



**MODUL TOPIKAL
SOALAN PERCUBAAN SPM 2023
TOPIK TINGKATAN 5
BAB 6
FUNGSI TRIGONOMETRI
(TRIGONOMETRIC FUNCTIONS)**

**SUMBER SOALAN:
SOALAN – SOALAN PERCUBAAN**

TERENGGANU
NEGERI SEMBILAN
KELANTAN
SABAH
SBP
MELAKA
SELANGOR SET 1
PERAK

SKEMA JAWAPAN

DISUSUN OLEH:

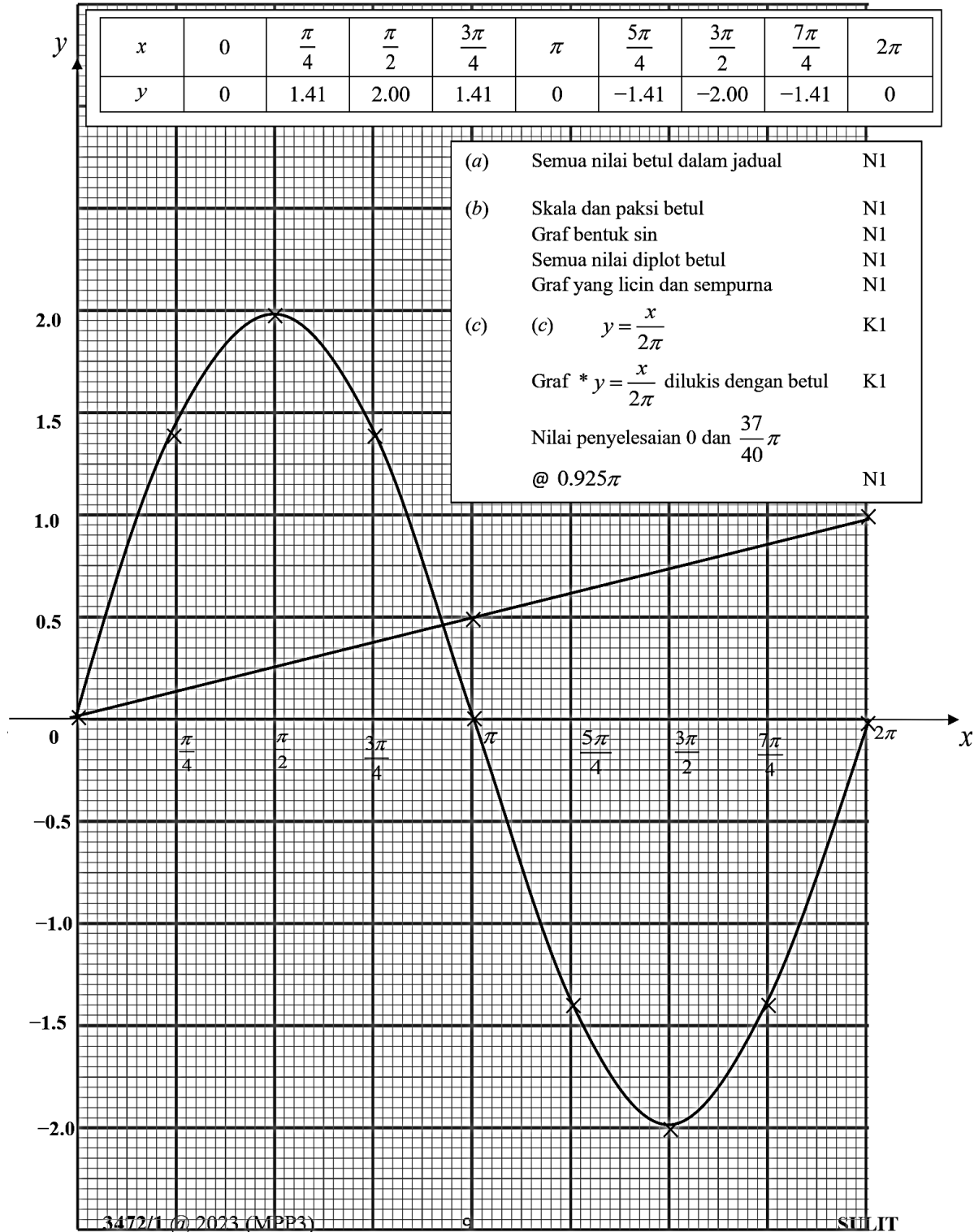
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**PN ZAINAB BINTI ABD RAHMAN
(SMK CONVENT, TAIPING)**

