

MARK SCHEME FOR ADDITIONAL MATHS. – MPP2 (PPT)**PAPER 1**

No	Mark Scheme	Σ Marks
1	5 $3 = \frac{x+10}{x}$ B1	2
2	17 $m = 5 - 4n$ $3m + n(12)$ B2 B1	3
3	$p = \frac{2 - q^2}{4}$ $(-2q)^2 - 4(2)(1 - 2p) = 0$ B1	2
4	$h = 100, k = 100$ (both) $h = 100$ or $k = 100$ $\frac{1}{4} \log_{10} h = \frac{1}{2}$ or $\log_{10} k = 2$ $\log_{10} y = \log_{10} k + \frac{x^2}{4} \log_{10} h$ OR $m = \frac{1}{2}$ and $c = 2$ B3 B2 B1	4
5	(a) $h = 1$ (b) $k > \frac{9}{2}$ $6^2 - 4(1)(2k) < 0$ B1	3
6	(a) $q = 9, p = -1$ (both) $p(4 - 1)^2 + 9 = 0$ (b) $0 \leq f(x) \leq 9$ B1 1	3

7	$a = 3, -3$ (both) $b = 9$ and $b = -2$ $b^2 = 7b + 18$ or equivalent	3 B2 B1	3
8	(a) $-\frac{1}{4p}$ $\log_6 6^{\frac{1}{2}}$ and $\log_6 \frac{1}{9}$ (b) $1 - p$ $\log_6 \left(\frac{6}{3}\right)$	2 B1 2 B1	4
9	(a) $AB:BC = 1:2$ $\frac{m}{n} = \frac{1}{2}$ $\frac{5n-m}{m+n} = 3$ (b) $r = 6$	3 B2 B1 1	4
10	Wrong and y-intercept $= -1$ y-intercept $= -1$ $y = -2x - 1$ OR $\frac{y - (-3)}{0 - 1} = -2$ $(1, -3)$ and $m = -2$ OR $\sqrt{(x - (-1))^2 + (y - (-4))^2} = \sqrt{(x - 3)^2 + (y - (-2))^2}$	4 B3 B2 B1	4
11	(a) 17 (b) 8 $46 - 38$	1 2 B1	3

12	(a) 8 1 (b) 1.609 3 $\sqrt{\frac{1^2(4)+2^2(9)+3^2(5)+4^2(8)+5^2(11)}{40}-\left(\frac{1(4)+2(9)+3(5)+4(8)+5(11)}{40}\right)^2}$ B2 $\frac{1(4)+2(9)+3(5)+4(8)+5(11)}{40}$ B1	4
13	(a) 1.542 1 (b) 28.45 2 B1	3
14	(a) $\frac{2\pi}{3}$ 1 (b) $\frac{\pi}{3}j^2 - \frac{\sqrt{3}}{2}j^2$ 3 B2 $2\left(\frac{\pi}{6}j^2 - \frac{\sqrt{3}}{4}j^2\right)$ B1	4
15	$a = 2, b = 4$ (both) 2 B1	2
16	$p = 2, q = 6$ (both) 4 Solve the linear simultaneous equation in one unknown B3 $9p - 3q = 0$ and $p + q = 8$ B2 $9p - 3q = 0$ or $p + q = 8$ B1	4

17	$a = -13, d = 12$ (both)	3	4
	$a = -13$ or $d = 12$	B3	
	Solve the linear simultaneous equation in one unknown	B2	
	$T_6 = a + 5d = 47$ or $S_{10} = \frac{10}{2} [2a + 9d] = 410$	B1	

18	$(a) \ y = \frac{64-5x}{x}$	2	4
	$\frac{8}{x} = \frac{y+5}{8}$	B1	
	$(b) \ 32$	2	
	$s_{\infty} = \frac{16}{1 - \frac{1}{2}}$	B1	
19	$\frac{-3}{a} + 6a + \frac{5}{2}$	3	3
	$\left[\frac{3(a)^{-1}}{-1} + 2(a) \right] - \left[\frac{3(-2)^{-1}}{-1} + 2(-2) \right]$	B2	
	$\frac{3x^{-1}}{-1} + 2x$	B1	
20	$(a) \ \int_0^k f(x)dx - \int_0^k (2x)dx$	1	3
	$(b) \ 2$	2	
	$10 - [x^2]_0^k = 6$	B1	

21	plot xy against $\frac{1}{x}$, $m = -2q$ and $c = 2p$ or equivalent 3 plot xy against $\frac{1}{x}$ or $m = -2q$ and $c = 2p$ B2 $xy = -2q\left(\frac{1}{x}\right) + 2p$ or equivalent B1	3
22	(a) $\begin{pmatrix} 3 \\ 4 \end{pmatrix}$ 1 (b) $4\bar{i} + \bar{j}$ 2 $-(3\bar{i} + 4\bar{j}) + (7\bar{i} + 5\bar{j})$ OR $-\begin{pmatrix} 3 \\ 4 \end{pmatrix} + \begin{pmatrix} 7 \\ 5 \end{pmatrix}$ B1	3
23	(a) $k=3$ 2 $3k=9$ OR $r-2=3\left(\frac{1}{2}\right)$ B1 (b) $r = \frac{7}{2}$ 1	3
24	$0^\circ, 360^\circ$ (both) 3 $(\cos x + 3)(\cos x - 1) = 0$ B2 $2(1 - \cos x) = -(1 - \cos^2 x)$ B1	3
25	(a) $-k$ 1 (b) $\frac{1}{\sqrt{1-k^2}}$ 2 $\sqrt{1-k^2}$ B1	3