

MODUL TOPIKAL
SOALAN PERCUBAAN SPM 2022

TOPIK TINGKATAN 4

BAB 4

INDEKS, SURD & LOGARITMA
(*INDICES, SURDS & LOGARITHMS*)

SUMBER SOALAN:

SOALAN – SOALAN PERCUBAAN

NEGERI SEMBILAN
SELANGOR SET A (MODUL PINTAS)
MELAKA
JOHOR (TANGKAK)
JOHOR (MUAR)
TERENGGANU
PUTRAJAYA

SKEMA JAWAPAN

DISUSUN OLEH:

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(SMK TAMAN TASIK, TAIPING)

PN ZAINAB BINTI ABD RAHMAN
(SMK CONVENT, TAIPING)

SOALAN 1 : SOALAN PERCUBAAN SPM NEGERI SEMBILAN 2022

15	(a)	$\frac{\log_{12} 2^5}{\log_{12} 3^2}$ atau $\frac{6 \log_{12} 2}{\log_{12} 3}$ atau setara	K1
		$\frac{\log_{12} 4^3}{\log_{12} 3}$ atau $\frac{3 \log_{12} 2^2}{\log_{12} 3}$	K1
		$\frac{3 (\log_{12} 12 - \log_{12} 3)}{\log_{12} 3}$	K1
		$\frac{3(1 - k)}{k}$	N1
			8 markah
	(b)	$\ln \left(\frac{x}{e^2} \right) + 3 \ln x = 10$	P1
		$\ln \left(\frac{x(x^3)}{e^2} \right) = 10 \ln e$ or $\ln \left(\frac{x^4}{e^2} \right) = \ln e^{10}$	K1
		$x^4 = e^{12}$	K1
		$x = e^3$	N1

SOALAN 2 : SOALAN PERCUBAAN SPM NEGERI SEMBILAN 2022 (KERTAS 2)

3	(a)	$\frac{1}{2} (4\sqrt{5x})(5\sqrt{5y}) - (2\sqrt{x})(3\sqrt{y})$	K1
		$\frac{1}{2} (100)\sqrt{xy} - 6\sqrt{xy}$ atau $44\sqrt{xy}$	K1
		$k = 44$	N1
	(b)	$(2^t)^2(2)$	K1
		$(2^t - 8)(2(2^t) + 15) = 0$ atau setara	K1
		$2^t = 8$ or $2^t = 2^3$	K1
		$t = 3$	N1

7 markah

SOALAN 3 : SOALAN PERCUBAAN NEGERI SELANGOR K1 (MODUL PINTAS SET A)

1.	(a) $\frac{p^2}{3} \times 3^p \times 2^{-(p+2)} \times y^{-3p} \times y^{p+2} = q^1 y^{-2}$ $y^{-3p+p+2} = y^{-2}$ $-2p + 2 = -2$ $p = 2$ $\frac{p^2}{3} \times 3^p \times \left(\frac{1}{2}\right)^{p+2} = q^1$ $q = \frac{3}{4}$ Bandingkan kuasa y atau nilai pemalar dapat K1	K1		7
	(b) $\left(\frac{\log_3 9}{\log_3 \sqrt{y}}\right) \left(\frac{\log_3 y}{\log_3 x}\right) (\log_3 x)$ $\left(\frac{2\log_3 3}{\frac{1}{2}\log_3 y}\right) \left(\frac{\log_3 y}{\log_3 x}\right) (\log_3 x)$ 4	K1	4	
		K1	3	
		N1		

SOALAN 4 : SOALAN PERCUBAAN NEGERI SELANGOR K2 (MODUL PINTAS SET A)

2	(a) $\frac{1}{2}(2 + \sqrt{3})(3 + \sqrt{48})$ $\frac{1}{2}(6 + 2\sqrt{48} + 3\sqrt{3} + \sqrt{144})$ $9 + \frac{11}{2}\sqrt{3}$	K1		7
	(b) $\frac{1}{2} \log_a \frac{48 \times 0.25}{3^5} \text{ atau } \log_a \left(\frac{48 \times 0.25}{3^5}\right)^{\frac{1}{2}}$ $\log_a \left(\frac{4}{81}\right)^{\frac{1}{2}} \text{ ATAU } p^2 = \frac{4}{81}$ $\frac{2}{9}$ 2	K1	3	
		N1		
		K1	4	
		N1		
		N1		

SOALAN 5 : SOALAN PERCUBAAN SPM NEGERI MELAKA 2022 (KERTAS 1)

1(a)	$3k^{\frac{1}{2} + (-\frac{1}{3})}$	1	4
	$3k^{\frac{1}{6}}$	1	
1(b)	$(5^x)(5) - (5^x)(5)^{-1} + (5^x)$	1	
	29(5^{x-1}) boleh dibahagi tepat dengan 29 bagi semua integer positif x atau 5^{x-1}	1	

SOALAN 6 : SOALAN PERCUBAAN SPM NEGERI MELAKA 2022 (KERTAS 2)