SOALAN 1 : SOALAN PERCUBAAN SPM NEGERI TERENGGANU 2023 (KERTAS 1)

15	Rujuk Graf	8
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No. 15



SOALAN 2 : SOALAN PERCUBAAN SPM NEGERI TERENGGANU 2023 (KERTAS 2)

4	<p>(a) (i) $\frac{1 - \cos x}{\sin x}$</p> $= \frac{1 - (1 - 2 \sin^2 \frac{x}{2})}{2 \sin \frac{x}{2} \cos \frac{x}{2}}$ $= \frac{2 \sin^2 \frac{x}{2}}{2 \sin \frac{x}{2} \cos \frac{x}{2}}$ $= \frac{\sin \frac{x}{2}}{\cos \frac{x}{2}}$ $= \tan \frac{x}{2} \quad (LHS = RHS)$ <p>(ii) $\frac{1 - \cos x}{\sin x} + \sin x = 0$ &</p> $1 - \cos x + (1 - \cos^2 x) = 0$ <p>Selesaikan $\cos^2 x + \cos x - 2 = 0$</p> <p>0, 2π</p>	<p>K1</p> <p>N1</p> <p>K1</p> <p>K1</p> <p>N1</p> <p>8</p>
	<p>(b) $\sqrt{1 - m^2}$ dilihat atau $-\sqrt{1 - m^2}$</p> <p>Guna kos $2A = \cos^2 A - \sin^2 A$ @</p> $\cos 2A = 2 \cos^2 A - 1$ @ $\cos 2A = 1 - 2 \sin^2 A$ <p>&</p> <p>Selesaikan</p> $\sin^2 \frac{\theta}{2} = \frac{1 - \sqrt{1 - m^2}}{2} \quad @ \quad \sin^2 \frac{\theta}{2} = \frac{1 + \sqrt{1 - m^2}}{2}$	<p>P1</p> <p>K1</p> <p>N1</p>

SOALAN 3 : SOALAN PERCUBAAN SPM NEGERI SEMBILAN 2023 (KERTAS 1)

15	(a)	$\frac{2 + \tan B}{1 - 2 \tan B} = -3$	K1
		$\tan B = 1$	N1
	(b)	$1 - \cos^2 x = 1 - \cos x$	K1
		$\cos x (\cos x - 1) = 0$	K1
		$0^\circ, 90^\circ, 270^\circ, 360^\circ$	N1
	(c)	$\cos \theta = -\sqrt{1 - 16k^2}$	K1
		$2\cos^2 \frac{\theta}{2} - 1 = -\sqrt{1 - 16k^2}$	K1
		$\frac{1 - \sqrt{1 - 16k^2}}{2}$	N1

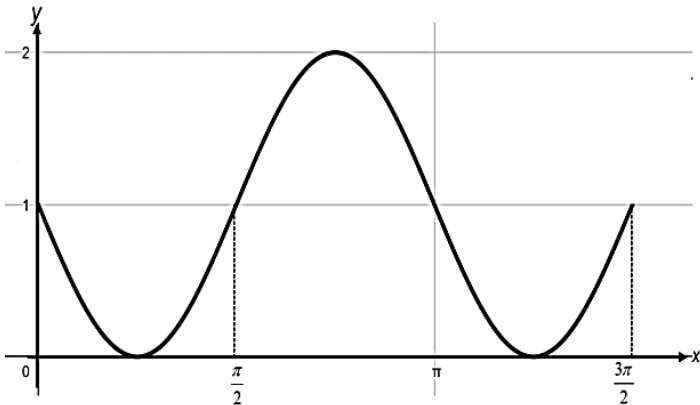
SOALAN 4 : SOALAN PERCUBAAN SPM NEGERI SEMBILAN 2023 (KERTAS 2)

