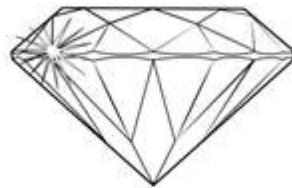




KEMENTERIAN PENDIDIKAN
JABATAN PENDIDIKAN NEGERI PERAK



MODUL BLUE DIAMOND *Matematik Tambahan*

TINGKATAN 4

Bab 4

INDEKS, SURD & LOGARITMA *(Indices, Surd & Logarithms)*

SKEMA JAWAPAN

SKEMA JAWAPAN KERTAS 1

NO.		BUTIRAN	PECAHAN MARKAH	JUMLAH
1	(a)	$\log_2 (2x - 1) - 4\left(\frac{\log_2 x^2}{\log_2 4}\right) + \log_2 x^3$	1	5
		$\log_2 \left[\frac{(2x - 1)}{x^4} \times x^3 \right]$	1	
		$\log_2 \left[\frac{(2x - 1)}{x} \right]$	1	
	(b)	$\frac{2x - 1}{x} = \frac{1}{2}$ $x = \frac{2}{3}$	1 1	

Sumber : Ticket To Victory 1 | Kertas 1 | Set 1 | Soalan 5

NO.		BUTIRAN	PECAHAN MARKAH	JUMLAH
2	(a)	$h = 37(1.08)^{10}$	1	5
		79.88	1	
	(b)	$\log_{10} (1.08)^t = \log_{10} \left(\frac{1000}{37} \right)$ or $\log_{10} [37(1.08)^t] = \log_{10} (1000)$ $t \log_{10} (1.08) = \log_{10} (27.027)$ $t = 42.84$	1 1 1	

Sumber : Ticket To Victory 1 | Kertas 1 | Set 2 | Soalan 1

NO.		BUTIRAN	PECAHAN MARKAH	JUMLAH								
3		<table><tr><th rowspan="2">Nombor nisbah <i>Rational number</i></th><th colspan="2">Nombor tak nisbah <i>Irrational number</i></th></tr><tr><th>Surd <i>Surd</i></th><th>Bukan surd <i>Not a surd</i></th></tr><tr><td> 0.141414... </td><td> $\sqrt{2}$ </td><td> $\sqrt[3]{8}$ </td></tr></table> Betul 1 Semua betul Katakan N = 0.141414... -----(1) 100 N = 14.141414... -----(2) (2) – (1) 99 N = 14 N = $\frac{14}{99}$	Nombor nisbah <i>Rational number</i>	Nombor tak nisbah <i>Irrational number</i>		Surd <i>Surd</i>	Bukan surd <i>Not a surd</i>	0.141414...	$\sqrt{2}$	$\sqrt[3]{8}$	1 1 1 1	5
Nombor nisbah <i>Rational number</i>	Nombor tak nisbah <i>Irrational number</i>											
	Surd <i>Surd</i>	Bukan surd <i>Not a surd</i>										
0.141414...	$\sqrt{2}$	$\sqrt[3]{8}$										

Sumber : Ticket To Victory 1 | Kertas 1 | Set 2 | Soalan 4

NO.		BUTIRAN	PECAHAN MARKAH	JUMLAH
4	(a)	$p = \log_a x$ dan $q = \log_a y$. $xy = a^{p+q}$ $\log_a xy = p + q$ $\log_a xy = \log_a x + \log_a y$	1 1 1 1	7
	(b)	$2^{-x} (2^4 - 2^3) = \frac{1}{4}$ $2^{-x} = 2^{-5}$ $x = 5$	1 1 1	

Sumber : Ticket To Victory 1 | Kertas 1 | Set 3 | Soalan 3

NO.		BUTIRAN	PECAHAN MARKAH	JUMLAH
5		$\frac{a(\sqrt{3}-1)-5(\sqrt{3}+1)}{(\sqrt{3}+1)(\sqrt{3}-1)} = b + 2\sqrt{3}$ $\sqrt{3}(a-5) - a - 5 = 2b + 4\sqrt{3}$ $a = 9$ $b = -7$	1 1 1 1	4

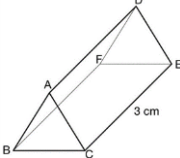
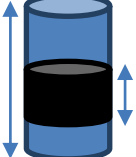
Sumber : Ticket To Victory 1 | Kertas 1 | Set 3 | Soalan 4

NO.			BUTIRAN	PECAHAN MARKAH	JUMLAH
6	(a)		$3a - \frac{1}{3}b = a^3 - b^{\frac{1}{3}} = \frac{a^3}{\sqrt[3]{b}}$	1 1	7
	(b)	i.	$X = p(1+q)^n X = 5000 \left(1 + \frac{7}{100}\right)^5 = RM 7012.76$	1 1	
		ii.	$5000 \left(1 + \frac{7}{100}\right)^n \geq 50\,000$ $\left(1 + \frac{7}{100}\right)^n \geq 10$ $n \log_{10} \left(1 + \frac{7}{100}\right) \geq \log_{10} 10$ $n \geq \frac{1}{\log_{10}(1 + 0.07)}$ $\geq \frac{1}{0.02938}$ $n \geq 34.03$ Maka, Imran memerlukan sekurang-kurangnya 35 tahun untuk memperoleh RM50 000.	1 1 1	

