SKEMA PEMARKAHAN MATEMATIK TAMBAHAN KERTAS 1(2007)

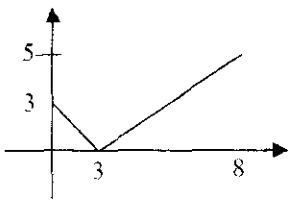
1	(*a*) {4, 5, 8} (*b*) many to one	**1** **1**	7	$x = \frac{9}{4}$ $4x - 5 = 4$ $\log_2 (4x - 5) = 4^{1/2}$ $\frac{\log_4 4}{\log_4 16}$	**4** B3 B2 B1
2	4 $\|6 - 5(2)\|$	**2** B1			
3	(*a*) $-\frac{1}{2}$ (*b*) $\frac{5}{2}$ $(2x-5)(x+2)$	**1** **2** B1	8	100 25 $2^x = 5$	**3** B2 B1
4	$p = 2$ $h = -2$ $k = 4$	**1** **1** **1**	9	12 : 7 $a = 3d$ or $d = \frac{1}{3}a$ $\frac{10}{2}[2a + 9d] = 3 \times \frac{5}{2}[2a + 4d]$	**3** B2 B1
5	$p < \frac{7}{4}$ $3^2 - 4(4 - p) < 0$	**2** B1	10	$a = \frac{2}{9}$ $r = 3$ $r^3 = 27$	**1** **2** B1
6	17.6549 $x \log \frac{6}{5} = \log 25$ $6^x = 25\,(5^x)$	**3** B2 B1			

71.57° 251.57°

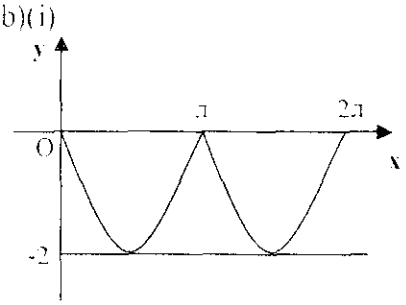
11	$a = 100000$	**2**	15	$x = 71^\circ 34', 251^\circ 34', 153^\circ 26', 333^\circ 26'$ 153 43° 333 43°	**4**
	$b = \frac{1}{100}$	**2**		Either $x = 71^\circ 34', 251^\circ 34'$ or $x = 153^\circ 26', 333^\circ 26'$	B3
	$\log y = (\log b)\, x + \log a$	B1		$(2\tan x + 1)(\tan x - 3) = 0$	B2
	or gradient = - 2			$2(1 + \tan^2 x) - 5\tan x = 5$	B1
	or y-intercept = 5				
12 b)	$y = x$	**2**	16	(*a*) $\theta = 1.249$ radian (4 s f)	**2**
	$(x-0)^2 + (y-4)^2 = (x-4)^2 + (y-0)^2$	B1		$\frac{1}{2} \times 3 \times 3 \times \theta = 5.62$	B1
a)	$x + y = 4$ $x + y - 4 = 0$ (General Form)	**1**		(*b*) Perimeter = 21.426 cm	**2**
				Perimeter = $3(\pi) + 12$	B1
13	$\overrightarrow{OP} = \begin{pmatrix} -1 \\ 4 \end{pmatrix}$	**1**	17	(*a*) $y = x + 3$	**1**
		1	4	(*b*) $y = 2x^2 - 3x + 5$	2
	$m = 6, n = 3$			$y = 2x^2 - 3x + C$	B1
14	(*a*) $\overrightarrow{AC} = 2\underline{i} - \underline{j}$	**2**	18	$\frac{dy}{dx} = -1$	**3**
	$\overrightarrow{AB} = 4\underline{i} - 2\underline{j}$	B1			
	(*b*) $h = 2$	**2**		Substitute $x = 1$	B2
	$\overrightarrow{OC} = 2\underline{i} + 3\underline{j} + \frac{1}{2}(4\underline{i} - 2\underline{j})$	B1		$\frac{dy}{dx} = \frac{(x-4)(2) - (2x+1)(1)}{(x-4)^2}$	B1

19	$p = -2, q = 8$ $4p + q = 0$ or $-4p = 8$ or $-q + 2q = 8$ Either $2px + q = 0$ or $4p + 2q = 8$	**3** B2 B1	22	(*a*) 84 $9C_3$ (*b*) 45 $6C_2 \times 3C_1$	**2** B1 **2** B1
20	8 $\int_0^2 f(x)dx + \frac{1}{2} \times 4 \times 1 = 10$	**2** B1	23	(*a*) 0.1239 $8C_3(0.4)^5(0.6)^3$ (*b*) 0.9915 / 0.991485 $1-(0.4)^8 - 8C_1(0.4)^7(0.6)^1$	**2** B1 **2** B1
21	(*a*) 12 (*b*) $k = \frac{5}{2}$ $\left[\frac{kx^2}{2}\right]_1^3 - 6 + \left(-\frac{1}{2} \times 6\right) = 1$ $\left[\frac{kx^2}{2}\right]_1^3$	**1** **3** B2 B1 B1	24	(*a*) $x = 5$ $\sigma_{original} = 2.236$ / $\sqrt{5}$ $\sigma = \sqrt{\frac{164}{4} - 6^2}$ (*b*) 6.708 $\sigma_{new} = \sigma_{original} \times 3$ $= 2.236 \times 3$	**1** **2** B1 1
			25	(*a*) $m = -0.64$ (*b*) 48.08 $-0.64 = \frac{N - 50}{3}$	**2** **2** B1