6(a)	$2 \left(\frac{\cos x}{\sin x} \right) \left(\frac{\sin^2 x}{\cos x} \right)$	K1	
	$2 \sin x$	N1	
6(b)	<div style="display: flex; align-items: center;"> <div style="margin-right: 20px;">(i)</div> </div> <div style="margin-top: 10px; border: 1px solid black; padding: 5px; display: inline-block;"> <ul style="list-style-type: none"> • Untuk $0 \leq x \leq 2\pi$ • Label 0 dan 2π pada paksi x </div> <div style="margin-left: 20px; margin-top: 10px;"> <p>Lakaran graf sin Graf naik 1 unit ke atas 1 kitaran dan modulus Semua betul</p> </div>	<p>P1 P1 P1 P1</p>	
(ii)	$0 < m \leq 1$	N1	
			7 markah

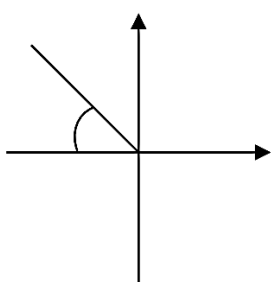
SOALAN 5 : SOALAN PERCUBAAN SPM NEGERI KELANTAN 2023 (KERTAS 1)

3 (a)	$\cos \theta = h$ $h = 1 - 2 \sin^2 \frac{\theta}{2}$ $\frac{1-h}{2}$	P1 K1 N1	6
3 (b)	$8 \sin^2 x - \sin x - 7 = 0$ $\sin x = -\frac{7}{8}$ dan $\sin x = 1$ $x = 90^\circ, 241.04^\circ, 298.96^\circ$	K1 K1 N1	

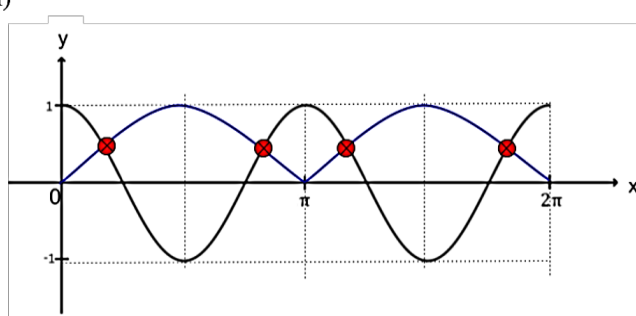
SOALAN 6 : SOALAN PERCUBAAN SPM NEGERI KELANTAN 2023 (KERTAS 2)

7 (a)	Use $\sin^2 x + \cos^2 x = 1$ atau $\sin 2x = 2 \sin x \cos x$ $1 - 2 \sin x \cos x$ atau $\cos^2 x + \sin^2 x - 2 \sin x \cos x$	K1 N1	8
7 (b)	 <p>Bentuk graf $-\sin x$ $1\frac{1}{2}$ pusingan bagi domain $0 \leq x \leq \frac{3}{2}\pi$ Min = 0, max = -1, titik tengah = π</p>	P1 P1 P1	
7 I(i)	2	N1	
(ii)	Julat $0 < k < 1$ atau $y = k + 1, 1 < y < 2$ 2 penyelesaian	K1 N1	

SOALAN 7 : SOALAN PERCUBAAN SPM NEGERI SABAH 2023 (KERTAS 1)

