 7 \sin B \text{ kos } A = 2 \sin A \text{ kos } B + 2 \sin B \text{ kos } A$

$5 \sin A \text{ kos } B = 9 \sin B \text{ kos } A$

$5 \tan A = 9 \tan B$

$\tan A = \dfrac{9}{5} \tan B$

$k = \dfrac{9}{5}$

$7\ sin\ A\ cos\ B - 7\ sin\ B\ cos\ A = 2\ sin\ A\ cos\ B + 2\ sin\ B\ cos\ A$

$5\ sin\ A\ cos\ B = 9\ sin\ B\ cos\ A$

$5\ tan\ A = 9\ tan\ B$

$tan\ A = \dfrac{9}{5}\ tan\ B$

$k = \dfrac{9}{5}$

41 kos/*cos* $A = \dfrac{1}{8}, 270° \leqslant A \leqslant 360°$

$\text{kos } 2\left(\dfrac{A}{2}\right) = 2 \text{ kos}^2\left(\dfrac{A}{2}\right) - 1$ $\quad cos\ 2\left(\dfrac{A}{2}\right) = 2\ cos^2\left(\dfrac{A}{2}\right) - 1$

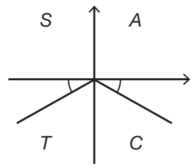
$\text{kos } \dfrac{A}{2} = \sqrt{\dfrac{\text{kos } A + 1}{2}}$ $\quad cos\ \dfrac{A}{2} = \sqrt{\dfrac{cos\ A + 1}{2}}$

$= \sqrt{\dfrac{\dfrac{1}{8} + 1}{2}}$ $\quad = \sqrt{\dfrac{\dfrac{1}{8} + 1}{2}}$

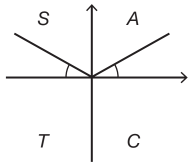
$= -\sqrt{\dfrac{9}{16}}$ $\quad = \sqrt{\dfrac{9}{16}}$

$= -\dfrac{3}{4}$ $\quad = -\dfrac{3}{4}$

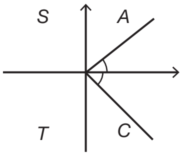
42 (a) $\sin \theta = -0.342$
Sudut rujukan/*Reference angle*
$= \sin^{-1} 0.342$
$= 20°$
$\theta = 180° + 20°, 360° - 20°$
$= 200°, 340°$



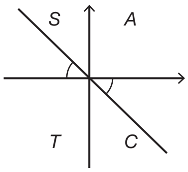
(b) $\sin 2\theta = 0.8192$
Sudut rujukan/*Reference angle* $= \sin^{-1} 0.8192$
$= 55°$
$2\theta = 55°, 180° - 55°, 360° + 55°, 360° + 125°$
$= 55°, 125°, 415°, 485°$
$\theta = 27.5°, 62.5°, 207.5°, 242.5°$



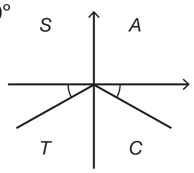
(c) kos/*cos* $3\theta = 0.7431$
Sudut rujukan/*Reference angle* $= \text{kos}^{-1}/cos^{-1}\ 0.7431$
$= 42°$
$3\theta = 42°, 360° - 42°, 360° + 42°, 360° + 318°,$
$720° + 42°, 720° + 318°$
$= 42°, 318°, 402°, 678°, 762°, 1\,038°$
$\theta = 14°, 106°, 134°, 226°, 254°, 346°$



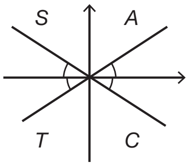
(d) $\tan(\theta + 10°) = -0.8391$
Sudut rujukan/*Reference angle* $= \tan^{-1} 0.8391$
$= 40°$
$\theta + 10° = 180° - 40°, 360° - 40°$
$= 140°, 320°$
$\theta = 130°, 310°$



