

**BAHAN KECEMERLANGAN 2016**  
**SPM**

**Skema**  
**BK 1**

**MATEMATIK TAMBAHAN**

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**MARK SCHEME FOR ADDITIONAL MATHS. – BK 1**  
**PAPER 1**

No	Mark Scheme	$\Sigma$ Marks
1	(a) $-3$ 2	3
	$1 - 2m = 7$ @ $ 1 - 2m  = 7$ B1	
	(b) Many to one 1	
2	(a) $-2$ 1	3
	(b) $\frac{6x}{2-3x}$ , $x \neq \frac{2}{3}$ or equivalent 2	
	$2x = u(3x+6)$ or equivalent B1 (attempting inverse operation to express $g^{-1}$ )	
3	(a) 78 2	4
	$x = 72$ B1	
	(b) 7 2 $f(x) \geq 0$ or $f(x) = 0$ B1	
4	$p = 2, q = 1$ 3	3
	$p = 2$ or $q = 1$ B2	
	$3\left(-\frac{2}{3}\right)^2 - (2p-3)\left(-\frac{2}{3}\right) - 2 = 0$ B1	
	or $-\frac{2}{3} + (2q-1) = \frac{2p-3}{3}$ or $\left(-\frac{2}{3}\right) \times (2q-1) = -\frac{2}{3}$ (Use SOR or POR)	
5	$-2 < k < \frac{2}{3}$ 3	3
	$-(3k-2)(k+2) > 0$ or equivalent or the roots $-2$ and $\frac{2}{3}$ B2	
	$(2-k)^2 - 4(1)(k^2) > 0$ @ $x^2 + (2-k)x + k^2 = 0$ B1	
6	(a) $p = 3$ 1 $q = -2$ 1	3
	(b) $x = \frac{1}{2}$ 1	
7	$-1 < x < 3$ 2 $x^2 - 2x - 3 < 0$ @ $x = -1; x = 3$ B1	2

No	Mark Scheme	$\Sigma$ Marks
8	$\frac{3^{2n-1} \times 3^{12n-6} \times 3^{4-4n}}{3^{6n-1}}$ (Change to the same base)	2 B1
9	$y = \frac{x^2}{81}$ $\log_3 \frac{x^2}{y} = 4$ $\log_3 x - \frac{\log_3 y}{\log_3 9} = 2$	3 B2 B1
10	(a) $2r$ (b) $\frac{3s+2-3r}{2r}$ $\frac{\log_n 64n^2}{\log_n 9} - \frac{\log_n 27}{\log_n 9}$ (Change to same base and use product law / quotient law) $\frac{\log_n \frac{64n^2}{27}}{\log_n 9}$ (Change to same base) or $\log_9 64n^2 - \log_9 27$ (Use product law / quotient law)	1 3 B2 B1
11	(3,4) $\frac{2(-2)+3x}{5} = 1 \text{ or } \frac{2(-1)+3y}{5} = 2$	2 B1
12	$3y = x + 18$ or equivalent $5 = 1/3(-3) + c$ $m_2 = 1/3$ $m_1 = -3$	4 B3 B2 B1
13	$m = 10$ and $n = 12$ @ $m = 9$ and $n = 13$ $m = 10$ or $n = 12$ @ $m = 9$ or $n = 13$ $\frac{2+5+7+9+11+m+n}{7} = 8$ (Mean formula)	3 B2 B1
14	$k = 4$ $13 = 10.5 + \left( \frac{\frac{1}{2}(12+k)-5}{6} \right) 5$ $L = 10.5$ @ $F = 5$ @ $f = 6$ @ $c = 5$	3 B2 B1