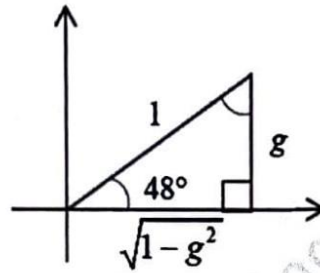
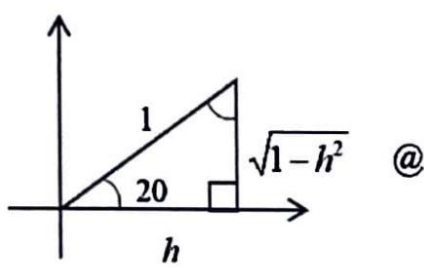
13	a) i) $\cos \alpha \cos \beta - \sin \alpha \sin \beta = \frac{1}{4}$ $\frac{3}{4}$ ii) $\cos \alpha \cos \beta + \sin \alpha \sin \beta$ $\frac{5}{4}$	K1 N1 K1 N1	8
	b) $4 \sin \theta \cos \theta = \sqrt{2}$ $\sin 2\theta = \frac{\sqrt{2}}{2}$ $2\theta = \sin^{-1}\left(\frac{\sqrt{2}}{2}\right)$ $2\theta = 45^\circ, 135^\circ, 405^\circ, 495^\circ$ $\theta = 22.5^\circ, 67.5^\circ, 202.5^\circ, 247.5^\circ$	K1 K1 N1	
	c) 	P1	

SOALAN 8 : SOALAN PERCUBAAN SPM NEGERI SABAH 2023 (KERTAS 2)

6	a) $\cos 2x = \cos^2 x - \sin^2 x$ $= (1 - \sin^2 x) - \sin^2 x$ $= 1 - 2\sin^2 x$ (<i>proven</i>) <i>OR</i> $= (\sin^2 x + \cos^2 x) - 2\sin^2 x$ $= \cos^2 x - \sin^2 x$ $= \cos 2x$ (<i>proven</i>)	K1 N1 <i>OR</i> K1 N1	6
	b) i) $y = \cos 2x$ ii)  <i>Shape</i> <i>graph reflected on the x-axis</i> <i>number of solutions : 4</i>	P1 P1 N1	

SOALAN 9 : SOALAN PERCUBAAN SPM SBP 2023 (KERTAS 1)

15(a)



K1

3

$$\sqrt{1-h^2} \quad @ \quad \sqrt{1-g^2} \quad @ \quad gh$$

K1

$$\sqrt{(\sqrt{1-h^2})(\sqrt{1-g^2})} + gh$$

N1

(b) $4\cot^2\theta - (1 + \cot^2\theta) = 2 \quad @ \quad 4(\operatorname{cosec}^2\theta - 1) - \operatorname{cosec}^2\theta = 2 \quad \text{K1}$

3

$$\tan^2\theta = 1 \quad @ \quad \sin^2\theta = \frac{1}{2}$$

K1

$$\theta = 45^\circ, 135^\circ, 225^\circ, 315^\circ$$

N1

(c) $\frac{\sqrt{3}}{2} = 2\cos^2 15^\circ - 1 \quad \text{K1}$

2

8

SOALAN 10 : SOALAN PERCUBAAN SPM NEGERI 2023 (KERTAS 2)

5(a)(i)

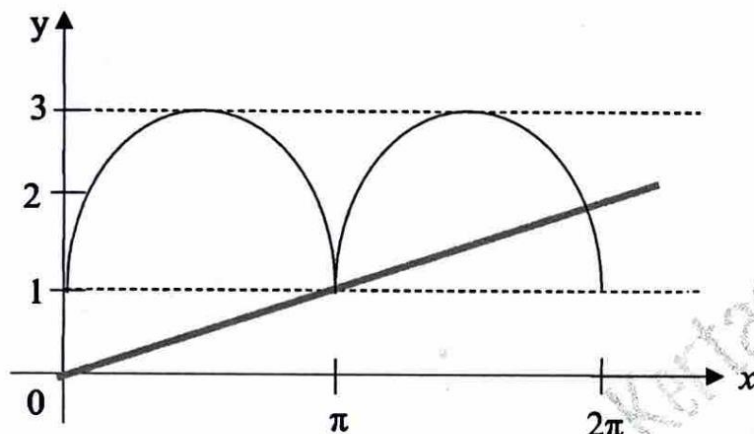
$$\frac{1 - (1 - 2\sin^2 x) - 2\sin x \cos x}{\cos x - \sin x}$$