2(a)	$b > 0$ atau $b \neq 1$	1	6
2(b)	$\log_p(\frac{p}{\sqrt{q}} \times \sqrt{p}\sqrt{q})$	1	
	$1 + \frac{1}{2} \log_n n$ atau setara	1	
	$\frac{3}{2}$	1	
2(c)	$\log_{14} 6 = \frac{\log_2 6}{\log_2 14}$ atau $\frac{\log_2 3 + \log_2 2}{\log_2 7 + \log_2 2}$	1	
	$\frac{x + 1 - y}{y}$	1	

SOALAN 7 : SOALAN PERCUBAAN SPM NEGERI JOHOR K1 (TANGKAK)

3	(a)	2^2 or 3^4	1	4
		$q^8 - p^4$	1	
	(b)	Changing 6^{m+2} to $6^m(6^2)$ or 6^{m+1} to $6^m(6)$	1	
		$6^m[6^2 + 6 - 18]$	1	
		$6^m[24]$	1	

SOALAN 8 : SOALAN PERCUBAAN SPM NEGERI JOHOR K2 (TANGKAK)

2	(a) Katakan $l = \text{lebar}$, *terima sebarang algebra bagi lebar.		
	$l \times (2 - \sqrt{2}) = 3 + \sqrt{2}$	1	
	$l = \frac{3 + \sqrt{2}}{2 - \sqrt{2}} \times \frac{2 + \sqrt{2}}{2 + \sqrt{2}}$	1	
	$= \frac{6 + 3\sqrt{2} + 2\sqrt{2} + 2}{4 - 2}$	1	
	$= 4 + \frac{5}{2}\sqrt{2}$	1	4
(b)	$\log_7 (x - 1) - \log_7 (x - 7) = 1$		
	$\log_7 \frac{(x - 1)}{(x - 7)} = 1$	1	
	$x = 8$	1	2

SOALAN 9 : SOALAN PERCUBAAN SPM NEGERI JOHOR K1 (MUAR)

3(a)	$2(3^x) = 162$	1	
	$3^x = 81$		
	$3^x = 3^4$		
	$x = 4$	1	
(b)	$3^n(3^4) + 3^n(3^5) + (3^n)$	1	
	$(3^4 + 3^5 + 1)3^n$	1	
	$325(3^n)$	1	5

SOALAN 10 : SOALAN PERCUBAAN SPM NEGERI JOHOR K2 (MUAR)

2 (a)	$\frac{5 + \sqrt{7}}{5 - \sqrt{7}} \times \frac{5 + \sqrt{7}}{5 + \sqrt{7}}$	K1
	$\frac{32 + 10\sqrt{7}}{18}$	K1
	$\frac{16 + 5\sqrt{7}}{9}$	N1
2(b)	$(x - 4)\log 3 = (x - 3)\log 50$	K1
	$x(\log 3 - \log 50) = -3\log 50 + 4\log 3$	K1
	$x = 2.610$	N1
JUMLAH		6m

SOALAN 11 : SOALAN PERCUBAAN SPM 2022 NEGERI TERENGGANU 2022 (KERTAS 1)

7	(a) 1	N1	4
	(b) $\log_m a = 2 \log_m \left(\frac{b}{2} \right)$	K1	
	$a = \frac{b^2}{4}$	K1	
	$b = 2\sqrt{a}$	N1	

SOALAN 12 : SOALAN PERCUBAAN SPM 2022 NEGERI TERENGGANU 2022 (KERTAS 2)

7	(a) $\frac{3}{\sqrt{3}-3} \times \frac{\sqrt{3}+3}{\sqrt{3}+3}$ dan kembangkan	K1	
	$-\frac{\sqrt{3}+3}{2}$	N1	
	(b) (i) $\frac{\log_a hk}{\log_a a^2}$	K1	
	$\frac{\log_a h + \log_a k}{2}$	K1	8
	$\frac{1}{2} \log_a h + \frac{1}{2} \log_a k$	N1	
	(ii) $\log_{a^2} 5q = 1$	K1	
	$5q = a^2$	K1	
	$a = \sqrt{5q}$	N1	

SOALAN 13 : SOALAN PERCUBAAN SPM PUTRAJAYA 2022 (KERTAS 1)

4	$4\sqrt{5} - 3 \times 5$	K1	2
	$4\sqrt{5} - 15$	N1	

SOALAN 14 : SOALAN PERCUBAAN SPM PUTRAJAYA 2022 (KERTAS 2)

5	(a)	$\frac{3^{3h+9}}{3^{4p-12}} = 3$ $3h - 4p + 21 = 1$ $p = \frac{3h}{4} + 5$	K1 N1	2
	(b)	$\frac{26}{4+\sqrt{3}} = \frac{26}{4+\sqrt{3}} \times \frac{4-\sqrt{3}}{4-\sqrt{3}}$ $\frac{104}{13} - 2\sqrt{3}$	K1 N1	2
	(c)	$p^4 m^2 = p^4 + m^2$ $\frac{p^4}{\sqrt{m}} + \frac{m^2}{\sqrt{m}}$ $8x + 4$	K1 K1 N1	3