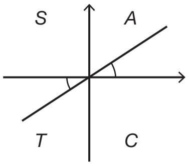
(e) $\sin(2\theta - 5°) = -0.766$
Sudut rujukan/*Reference angle* $= \sin^{-1} 0.766$
$= 50°$
$2\theta - 5° = 180° + 50°, 360° - 50°$
$= 230°, 310°$
$2\theta = 235°, 315°$
$\theta = 117.5°, 157.5°$



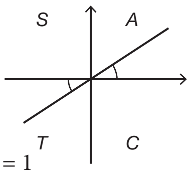
(f) sek^2/*sec*^{2} $(2\theta + 15°) = 5.6$
$\dfrac{1}{\text{kos}^2/cos^2\,(2\theta + 15°)} = 5.6$
kos/*cos* $(2\theta + 15°) = \pm\sqrt{\dfrac{1}{5.6}}$
$= \pm 0.4226$
Sudut rujukan/*Reference angle* = kos^{-1}/*cos*$^{-1}$ 0.4226
$= 65°$
$2\theta + 15° = 65°, 180° - 65°, 180° + 65°, 360° - 65°$
$= 65°, 115°, 245°, 295°$
$2\theta = 50°, 100°, 230°, 280°$
$\theta = 25°, 50°, 115°, 140°$



(g) kot/*cot* $\dfrac{\theta}{2} = 2$
$\tan\dfrac{\theta}{2} = \dfrac{1}{2}$
Sudut rujukan/*Reference angle*
$= \tan^{-1} 0.5$
$= 26.6°$
$\dfrac{\theta}{2} = 26.6°, 180° + 26.6°$
$= 26.6°, 206.6°$
$\theta = 53.2°, 413.2°$

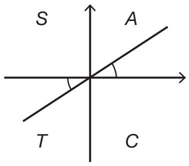


43 (a) $4\tan\theta - 2\tan^2\theta$ = sek^2/*sec*^{2} θ
$4\tan\theta - 2\tan^2\theta = 1 + \tan^2\theta$
$3\tan^2\theta - 4\tan\theta + 1 = 0$
$(3\tan\theta - 1)(\tan\theta - 1) = 0$
$\tan\theta = \dfrac{1}{3}$ atau/*or* $\tan\theta = 1$

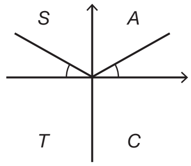


Sudut rujukan/*Reference angle*
$= \tan^{-1}\dfrac{1}{3}, \tan^{-1} 1$
$= 0.3218$ rad, 0.7854 rad
$\theta = 0.3218$ rad, 0.7854 rad, $(\pi + 0.3218)$ rad,
$(\pi + 0.7854)$ rad
$= 0.3218$ rad, 0.7854 rad, 3.4634 rad, 3.927 rad

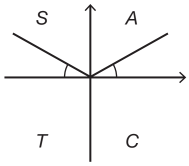
(b) $2\sin\theta = 5$ kos/*cos* θ
$\dfrac{\sin\theta}{\text{kos}/cos\,\theta} = \dfrac{5}{2}$
$\tan\theta = 2.5$
Sudut rujukan/*Reference angle*
$= \tan^{-1} 2.5$
$= 1.1903$ rad
$\theta = 1.1903$ rad, 4.3319 rad



(c) $2\sin 2\theta = 3$ kos/*cos* θ
$2(2\sin\theta$ kos/*cos* $\theta) - 3$ kos/*cos* $\theta = 0$
kos/*cos* $\theta(4\sin\theta - 3) = 0$
kos/*cos* $\theta = 0$ atau/*or* $\sin\theta = \dfrac{3}{4}$
$\theta = 1.5708$ rad, 4.7124 rad
atau/*or*
$\theta = 0.8481$ rad, 2.2935 rad
$\theta = 0.8481$ rad, 1.5708 rad, 2.2935 rad, 4.7124 rad