Solution	Marks
1. $x = \frac{y}{2} - 2$ atau $y = 2x + 4$ atau $6x + 3y = 2xy$	P1
$6\left(\frac{y}{2} - 2\right) + 3y = 2\left(\frac{y}{2} - 2\right)y$ atau $6x + 3(2x + 4) = 2x(2x + 4)$	K1
$y^2 - 10y + 12 = 0$ $x^2 - x - 3 = 0$	
$x = \frac{-(-1) \pm \sqrt{(-1)^2 - 4(1)(-3)}}{2(1)}$	K1
x = 2.303 , y = 8.606 x = -1.303 , y = 1.394	N1 N1
	5

Solution	Marks
2. (a) (i) $x = \frac{-1}{y-k}$ atau $x = \frac{1}{k-y}$	K1
$f^{-1}(x) = \frac{1}{k-x}$	N1
(ii) $k \neq x$	N1
(b) $3 - k^2 = 3 - (3+k)^2$	K1
$k = -\frac{3}{2}$	N1
	N2
(c) $0 \leq y \leq 5$	N1
	8

Solution	Marks
3. (a) $T_1 = \pi(2)^2 4$ $T_2 = \pi(2)^2 5$ $T_3 = \pi(2)^2 6$	(Any one. K1)
$T_2 - T_1 = \pi(2)^2 5 - \pi(2)^2 4 = 4\pi$ $T_3 - T_2 = \pi(2)^2 6 - \pi(2)^2 5 = 4\pi$	Both K1
$T_2 - T_1 = T_3 - T_2$	K1
Common difference is 4π	N1
(b) $a = 16\pi$ and $d = 4\pi$	K1
$S = \frac{n}{2}(2(16\pi) + (n-1)4\pi) = 456\pi$	K1
$\therefore$ Total no. of cylinders, $n = 12$	N1
	7

Solution	Marks
4.(a) $(1 + \tan^2\theta)\cos^2\theta = \sec^2\theta \times \cos^2\theta$	K1
$= \frac{1}{\cos^2\theta} \times \cos^2\theta$	N1
$= 1$	
(b)(i) 	P3
Shape – P1 Amplitude – P1 Absolute value – P1 (Graph reflects in x-axis)	K1 (line)
$y = -2$	N1
$-2 < k < 0$	N1
	8

Solution	Marks
5. (a) (i) $\overrightarrow{AC} = 3\underline{a} + 5\underline{b}$	N1
(ii) $\overrightarrow{BF} = \frac{3}{5}\overrightarrow{BE}$	K1
$= \frac{3}{5}(-5\underline{b} + 2\underline{a})$	N1
(b) Area $\Delta ABC = \frac{1}{2} \times 4 \times \lvert 3\underline{a} \rvert = 12$	K1
$\lvert 3\underline{a} \rvert = 6 \quad \lvert \underline{a} \rvert = 2$ units	N1 N1
	6

Solution	Marks
6. (a) $k = 4$	N1
(b) Mode $= \frac{39.5 + 54.5}{2} = 47$	K1 N1
(c) Lower boundary of median class ; $L_m = 39.5$	K1
$Median = 39.5 + \left(\frac{\frac{40}{2} - 15}{12} \right) 15$	K1
$= 45.75$	N1
	6

7.

x^2	1	4	9	16	25	36
$x + y$	2.3	3.9	6.7	10.7	15.7	21.8

N1
N1

a) Refer graph paper K2N1

b) $k(x + y - p) = px^2$ N1

$x + y = \frac{p}{k}x^2 + p$

From graph, $C = 1.8$, $\therefore p = 1.8$ K1N1

Gradient = 0.56, $\frac{p}{k} = 0.56$ K1

$k = \frac{1.8}{0.56}$

$= 3.214$ N1

10

8. a) $y^2 = x - 2, \quad x + y = 8$

$y^2 = 8 - y - 2$ K1

$y^2 + y - 6 = 0$

$y = -3 , y = 2$

$\Rightarrow \quad k = 2$ N1

b) Area $= \int_0^2 (y^2 + 2)dy$ K1

$+ \frac{1}{2}(8 - 2)(6)$ K1

$= \left[\frac{y^3}{3} + 2y \right]_0^2 + 18$ K1

$= \left[\frac{(2)^3}{3} + 2(2) \right] - [0] + 18$ K1

$= \frac{74}{3}$ N1

c) $V = \int_2^6 \pi(x - 2)dx$

$= \pi \left[\frac{x^2}{2} - 2x \right]_2^6$ K1

$= \pi \left[\frac{6^2}{2} - 2(6) \right] - \pi \left[\frac{2^2}{2} - 2(2) \right]$ K1

$= 8\pi$ unit^3 N1

10

9.

