

*Additional  
Mathematics  
Paper 1*

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**PROGRAM PENINGKATAN PRESTASI AKADEMIK  
SPM 2015**

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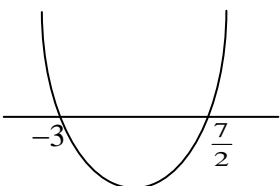
**ADDITIONAL MATHEMATICS  
MARKING SCHEME  
Paper 1**

**MODUL 2**

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**PROGRAM PENINGKATAN PRESTASI AKADEMIK SPM 2015**  
**Marking Scheme**  
**Additional Mathematics Paper 1**

Question	Solution/ Marking Scheme	Answer	Marks
1		(a) $\{-7, -4, -1, 2\}$ (b) 2	1 1
2	B2: $k(kx+m)+m=4x-15$ <i>or</i> $k=2$ <i>or</i> $m=-5$ B1: $k(kx+m)+m$	$k=2$ and $m=-5$	3
3	(b) B1: $p-3=\frac{3}{p-4-p}$	(a) $g^{-1}(x)=\frac{2-x}{5}$ (b) $p=\frac{9}{4}$	1 2
4	(b) B1: $5=(0+p)^2+4$	(a) $q=4$ (b) $p=-1$	1 2
5	B2: $(2x-7)(x+3)>0$ <b>or</b>  <b>or</b> $x=\frac{7}{2}$ , $x=-3$ B1: $2x^2-x-21$	$x < -3$ $x > \frac{7}{2}$	3

6	(a) B1: $\left(\frac{1}{2}\right)^2 + k\left(\frac{1}{2}\right) - 2k + 5$	$k = \frac{7}{2}$	2
		(b) $POR = -2$	1
7	B2: $4^x \left(\frac{1}{4} + 1\right) = 80$ B1: $\frac{4^x}{4^1}$	$x = 3$	3
8	B2: $\frac{\log_3 a^2}{\log_3 9} - \frac{\log_3 b}{\log_3 9}$ B1: $\log_9 a^2 - \log_9 b$ or $\frac{\log_3 \frac{a^2}{b}}{2}$ or $\frac{\log_3 a^2}{\log_3 9}$ or $\frac{\log_3 b}{\log_3 9}$	13	3
9	B3: $\frac{9000(1.2^{10} - 1)}{1.2 - 1} - 20\,000(10)$ B2: $\frac{9000(1.2^{10} - 1)}{1.2 - 1}$ B1: $r = 1.2$ or $RM\,20\,000 \times 10$	<i>RM</i> 33 628 and Shop lot B	4
10	(b) B1: $29 + (n - 1)(-7) = 76$	(a) 8 (b) 16	1 2
11	B1: $\frac{a}{1 - 5} = 5a$	$r = \frac{4}{5}$	2

12	<p>(b) B2: <math>\frac{1}{2}r^2\left(\frac{3}{4}\right) = 54</math> or <math>r = 12</math></p> <p>B1: <math>\frac{1}{2}r^2\left(\frac{*3}{4}\right) = 6</math></p>	<p>(a) <math>\frac{3}{4}</math> rad</p> <p>(b) 8</p>	<p>1</p> <p>3</p>
13	<p>B2: <math>x = 7</math> or <math>y = 8</math></p> <p>B1: <math>\frac{x-1}{2} = \frac{-4+10}{2}</math> or <math>\frac{y-0}{2} = \frac{6+2}{2}</math></p>	(7, 8)	3
14	<p>B2: <math>2h = 5</math> or <math>2k = 12</math></p> <p>B1: <math>(x-h)^2 + (y-k)^2 = \left(\frac{13}{2}\right)^2</math></p>	$A\left(\frac{5}{2}, 6\right)$	3
15	<p>B2: <math>x^2y = 2x^2 - 7</math></p> <p>B1: <math>m = 2</math> or <math>c = -7</math></p>	$y = 2 - \frac{7}{x^2}$	3
16		<p>(a) 3</p> <p>(b) <math>k &gt; 48</math></p> <p>(c) <math>k &gt; 34</math></p>	<p>1</p> <p>1</p> <p>1</p>
17	<p>B3: <math>x = 90</math></p> <p>B2: <math>45 - \frac{1}{2}x = 0</math></p> <p>B1: <math>45 - \frac{1}{2}x</math></p>	$P_{\max} = 2025$	4

18	(a) B1: $-3 \int_0^2 f(x) dx$  (b) B1: $\int_0^2 5 dx - \frac{1}{2} \int_0^2 f(x) dx$ or $5x$	(a) $-2$  (b) $9\frac{2}{3}$	2  2
19	B2: $\frac{1}{2}(6+3)(3) - \int_0^3 f(x) dx$  B1: $\frac{1}{2}(6+3)(3)$ or $[any\ number] - 3$	10 5	3
20	(a) B1: $\overrightarrow{RQ} = \overrightarrow{RP} + \overrightarrow{PQ}$  (b) B1: $\frac{2}{3}\overrightarrow{RQ} + (-3x)$ or $\frac{2}{3}(-9y + 6x) + (-3x)$	$-9\underline{y} + 6\underline{x}$  $-6\underline{y} + \underline{x}$	2  2
21	B1: $\begin{pmatrix} 2 \\ -7 \end{pmatrix} = \begin{pmatrix} -2 \\ -5 \end{pmatrix} + \begin{pmatrix} k \\ -2 \end{pmatrix}$ $\overrightarrow{AC} = \overrightarrow{AO} + \overrightarrow{OC}$	4	2
22	(b) B2: $2\theta = 48.12^\circ, 311.81^\circ$  B1: $\cos 2\theta = \frac{2}{3}$ or $3\cos 2\theta = 2$	(a) 3  (b) $\theta = 24.06,$ $155.91$	1  3

23	(b) B1: ${}^3C_2 \left(\frac{1}{5}\right)^2 \left(\frac{4}{5}\right)$ or $3 \left(\frac{1}{5} \times \frac{1}{5} \times \frac{4}{5}\right)$	(a) $p = \frac{1}{5}$  $\frac{12}{125}$	1  2
24	(a) B1: ${}^5C_3 \times {}^7C_2$ (b) (b) B1: $5! - (2 \times 4!)$	(a) 210  (b) 72	2  2
25	(a) B1: $1 - \frac{1}{243} - \frac{10}{243} - \frac{40}{243} - \frac{80}{243} - \frac{32}{243}$  (b) B1: ${}^5C_5 (p)^5 (q)^0 = \frac{32}{243}$ or $p^5 = \frac{32}{243}$	$k = \frac{80}{243}$  (b) $\frac{2}{3}$	2  2

**END OF MARKING SCHEME**