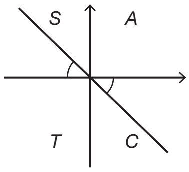


(d) 3 kos/*cos* $2\theta + 5\sin\theta = 4$
$3(1 - 2\sin^2\theta) + 5\sin\theta = 4$
$3 - 6\sin^2\theta + 5\sin\theta = 4$
$6\sin^2\theta - 5\sin\theta + 1 = 0$
$(3\sin\theta - 1)(2\sin\theta - 1) = 0$
$\sin\theta = \dfrac{1}{3}$ atau/*or* $\sin\theta = \dfrac{1}{2}$



Sudut rujukan/*Reference angle*
$= \sin^{-1}\dfrac{1}{3}, \sin^{-1}\dfrac{1}{2},$
$= 0.3398$ rad, 0.5236 rad
$\theta = 0.3398$ rad, 0.5236 rad, $(\pi - 0.3398)$ rad,
$(\pi - 0.5236)$ rad
$= 0.3398$ rad, 0.5236 rad, 2.8018 rad, 2.618 rad

(e) 2 kos^2/*cos*^{2} $\theta + 5\sin\theta$ kos/*cos* $\theta = 0$
kos/*cos* θ (2 kos/*cos* $\theta + 5\sin\theta) = 0$
kos/*cos* $\theta = 0$
atau/*or*
$5\sin\theta = -2$ kos/*cos* θ
$\theta = 90°, 270°$
atau/*or*
$\tan\theta = -\dfrac{2}{5}$
$\theta = 180° - 21.8°, 360° - 21.8$
$= 158.2°, 338.2°$
$\theta = 1.5708$ rad, 2.7611 rad, 4.7124 rad, 5.9027 rad



44 (a) sek x kosek x − kot x
$= \dfrac{1}{\text{kos}\,x\sin x} - \dfrac{\text{kos}\,x}{\sin x}$
$= \dfrac{1 - \text{kos}^2 x}{\text{kos}\,x\sin x}$
$= \dfrac{\sin^2 x}{\text{kos}\,x\sin x}$
$= \dfrac{\sin x}{\text{kos}\,x}$
$= \tan x$

sec x cosec x − cot x
$= \dfrac{1}{\cos x\sin x} - \dfrac{\cos x}{\sin x}$
$= \dfrac{1 - \cos^2 x}{\cos x\sin x}$
$= \dfrac{\sin^2 x}{\cos x\sin x}$
$= \dfrac{\sin x}{\cos x}$
$= \tan x$

(b) $\text{sek } x \text{ kosek } x = 3 \text{ kot } x$ *$\sec x \operatorname{cosec} x = 3 \cot x$*

$\tan x = 2 \text{ kot } x$ *$\tan x = 2 \cot x$*

$\tan^2 x = 2$ *$\tan^2 x = 2$*

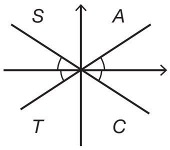
$\tan x = \pm\sqrt{2}$ *$\tan x = \pm\sqrt{2}$*

Sudut rujukan/*Reference angle*

$= \tan^{-1}\sqrt{2}$

$= 54.7°$

$\theta = 54.7°, 125.3°, 234.7°, 305.3°$



45 (a) $\dfrac{\text{kot } A - \tan A}{\text{kot } A + \tan A}$ *$\dfrac{\cot A - \tan A}{\cot A + \tan A}$*

$= \dfrac{\dfrac{1}{\tan A} - \tan A}{\dfrac{1}{\tan A} + \tan A}$ *$= \dfrac{\dfrac{1}{\tan A} - \tan A}{\dfrac{1}{\tan A} + \tan A}$*

$= \dfrac{1 - \dfrac{\sin^2 A}{\text{kos}^2 A}}{1 + \dfrac{\sin^2 A}{\text{kos}^2 A}}$ *$= \dfrac{1 - \dfrac{\sin^2 A}{\cos^2 A}}{1 + \dfrac{\sin^2 A}{\cos^2 A}}$*