$1 - 2\sin^2 x$ @ $2\sin x \cos x$ (dilihat) **K1**

$2\sin x$ **N1**

2

(b)(i)



Bentuk graf sin **N1**

1 kitaran **N1**

Amplitud (maks 3, min 1) **N1**

Mutlak dan anjakan 1 unit ke atas **N1**

$y = \frac{x}{\pi}$ **N1**

Lakar garis lurus $y = \frac{x}{\pi}$ **N1**

Bilangan penyelesaian = 2 **N1**

4

3

9

SOALAN 11 : SOALAN PERCUBAAN SPM NEGERI MELAKA 2023 (KERTAS 1)

<p>13. (a)</p>	<p><i>Bentuk kos at least 1 cycle</i></p> <p><i>Amplitude</i> <i>Min = -3</i> <i>Max = 3</i></p> <p><i>Cycles</i> $1\frac{1}{2}$ cycles & -ve cos graph</p>	<p>1</p> <p>1</p> <p>1</p>	
<p>(b)</p>	<p>$y = \frac{\pi}{2x}$</p> <p>Reciprocal graph</p> <p>No of solutions = 3</p>	<p>1</p> <p>1</p> <p>1</p>	
<p>(c)</p>	<p>$\frac{3p}{2} = 3$ or $\frac{3p}{2} = -3$</p> <p>$p = 2$ and $p = -2$</p>	<p>1</p> <p>1</p>	<p>8</p>

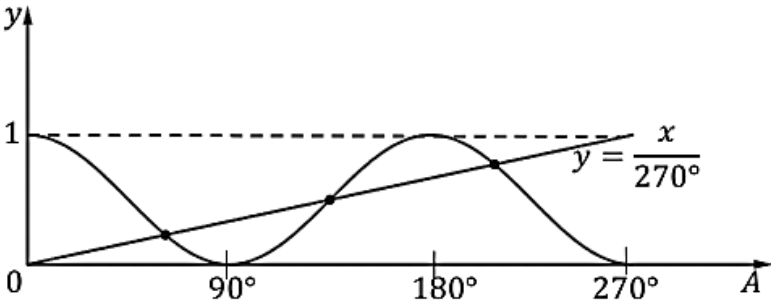
SOALAN 12 : SOALAN PERCUBAAN SPM NEGERI MELAKA 2023 (KERTAS 2)

6(a)	$\frac{\cos(A+B)}{\sin A \sin B} = \frac{\cos A \cos B - \sin A \sin B}{\sin A \sin B}$ $= \frac{\cos A \cos B}{\sin A \sin B} - \frac{\sin A \sin B}{\sin A \sin B}$ $= \cot A \cot B - 1$	1	7
		1	
(b)	$\tan(45^\circ + x) = 4 \tan(45^\circ - x)$ $\frac{\tan 45^\circ + \tan x}{1 - \tan 45^\circ \tan x} = 4 \left(\frac{\tan 45^\circ - \tan x}{1 + \tan 45^\circ \tan x} \right)$ $\frac{1 + \tan x}{1 - \tan x} = 4 \left(\frac{1 - \tan x}{1 + \tan x} \right)$ $(3 \tan x - 1)(\tan x - 3) = 0$ $\tan x = \frac{1}{3} \text{ atau } \tan x = 3$ $x = 18.43^\circ, 71.57^\circ, 198.43^\circ, 251.57^\circ$	1	7
		1	
		1	
		1	
		1	

SOALAN 13 : SOALAN PERCUBAAN SPM NEGERI SELANGOR SET 1 2023 (KERTAS 1)

