

MODUL TOPIKAL
SOALAN PERCUBAAN SPM 2022

SKEMA JAWAPAN

TOPIK TINGKATAN 5

BAB 3

PENGAMIRAN
(INTEGRATION)

SUMBER SOALAN:

SOALAN – SOALAN PERCUBAAN

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

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

9	(a) $\int_1^3 f(x)dx + \int_3^5 f(x)dx$	K1
	$p + \frac{q}{3}$	N1
	(b) $\int_1^3 2r^2x dx - \int_1^3 g(x)dx$	K1
	$\left[2r^2 \frac{x^2}{2} \right]_1^3 - r$ atau $\left[2r^2 \frac{(3)^2}{2} \right] - \left[2r^2 \frac{(1)^2}{2} \right] - r$	K1
	$8r^2 - r$	N1
		5 markah

SOALAN 2 : SOALAN PERCUBAAN SPM NEGERI SEMBILAN 2022

6	(a) $\int_0^2 6x - x^2 - 2x^2 dx$ atau $\left[\frac{6x^2}{2} - \frac{3x^3}{3} \right]_0^2$	K1
	$\left[\frac{6(2)^2}{2} - \frac{3(2)^3}{3} \right] - 0$	K1
	4	N1
(b)	$\int_0^2 \pi(2x^2)^2 dx$ atau $\pi \left[\frac{4x^5}{5} \right]_0^2$	K1
	$\pi \left(\frac{4(2)^5}{5} - \frac{4(0)^5}{5} \right)$	K1
	$\frac{128}{5} \pi$	N1
		6 markah

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

11.	(a) $\int_1^3 x \, dx - 2 \int_1^3 g(x) \, dx$ $\left[\frac{x^2}{2}\right]_1^3 - 2(-10)$ 24	K1 K1 N1	3	6
	(b) $g(x) = \int 2x - 8 \, dx$ $g(x) = \frac{2x^2}{2} - 8x + c$ $0 = 1^2 - 8(1) + c$ $c = 7$ $g(x) = x^2 - 8x + 7$	K1 K1 N1	3	

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

6	(a) $x^2 = -x^2 + 4$ $x = \sqrt{2}$	K1 N1	2	8
	(b) $\int_0^{\sqrt{2}} x^2 \, dx + \int_{\sqrt{2}}^2 -x^2 + 4 \, dx$ $= \left[\frac{x^3}{3}\right]_0^{\sqrt{2}} + \left[\frac{-x^3}{3} + 4x\right]_{\sqrt{2}}^2$ $= \left[\frac{\sqrt{2}^3}{3} - 0\right] + \left[\left(-\frac{2^3}{3} + 4(2)\right) - \left(-\frac{\sqrt{2}^3}{3} + 4\sqrt{2}\right)\right]$ $= \frac{16-8\sqrt{2}}{3} \text{ unit}^2 \text{ or } 1.562 \text{ unit}^2$	K1 K1 N1	3	
	(c) $\pi \int_2^4 4 - y \, dy + \pi \int_0^2 y \, dy$ $= \pi \left[4y - \frac{y^2}{2}\right]_2^4 + \pi \left[\frac{y^2}{2}\right]_0^2$ $= \pi \left[\left(4(4) - \frac{4^2}{2}\right) - \left(4(2) - \frac{2^2}{2}\right)\right] + \pi \left[\frac{2^2}{2} - 0\right]$ $= 4\pi \text{ unit}^3$	K1 K1 N1	3	

SOALAN 6 : SOALAN PERCUBAAN SPM NEGERI JOHOR (TANGKAK)

9	(a)	$\int_0^k \pi x^2 dy = 6\pi$ $\pi \int_0^k 4 - y dy = 6\pi$ $\left[4y - \frac{y^2}{2} \right]_0^k = 6$ $-k^2 + 8k - 12 = 0$ $k^2 - 8k + 12 = 0$ $(k - 6)(k - 2) = 0$ $k = 2, \quad k = 6$ $\therefore k = 2$	1	1	1	5
	(b)	$\int_1^3 2f(x) dx - \int_1^3 5 dx$ $= 2 \int_1^3 f(x) dx - [5x]_1^3$ $= 2(6) - [5(3) - 5(1)]$ $= 2$	1	1	1	