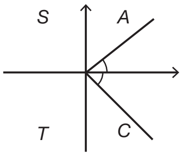
$= \dfrac{\dfrac{\text{kos}^2 A - \sin^2 A}{\text{kos}^2 A}}{\dfrac{\text{kos}^2 A + \sin^2 A}{\text{kos}^2 A}}$ *$= \dfrac{\dfrac{\cos^2 A - \sin^2 A}{\cos^2 A}}{\dfrac{\cos^2 A + \sin^2 A}{\cos^2 A}}$*

$= \text{kos}^2 A - \sin^2 A$ *$= \cos^2 A - \sin^2 A$*

$= \text{kos } 2A$ *$= \cos 2A$*

(b) $\dfrac{\text{kot } A - \tan A}{\text{kot } A + \tan A} = \dfrac{1}{7}$ *$\dfrac{\cot A - \tan A}{\cot A + \tan A} = \dfrac{1}{7}$*

$\text{kos } 2A = \dfrac{1}{7}$ *$\cos 2A = \dfrac{1}{7}$*



Sudut rujukan/*Reference angle* $= \text{kos}^{-1}/\cos^{-1} \dfrac{1}{7}$

$= 81.8°$

$2A = 81.8°, 278.2°, 360°+81.8°, 360°+278.2°$

$= 81.8°, 278.2°, 441.8°, 638.2°$

$A = 40.9°, 139.1°, 220.9°, 319.1°$

46 $2 \sin\left(\dfrac{\pi z}{4}\right) = 1$

$\sin\left(\dfrac{\pi z}{4}\right) = \dfrac{1}{2}$

Sudut rujukan/*Reference angle* $= \sin^{-1}\left(\dfrac{1}{2}\right)$

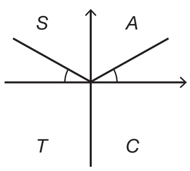
$= \dfrac{\pi}{6}$

$\dfrac{\pi z}{4} = \dfrac{\pi}{6}, \dfrac{5\pi}{6}$

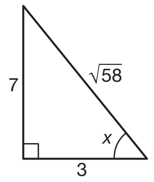
$\dfrac{z}{4} = \dfrac{1}{6}, \dfrac{5}{6}, \dfrac{13}{6}$

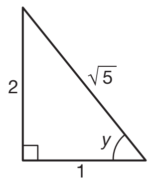
$z = \dfrac{2}{3}, \dfrac{10}{3}, \dfrac{26}{3}$

$= \dfrac{2}{3}, 3\dfrac{1}{3}, 8\dfrac{2}{3}$



47 $\tan x = \dfrac{7}{3}$ $\text{kos}/\cos y = \dfrac{1}{\sqrt{5}}$





$\sin\left[\tan^{-1}\left(\dfrac{7}{3}\right) + \text{kos}^{-1}\left(\dfrac{1}{\sqrt{5}}\right)\right]$

$\sin\left[\tan^{-1}\left(\dfrac{7}{3}\right) + \cos^{-1}\left(\dfrac{1}{\sqrt{5}}\right)\right]$

$= \sin(x + y)$

$= \sin x \text{ kos } y + \sin y \text{ kos } x$

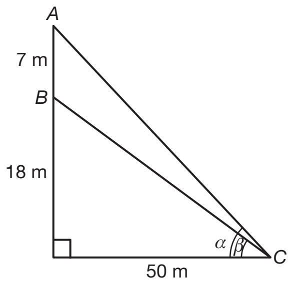
$\sin x \cos y + \sin y \cos x$

$= \dfrac{7}{\sqrt{58}}\left(\dfrac{1}{\sqrt{5}}\right) + \dfrac{2}{\sqrt{5}}\left(\dfrac{3}{\sqrt{58}}\right)$