No	Mark Scheme	$\Sigma$ Marks
15	(a) 0.9675 radian	2
	$3.87 = 4\theta$	B1
	(b) 17.396	2
	$\frac{1}{2}(4)^2(3.142 - 0.9675)$	B1
16	(a) 1.2872 rad	2
	$\tan A = \frac{12}{16}$ ; $\angle PAB = 36.87^\circ$	B1
	(b) 24.872	2
	$s = (10)(1.2872)$	B1
17	$\frac{2}{3}$	2
	$ar^3 = \frac{32}{27}$	B1
18	(a) 14	2
	$p + 1 - 11 = 19 - p - 1$	B1
	(b) 7	1
19	XYZ Company and saving RM 19390	4
	$S_{ABC} = \text{RM}62\,992$ and $S_{XYZ} = \text{RM}64\,634$	B3
	$S_5 = \frac{11400(1.05^5 - 1)}{1.05 - 1}$ or $\frac{10800(1.09^5 - 1)}{1.09 - 1}$	B2
	Common ration : 1.05 or 1.09	B1

No	Mark Scheme	$\Sigma$ Marks
20	$k = -2$ <u>and</u> $p = 10$ 4 $k = -2$ <u>or</u> $p = 10$ B3 $(8) = k(1) + p$ <u>and</u> $(2) = k(4) + p$ B2 $\frac{y}{x^2} = kx + p$ <u>or</u> $m = -2$ B1	3
21	$p = 100$ <u>and</u> $n = 2$ 3 $p = 100$ <u>or</u> $n = 2$ B2 $\log_{10} y = \log_{10} p + 3 \log_{10} x$ B1	3
22	(a) $xy = -2x + h$ 1 (b) $h = 5$ ; $k = 1$ both 2 $h = 5$ @ $k = 1$ B1	3
23	$y = 7x - 4$ 3 $m = 7$ B2 $\frac{dy}{dx} = 4x + 3$ B1	3
24	(a) 2 2 $\frac{dy}{dx} = 6x - 4$ B1 (b) 0.005 2 $(2.01 - 2) = \left( * \frac{dy}{dx} \right) \times \delta x$ <u>or</u> equivalent B1	4
25	$(1, 0)$ and $\left( \frac{1}{4}, -\frac{27}{128} \right)$ 4 $x = 1$ and $x = \frac{1}{4}$ @ $(1, 0)$ @ $\left( \frac{1}{4}, -\frac{27}{128} \right)$ B3 $2(x - 1)^2(4x - 1) = 0$ B2 $2x \cdot 3(x - 1)^2 + (x - 1)^3(2)$ B1	4

END OF MARK SCHEME

No.	Pemarkahan	Jumlah Markah
1	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p><math>x = 3 - 2y</math></p> <p><math>(3 - 2y)^2 + y^2 - (3 - 2y)y = 5</math></p> <p><math>7y^2 - 15y + 4 = 0</math></p> <p><math>\frac{-(-15) \pm \sqrt{(-15)^2 - 4(7)(4)}}{2(7)}</math></p> <p>K1</p> <p><math>y = 1.831 ; y = 0.312</math></p> <p><math>x = -0.662 ; x = 2.376</math></p> </div> <div style="width: 45%; border: 1px dashed black; padding: 5px;"> <p>atau</p> <p><math>y = \frac{3-x}{2}</math> P1</p> <p><math>x^2 + (\frac{3-x}{2})^2 - x(\frac{3-x}{2}) = 5</math> K1</p> <p><math>7x^2 - 12x - 11 = 0</math></p> <p><math>\frac{-(-12) \pm \sqrt{(-12)^2 - 4(7)(-11)}}{2(7)}</math></p> <p><math>x = -0.661 ; x = 2.376</math> N1</p> <p><math>y = 1.831 ; y = 0.312</math> N1</p> </div> </div>	5
2	<p>(a) Use <math>T_n = (24) \left(\frac{1}{2}\right)^4</math> or Listing 24, 12, 6, 3, 1.5... K1</p> <p style="text-align: right;">= 1.5 N1</p> <p>(b) 384, 96, 24,..... P1</p> <p><math>r = \frac{96}{384} = \frac{24}{96}</math> K1</p> <p><math>\frac{1}{4}</math> N1</p> <p>(c) <math>S = \frac{384}{1 - \frac{1}{4}}</math> K1</p> <p>512 N1</p>	7