14	(a)		<u>Guna rumus sudut majmuk</u> $\frac{\cos(x-y) - \cos(x+y)}{\sin(x-y) + \sin(x+y)}$ $\frac{\cos x \cos y + \sin x \sin y - [\cos x \cos y - \sin x \sin y]}{\sin x \cos y - \cos x \sin y + \sin x \cos y + \cos x \sin y}$ Guna rumus $\cos(x-y)$ @ $\cos(x+y)$ @ $\sin(x-y)$ @ $\sin(x+y)$ dengan betul $\frac{2 \sin x \sin y}{2 \sin x \cos y}$ $\tan y$	P1	8
				P1	
				P1	
				N1	
	(b)	(i)	$b = 2$ $c = 3$	P1	8
		(ii)	Menggantikan nilai x dan y dari koordinat $\left(\frac{\pi}{8}, 7\right)$ ke dalam persamaan $y = a \tan bx + c$. $a = 4$	K1	
				N1	

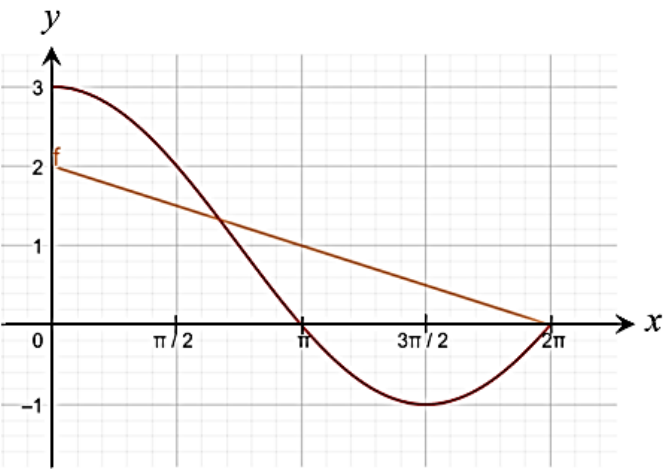
SOALAN 14 : SOALAN PERCUBAAN SPM NEGERI SELANGOR SET 1 2023 (KERTAS 2)

2	(a)	<p>Guna</p> $\cos(A + A) = \cos A \cos A - \sin A \sin A \text{ \&}$ $\cos 2A = \cos^2 A - \sin^2 A$	K1	
	(b)	 <p>Bentuk graf kosinus Mak: 1, Min: 0 Anjakan $\frac{1}{2}$ unit ke atas $y = \frac{x}{270^\circ}$</p>	P1 P1 P1 K1 K1	
		<p>Lihat Garis Lurus $y = \frac{x}{270^\circ}$ Bilangan Penyelesaian: 3</p>	N1	
				8

SOALAN 15 : SOALAN PERCUBAAN SPM NEGERI PERAK 2023 (KERTAS 1)

NO.	BUTIRAN	MARKAH	JUMLAH
15	(a) $\frac{\tan\theta + \tan\frac{\pi}{4}}{1 - \tan\theta\tan\frac{\pi}{4}}$	1	8
	$\frac{\tan\theta + (1)}{1 - \tan\theta(1)}$	1	
(b)	$\tan\frac{11\pi}{12} = \tan\left(\frac{2\pi}{3} + \frac{\pi}{4}\right)$	1	
	$\frac{1 + \tan\frac{2\pi}{3}}{1 - \tan\frac{2\pi}{3}}$	1	
	$\frac{1 - \sqrt{3}}{1 + \sqrt{3}}$	1	
	$\frac{1 - \sqrt{3}}{1 + \sqrt{3}} \times \frac{1 - \sqrt{3}}{1 - \sqrt{3}}$	1	
	$\frac{1 - \sqrt{3} - \sqrt{3} + 3}{1 + \sqrt{3} - \sqrt{3} - 3}$	1	
	$-2 + \sqrt{3}$	1	

SOALAN 16 : SOALAN PERCUBAAN SPM NEGERI PERAK 2023 (KERTAS 2)

7	(a)	 <p>Bentuk graf kosinus $\frac{2}{3}$ kitaran untuk $0 \leq x \leq 2\pi$ Amplitud graf = 2 unit Graf dianjak 1 unit dari paksi-x</p>	1 1 1 1	7
	(b)	$y = 2 - \frac{x}{\pi}$ <p>Lakar $y = 2 - \frac{x}{\pi}$ menggunakan paksi-paksi (a) Bilangan penyelesaian = 2</p>	1 1 1	