$= \dfrac{7 + 6}{\sqrt{290}}$

$= \dfrac{13\sqrt{290}}{290}$

48



$\tan(\alpha - \beta) = \dfrac{\tan\alpha - \tan\beta}{1 - \tan\alpha \tan\beta}$

$= \dfrac{\dfrac{25}{50} - \dfrac{18}{50}}{1 + \dfrac{25}{50}\left(\dfrac{18}{50}\right)}$

$= \dfrac{7}{59}$

$\alpha - \beta = \tan^{-1}\left(\dfrac{7}{59}\right)$

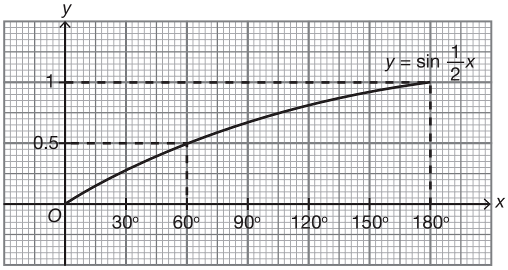
$= 6.8°$

Praktis Sumatif

Kertas 1

1 $y = \sin \dfrac{1}{2}x$

x	0	30	60	90	120	150	180
y	0	0.259	0.500	0.707	0.866	0.966	1.000

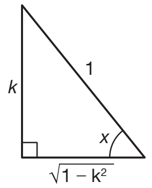


Julat/*Range* = $60° < x < 180°$

2 $7 \sin^2 x - 4 \text{kos}^2/cos^2\, x = 7 \sin^2 x - 4 (1 - \sin^2 x)$
$= 7 \sin^2 x - 4 + 4 \sin^2 x$
$= 11 \sin^2 x - 4$

$0 \leqslant \sin^2 x \leqslant 1$
$0 \leqslant 11 \sin^2 x \leqslant 11$
$-4 \leqslant 11 \sin^2 x - 4 \leqslant 7$
$-4 \leqslant f(x) \leqslant 7$

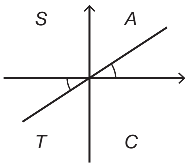
3 (a) $\tan x = \dfrac{k}{\sqrt{1 - k^2}}$

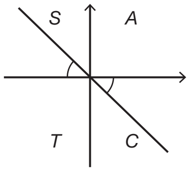


(b) sek $(-x)$
$= \dfrac{1}{\text{kos}(-x)}$
$= \dfrac{1}{\text{kos}(x)}$
$= \sqrt{1 - k^2}$
sec $(-x)$
$= \dfrac{1}{cos(-x)}$
$= \dfrac{1}{cos(x)}$
$= \sqrt{1 - k^2}$

4 Kala/*Period* = $\dfrac{\pi}{b}$, $\quad \therefore b = 3$
$5 = a \tan 3\left(\dfrac{\pi}{3}\right) + c$
$5 = a \tan \pi + c$
$\therefore c = 5$
$7 = a \tan 3\left(\dfrac{\pi}{12}\right) + 5$
$\therefore a = 2$

5 sek/*sec* $x (1 + \tan x) = 6$ kosek/*cosec* x
$\dfrac{1}{\text{kos}/cos\, x}(1 + \tan x) = \dfrac{6}{\sin x}$
$\tan x (1 + \tan x) = 6$
$\tan^2 x + \tan x - 6 = 0$
$(\tan x - 2)(\tan x + 3) = 0$
$\tan x = 2$ atau/*or* $\tan x = -3$





Sudut rujukan/*Reference angles* $= \tan^{-1} 2, \tan^{-1}(-3)$
$= 63.4°, 71.6°$

$x = 63.4°, 180° + 63.4°, 180° - 71.6°, 360° - 71.6°$
$= 63.4°, 108.4°, 243.4°, 288.4°$