SOALAN 7 : SOALAN PERCUBAAN SPM NEGERI JOHOR (TANGKAK)

8	(a)	Pada titik B, $y = 0$ $x = (0)^2 + 3$ $x = 3$ Maka, titik B ialah (3,0).	1	1	
	(b)	Luas rantau berlorek $R = \frac{1}{2} \times 4 \times 4 + \int_0^1 x dy$ $= \frac{1}{2} \times 4 \times 4 + \int_0^1 (y^2 + 3) dy$ $= 8 + \left[\frac{y^3}{3} + 3y \right]_0^1$ $= 8 + \left[\frac{(1)^3}{3} + 3(1) - \left(\frac{(0)^3}{3} + 3(0) \right) \right]$ $= 11\frac{1}{3}$	1	1	1

$\begin{aligned} \text{(c) Isi padu janaan} &= \frac{1}{3} \times \pi \times (1)^2 \times 1 + \int_3^4 \pi y^2 \, dx \\ &= \frac{1}{3} \times \pi \times (1)^2 \times 1 + \int_3^4 \pi(x-3) \, dx \\ &= \frac{1}{3} \pi + \pi \left[\frac{x^2}{2} - 3x \right]_3^4 \\ &= \frac{1}{3} \pi + \pi \left[\frac{(4)^2}{2} - 3(4) - \left(\frac{(3)^2}{2} - 3(3) \right) \right] \\ &= \frac{1}{3} \pi + \frac{1}{2} \pi \\ &= \frac{5}{6} \pi \end{aligned}$	1	1	1	1	10
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SOALAN 8 : SOALAN PERCUBAAN SPM NEGERI JOHOR (MUAR)

9(a)	$\begin{aligned} \int_{-1}^1 g(x) \, dx &= \frac{1}{2} \left[\frac{2x-1}{x^2} \right]_{-1}^1 \\ &= \frac{1}{2} \left[\frac{2(1)-1}{1^2} - \frac{2(-1)-1}{(-1)^2} \right] \\ &= \frac{1}{2} [1 - (-3)] \\ &= 2 \end{aligned}$	1	1	1	
(b)	$\int_4^5 f(x) \, dx + \int_5^7 f(x) \, dx + \int_7^{10} f(x) \, dx$	1	1	1	
7					5

SOALAN 9 : SOALAN PERCUBAAN SPM NEGERI JOHOR (MUAR)

8(a)	batas rantau $y = -1$ dan $y = 3$ $\begin{aligned} \text{luas} &= \int_{-1}^3 -(y+1)(y-3) dy \\ &= \int_{-1}^3 (-y^2 + 2y + 3) dy \\ &= \left[-\frac{y^3}{3} + \frac{2y^2}{2} + 3y \right]_{-1}^3 \\ &= \left[-\frac{3^3}{3} + 3^2 + 3(3) \right] - \left[-\frac{(-1)^3}{3} + (-1)^2 + 3(-1) \right] \\ &= \frac{32}{3} \text{ unit}^2 \end{aligned}$	K1 K1 K1 N1
8(b)	i) $x = 5 - 7, y = \frac{4}{5-y}$ $\begin{aligned} y^2 - 5y + 4 &= 0 \\ (y-4)(y-1) &= 0 \\ y &= 4, y = 1 \\ A(1, 4) \text{ dan } B(4, 1) \end{aligned}$	K1 N1
	ii) Isipadu $\begin{aligned} &= \pi \int_1^4 (5-x)^2 dx - \pi \int_1^4 \left(\frac{4}{x}\right)^2 dx \\ &= \pi \left[25x - 5x^2 + \frac{x^3}{3} \right]_1^4 - \pi \left[\frac{16x^{-1}}{-1} \right]_1^4 \\ &= \left\{ \pi \left[25(4) - 5(4)^2 + \frac{(4)^3}{3} \right] - \left[25(1) - 5(1)^2 + \frac{(1)^3}{3} \right] \right\} - \pi \left[\frac{16}{(4)} - \left(-\frac{16}{(1)} \right) \right] \\ &= 9\pi \text{ unit}^3 \end{aligned}$	K1 K1 K1 N1
JUMLAH		10m