Sumber : Ticket To Victory 2 | Kertas 1 | Set 1 | Soalan 7

NO.			BUTIRAN	PECAHAN MARKAH	JUMLAH
7	(a)	i.	20	1	
		ii.	Terima nombor dalam julat $15 \leq m < 20$	1	
	(b)		$\pi r^2 h = \pi \left(\frac{1}{\sqrt{2} - 1} \right)^2 (\sqrt{2} + 1)$	1	
			$isipadu = \pi \left(\frac{\sqrt{2} + 1}{3 - 2\sqrt{2}} \right)$ $isipadu = \pi \left(\frac{\sqrt{2} + 1}{3 - 2\sqrt{2}} \right) \left(\frac{3 + 2\sqrt{2}}{3 + 2\sqrt{2}} \right)$ $isipadu = (7 + 5\sqrt{2})\pi$	1 1 1	

Sumber : Ticket To Victory 2 | Kertas 1 | Set 2 | Soalan 11

NO.		BUTIRAN	PECAHAN MARKAH	JUMLAH
8	(a)	  $V_{air} = 3\sqrt{2} \text{ cm}^3$ $V_{Prisma} = 3\sqrt{8} \text{ cm}^3$ $V_{Prisma} = V_{silinder} - V_{asal \text{ air}}$ $V_{prisma} = \pi r^2 h - 3\sqrt{2}\pi r^2$ $3\sqrt{8} = \pi r^2 h - 3\sqrt{2}\pi r^2$ $3\sqrt{8} = \pi r^2 (h - 3\sqrt{2})$ $h - 3\sqrt{2} = \frac{3\sqrt{8}}{\pi r^2}$	1 1 1 1	7
	(b)	$V_{kubus} = V_{silinder} - V_{air \text{ (baru)}}$ $(\sqrt{2}x)^3 = \pi r^2 h - \pi r^2 h_1$ $\sqrt{8}x^3 = \pi r^2 (h - h_1)$ $h - h_1 = \frac{\sqrt{8}x^3}{\pi r^2}$ $\frac{\sqrt{8}x^3}{\pi r^2} = 1.08 \left(\frac{3\sqrt{8}}{\pi r^2} \right)$ $\frac{x^3}{3} = 1.08 \quad x = 1.5 \text{ cm}$ $h - 3\sqrt{2} = \frac{3\sqrt{8}}{\pi(3)^2} \quad h = 4.4 \text{ cm}$	1 1 1	

Sumber : Modul Gempur | Kertas 1 | Set 1 | Soalan 8

Sumber : Modul Gempur | Kertas 1 | Set 2 | Soalan 8

NO.	BUTIRAN		PECAHAN MARKAH	JUMLAH
10	(a)	$2^x = 4^y$ $\log_{10} 2^x = \log_{10} 4^y$ $x \log_{10} 2 = y \log_{10} 4$ $\log_{10} 2 = \frac{y}{x} \log_{10} 4 \dots\dots\dots$ $4^y = 8^z$ $4^y = (2 \times 4)^z$ $4^y = 2^z \times 4^z$ $\log_{10} 4^y = \log_{10} (2^z \times 4^z)$ $\log_{10} 4^y = \log_{10} 2^z + \log_{10} 4^z$ $y \log_{10} 4 = z \log_{10} 2 + z \log_{10} 4 \dots\dots\dots$ Masukkan (i) ke dalam (ii) $y \log_{10} 4 = z \left(\frac{y}{x} \log_{10} 4 \right) + z \log_{10} 4$ $y = \frac{yz}{x} + z$ $xy = yz + xz$ $xy - yz = xz$ $y(x - z) = xz$ $y = \frac{xz}{x - z}$	1 1 1	8
	(b)	i $T = 100(0.95)^4$ $T = 81.45^\circ\text{C}$	1	

	ii	$100(0.95)^4 = 90$ $(0.95)^x = \frac{90}{100}$ $(0.95)^x = 0.9$ $x \log_{10} 0.95 = \log_{10} 0.9$ $x = \frac{\log_{10} 0.9}{\log_{10} 0.95}$ $x = 2.05 \text{ saat}$	1	
			1	
			1	