6 (a) kos x kot $x + \sin x$
$= \text{kos}\, x \left(\dfrac{\text{kos}\, x}{\sin x}\right) + \sin x$
$= \dfrac{\text{kos}^2 x + \sin^2 x}{\sin x}$
$= \dfrac{1}{\sin x}$
$=$ kosek x

cos x cot x + sin x
$= cos\, x \left(\dfrac{cos\, x}{sin\, x}\right) + sin\, x$
$= \dfrac{cos^2 x + sin^2 x}{sin\, x}$
$= \dfrac{1}{sin\, x}$
$= cosec\, x$

(b) kos x kot $x + \sin x = 4$
cos x cot x + sin x = 4
$\dfrac{1}{\sin x} = 4$
$\sin x = 0.25$
$x = \sin^{-1} 0.25$
$x = 14.5°$

Kertas 2

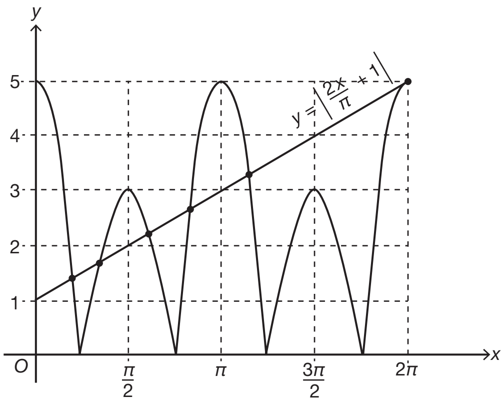
1 $a = \dfrac{5 + 3}{2}$
$= 4$

$\dfrac{2\pi}{b} = \pi$
$b = 2$

$c = 5 - 4$
$= 1$

$\therefore a = 4, b = 2, c = 1$

(a)



2π kos $2x - x = 0$
4π kos $2x - 2x = 0$
4π kos $2x = 2x$
4 kos $2x = \dfrac{2x}{\pi}$
4 kos $2x + 1 = \dfrac{2x}{\pi} + 1$
$|4 \text{ kos } 2x + 1| = \left|\dfrac{2x}{\pi} + 1\right|$
$y = \left|\dfrac{2x}{\pi} + 1\right|$

$2\pi\ cos\ 2x - x = 0$
$4\pi\ cos\ 2x - 2x = 0$
$4\pi\ cos\ 2x = 2x$
$4\ cos\ 2x = \dfrac{2x}{\pi}$
$4\ cos\ 2x + 1 = \dfrac{2x}{\pi} + 1$
$|4\ cos\ 2x + 1| = \left|\dfrac{2x}{\pi} + 1\right|$
$y = \left|\dfrac{2x}{\pi} + 1\right|$

x	0	2π
y	1	5

Bilangan penyelesaian/*Number of solutions* = 6

(b) $k = 5$

2 (a) $\sin A$ kos/*cos* A ($5 \tan A + 2$ kot/*cot* A)
$= \sin A \text{ kos}/cos\, A \left[5\left(\dfrac{\sin A}{\text{kos}\, A}\right) + 2\left(\dfrac{\text{kos}\, A}{\sin A}\right)\right]$

$= 5 \sin^2 A + 2 \text{kos}^2/\cos^2 A$
$= 5 \sin^2 A + 2 (1 - \sin^2 A)$
$= 5 \sin^2 A + 2 - 2 \sin^2 A$
$= 2 + 3 \sin^2 A$

(b) $15 \text{kos}^2/\cos^2 A + 2 \sin^2 A = 7$
$15 (1 - \sin^2 A) + 2 \sin^2 A = 7$
$15 - 13 \sin^2 A = 7$
$15 - 7 = 13 \sin^2 A$
$13 \sin^2 A = 8 \ldots ①$
$15 \text{kos}^2/\cos^2 A + 2 \sin^2 A = 7$
$15 \text{kos}^2/\cos^2 A + 2 (1 - \text{kos}^2/\cos^2 A) = 7$
$13 \text{kos}^2/\cos^2 A + 2 = 7$
$13 \text{kos}^2/\cos^2 A = 7 - 2$
$13 \text{kos}^2/\cos^2 A = 5 \ldots ②$