SOALAN 10 : SOALAN PERCUBAAN SPM 2022 NEGERI TERENGGANU 2022

9	(a) (i) -10 (ii) $\frac{1}{2}(-10)$ -5 (b) $g(x) = \frac{3x^3}{3} - \frac{24x^2}{2} + 17x + c \text{ dan } 96 = \frac{3(1)^3}{3} - \frac{24(1)^2}{2} + 17(1) + c$ $g(x) = x^3 - 12x^2 + 17x + 90$	N1 K1 N1 K1 N1	5
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SOALAN 11 : SOALAN PERCUBAAN SPM 2022 NEGERI TERENGGANU 2022

8	(a) (i)	$k(4) - 12 = 0$	K1	10
		$k = 3$	N1	
	(ii)	$m_1 \left(\frac{1}{3} \right) = -1$ atau $3x - 12 = -3$	K1	
		$(3, -6)$	N1	
	(b)	$y = \frac{3}{2}x^2 - 12x + c$		
		$-6 = \frac{3}{2}(3)^2 - 12(3) + c$	K1	
		$y = \frac{3}{2}x^2 - 12x + \frac{33}{2}$	N1	
	(c)	$y = \frac{3}{2}x^2 - \frac{15}{2}$	P1	
		$V = \pi \int_{-7.5}^{-6} \left(\frac{2}{3}y + 5 \right) dy$		
		$\pi \left[\frac{2y^2}{2(3)} + 5y \right]_{-7.5}^{-6}$	K1	
		$\pi \left[\left(\frac{2(-6)^2}{2(3)} + 5(-6) \right) - \left(\frac{2(-7.5)^2}{2(3)} + 5(-7.5) \right) \right]$	K1	
		0.75π	N1	

SOALAN 12 : SOALAN PERCUBAAN SPM PUTRAJAYA 2022

12.(a)	$\frac{dy}{dx} = -2x$	K1	3
	$-2x = 2$ $(-1,5)$	K1 N1	
(b)(i)	$\int_2^0 (h(x)dx + \int_2^0 2dx$ $-7 + [2(0) - 2(2)]$ -11 $\int_0^5 h(x)dx = \int_0^2 h(x)dx + \int_2^5 h(x)dx$ $= 7 + 7$ 14	K1 K1 N1 K1 N1	5
			8M

SOALAN 13 : SOALAN PERCUBAAN SPM PUTRAJAYA 2022

9	(a)	$y = x^2 - 9$ $\frac{dy}{dx} = 2x$ Kecerunan garis lurus $PQ = 2$ $2x = 2$ $x = 1$ Apabila $x = 1$, $y = 12 - 9 = -8$ Koordinat titik K ialah $(1, -8)$	K1 K1 N1	3
	(b)	Pada paksi- x , $y = 0$ $x^2 - 9 = 0$ $x^2 = 9$ $x = \pm 3$ Lengkung itu memotong paksi- x di titik $(-3, 0)$ dan titik $(3, 0)$. Luas rantau berlorek = Luas Δ - Luas rantau yang dibatasi oleh lengkung		
		$= \frac{1}{2} (5 - 1)(8) - \int_1^3 y \, dx$ $= 16 - \int_1^3 (x^2 - 9) \, dx$ $= 16 - \left[\frac{x^3}{3} - 9x \right]_1^3$ $= 16 - \left[\left(\frac{3^3}{3} - 9(3) \right) - \left(\frac{1^3}{3} - 9(1) \right) \right]$ $= 16 - \left[-\frac{28}{3} \right]$ $= 16 - \frac{28}{3}$ $= 6\frac{2}{3} \text{ unit}^2$	K1 K1 K1 N1	4
	(c)	Isipadu kisaran = 40π $\pi \int_h^0 x^2 \, dy = 40\pi$ $\pi \int_h^0 (y + 9) \, dy = 40\pi$ $\left[\frac{y^2}{2} + 9y \right]_h^0 = 40$ $0 - \left(\frac{h^2}{2} + 9h \right) = 40$ $h^2 + 18h + 80 = 0$ $(h + 10)(h + 8) = 0$ $h = -10$ atau $h = -8$ (ditolak) Maka, $h = -10$	K1 K1 N1	3
				10