Sumber : Modul Gempur | Kertas 1 | Set 2 | Soalan 15

SKEMA JAWAPAN KERTAS 2

NO.	BUTIRAN	PECAHAN MARKAH	JUMLAH
1(a)	$8^a = (2^3)^a$ and $4^{-a} = (2^2)^{-a}$ $b^3 - \frac{1}{b^2}$	1 1	8
(b)	$\frac{x+\sqrt{3}}{x-\sqrt{3}} \times \frac{x+\sqrt{3}}{x+\sqrt{3}}$ $\frac{x^2 + p\sqrt{3} + 3}{q} = \frac{x+\sqrt{3}}{x-\sqrt{3}} \times \frac{x+\sqrt{3}}{x+\sqrt{3}}$ $p = 2x$ and $q = x^2 - 3$	1 1 1	
(c)	$\log_2(3+x^2) = \frac{\log_2(2-x)}{\log_2 \sqrt{2}}$ OR $\log_2 \sqrt{2} = \frac{1}{2}$ or $2 \log_2(2-x) = \log_2(2-x)^2$ Solve quadratic equation * $(3+x^2) = (2-x)^2$ $x = \frac{1}{4}$	1 1 1	

Sumber : Ticket To Victory 1 | Kertas 2 | Set 1 | Soalan 6

NO.	BUTIRAN	PECAHAN MARKAH	JUMLAH
2(a)	$\frac{k}{12} = 6$ $k = 72$	1 1	7
(b)	$\frac{2+\sqrt{3}}{3-\sqrt{3}} \times \frac{3+\sqrt{3}}{3+\sqrt{3}}$ $\frac{9+5\sqrt{3}}{6}$	1 1	
(c)	$\log_{16} 4 = \frac{\log_4 4}{\log_4 16}$ atau $\log_{16} 4 = \frac{1}{2}$ $5 - 4x = 3^2$ $x = -1$	1 1 1	

Sumber : Ticket To Victory 1 | Kertas 2 | Set 2 | Soalan 6

NO.	BUTIRAN	PECAHAN MARKAH	JUMLAH
3(a)	$(2^2)^{k+9} \times 2^3 = 2^{-6}$ $k = -\frac{27}{2}$	1 1	7
(b)	$\log_3 5 - \log_3 4$ 0.20	1 1	
(c)	$\frac{1}{2} \times (YZ) \times (\sqrt{6} - 2) = \frac{\sqrt{6} + 2}{2}$ $\frac{\sqrt{6} + 2}{\sqrt{6} - 2} \times \frac{\sqrt{6} + 2}{\sqrt{6} + 2}$ $5 + 2\sqrt{6}$	1 1 1	

Sumber : Ticket To Victory 1 | Kertas 2 | Set 3 | Soalan 6

NO.	BUTIRAN	PECAHAN MARKAH	JUMLAH
4(a)	$S = 80000(1 + 0.085)^{10}$ RM 180879 .68	1 1	6
(b)(i)	$\log_2 2^2 + \log_2 m + \log_2 n$ $2 + 2x + \frac{\log_4 n}{\log_4 2}$ $2 + 2x + \frac{y-3}{\log_4 4^{\frac{1}{2}}}$ $2 + 2x + 2(y - 3)$ $2x + 2y - 4$	1 1	
(ii)	$\frac{\log_2 n}{\log_2 m}$	1	
	$\frac{y - 3}{x}$	1	

Sumber : Ticket To Victory 2 | Kertas 2 | Set 1 | Soalan 2

NO.	BUTIRAN	PECAHAN MARKAH	JUMLAH
5(a)	$5^{3x-1} = 625^{x-1}$ $5^{3x-1} = 5^{4(x-1)}$ $3x-1 = 4(x-1)$ $3x-1 = 4x-4$ $x = 3$ $\log_2 (x + 1) + \log_2 4 = y$ $\log_2 (3 + 1) + \log_2 4 = y$ $\log_2 4 + \log_2 4 = y$ $\log_2 16 = y$ $16 = 2^y$	1 1 1 1	9

	$2^4 = 2^y$ $4 = y$	1	
(b)	$\frac{8+\sqrt{5}}{3-\sqrt{5}} \times \left(\frac{3+\sqrt{5}}{3+\sqrt{5}}\right)$ $\frac{8(3)+8\sqrt{5}+3\sqrt{5}+(\sqrt{5})^2}{(3)^2+3\sqrt{5}-3\sqrt{5}-(\sqrt{5})^2}$ $\frac{29+11\sqrt{5}}{4}$	1 1 1	

Sumber : Ticket To Victory 2 | Kertas 2 | Set 2 | Soalan 6

NO.	BUTIRAN	PECAHAN MARKAH	JUMLAH
6(a)	$3^{2x} \times 3^y = 3^{2x} + 16$ $(\sqrt{p})^2 \times \left(q^{\frac{1}{y}}\right)^y = (\sqrt{p})^2 + 16$ $p(q-1) = 16$ $p = \frac{16}{q-1}$	1 1 1 1	7
(b)	$\log_m a - \log_m 3 = 5 - \log_m (5-m)$ $\log_m \left(\frac{a}{3} \times (5-m)\right) = 5$ $a = \frac{3m^5}{5-m}$	1 1 1	

Sumber : Modul Gempur | Kertas 2 | Set 1 | Soalan 6