$$\frac{①}{②} = \frac{13 \sin^2 A}{13 \text{kos}^2/\cos^2 A} = \frac{8}{5}$$

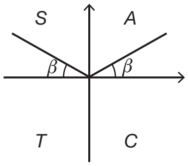
$$\therefore \tan^2 A = \frac{8}{5}$$

$\tan A = \pm\sqrt{\frac{8}{5}}$

$\beta = \tan^{-1}\sqrt{\frac{8}{5}}$

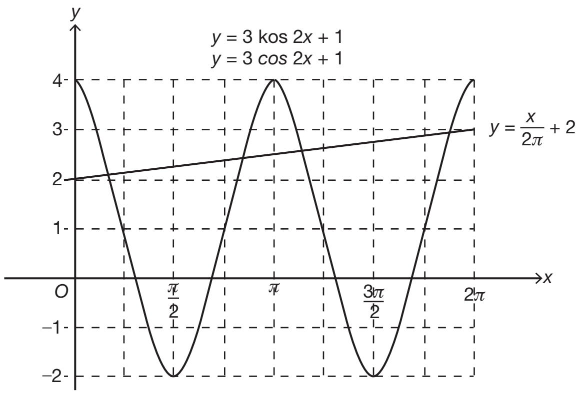
$= 0.9018$ rad

$A = 0.9018$ rad, 2.2398 rad



3 (a) $\text{kos } x \sin^2 x + \text{kos}^3 x$ | $\cos x \sin^2 x + \cos^3 x$
$= \text{kos } x (\sin^2 x + \text{kos}^2 x)$ | $= \cos x (\sin^2 x + \cos^2 x)$
$= \text{kos } x$ | $= \cos x$

(b) (i)



(ii) $3 \text{kos}/\cos 2x \sin^2 2x + 3 \text{kos}^3/\cos^3 2x$
$= \frac{x}{2\pi} + 1$

$3 (\text{kos}/\cos 2x \sin^2 2x + \text{kos}^3/\cos^3 2x)$
$= \frac{x}{2\pi} + 1$

$3 \text{kos}/\cos 2x + 1 = \frac{x}{2\pi} + 1 + 1$

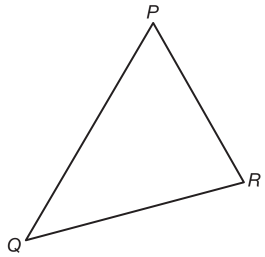
$y = \frac{x}{2\pi} + 2$

x	0	2π
y	2	3

Bilangan penyelesaian/*Number of solutions* = 4

4 $P = 180° - (Q + R)$
$\tan P = \tan [180° - (Q + R)]$

$$= \frac{\tan 180° - \tan (Q + R)}{1 + \tan 180° \tan (Q + R)}$$
$$= -\tan (Q + R)$$
$$= -\frac{\tan Q + \tan R}{1 - \tan Q \tan R}$$
$$= \frac{\tan Q + \tan R}{\tan Q \tan R - 1}$$



(a) $2 \tan Q = \frac{\tan Q + 3}{3 \tan Q - 1}$
$6 \tan^2 Q - 2 \tan Q - \tan Q - 3 = 0$
$6 \tan^2 Q - 3 \tan Q - 3 = 0$
$2 \tan^2 Q - \tan Q - 1 = 0$
$(\tan Q - 1)(2 \tan Q + 1) = 0$

$\tan Q = 1$ atau/*or* $\tan Q = -\frac{1}{2}$
$Q = 45°$ (tolak/*reject*)

(b) $\tan (R - P) = \frac{\tan R - \tan P}{1 + \tan R \tan P}$
$= \frac{3 - 2(1)}{1 + 3(2)}$
$= \frac{1}{7}$