$P(6, 0)$ or $S(0, 8)$ — N1

a) i) $Q = \left(\frac{6+0}{2}, \frac{0+8}{2}\right) = (3, 4)$ — K1N1

ii) Area $= \frac{1}{2}|24 + 6|$ — K1

$= 15$ unit^2 — N1

b) $(0, 2) = \left(\frac{3(3)+1(x)}{1+3}, \frac{3(4)+1(y)}{1+3}\right)$ — K1

$0 = \frac{9+x}{4}$, $2 = \frac{12+y}{4}$ — N1

$x = -9$, $y = -4$ — K1

$T = (-9, -4)$ — N1

c) $QB = 4$

$\sqrt{(x-3)^2 + (y-4)^2} = 4$ — K1

$(x-3)^2 + (y-4)^2 = 16$ — K1

$x^2 + y^2 - 6x - 8y + 9 = 0$ — N1

10

10 a) $\tan 60^\circ = \frac{OP}{6}$

$OP = 10.3923$ cm — N1

b) $\sin 30^\circ = \frac{6}{OR}$, $OR = \frac{6}{\sin 30^\circ}$ — N1

$OR = 12$ cm

$S_{QR} = 12(30 \times \frac{3.142}{180}) = 6.284$ cm — N1

$PQ = 12 - 10.3923 = 1.6077$ cm

Perimeter of $PQR = 6 + 1.6077$ — K1

$+ 6.284$

$= 13.8917$ cm. — N1

c) Area of $PQR =$

$\frac{1}{2}(12)^2\left(\frac{3.142}{6}\right) - \frac{1}{2}(10.3923)(6)$ — K1

$= 6.5271$ cm^2 — N1

Area of sector $PRS =$

$\frac{1}{2}(6)^2\left(\frac{3.142}{3}\right) = 18.852$ cm^2 — N1

Area of the shaded region

$= 6.5271 + 18.852 = 25.3791$ cm^2 — K1N1

10

11 a) $p = 0.95$, $n = 6$

i) $P(X = 3) = {}^6C_3(0.95)^3(0.05)^3$ — K1

$= 0.002143$ — N1

ii) $P(X \geq 5) = {}^6C_5(0.95)^5(0.05)$ — K1

$+ (0.95)^6$ — K1

$= 0.9672$ — N1

b) $X \sim N(1.5, 0.4^2)$

i) $P(1.2 < X < 1.65)$

$= P\left(\frac{1.2-1.5}{0.4} < Z < \frac{1.65-1.5}{0.4}\right)$ — K1

$= P(-0.75 < Z < 0.375) = 0.4195$ — N1

ii) $P(X > m) = 0.7$

$P\left(Z > \frac{m-1.5}{0.4}\right) = 0.7$ — K1

$P\left(Z > \frac{1.5-m}{0.4}\right) = 0.3$

$\frac{1.5-m}{0.4} = 0.524$ — K1

$m = 1.2904$ kg — N1

10

12. (a) $s = 3t^2 - t^3 = 0$ — K1

$t = 3s$ — N1

(b) $t = 4$, $s = -16$

$t = 5$, $s = -50$ — K1

$s = -16 - (-50)$ — K1

$= 34$ m — N1

(c) $v = 6t - 3t^2$

$6t - 3t^2 = 0$ — K1

$t = 2$

$t = 2$, $s = 4$

$t = 3$, $s = 0$

$t = 4$, $s = -16$

$s = 4 + 4 - (-16)$ — K1

$= 24$ m — N1

(d) $a = 6 - 6t$

$6 - 6t = 0$ — K1

$t = 1$

$v = 6(1) - 3(1)^2$ — K1

$= 3$ ms^{-1} — N1

10

13. (a)

$\frac{10}{\sin 45^0} = \frac{12}{\sin Q}$ K1

$\sin Q = 0.8485$ K1

$\angle Q = 121.95^0$ or $121^0 57'$ N1

(b) $\frac{10}{\sin 45^0} = \frac{PQ}{\sin 13.05}$ K1

PQ = 3.1933 cm N1

(c) $3.1933^2 =$

$13^2 + 125 - 2(13)(\sqrt{125})\cos\angle PVQ$ K1

$\cos\angle PVQ = 0.9763$ K1

$\angle PVQ = 12.50$ or $12\ 30'$ N1

(d) Area of $\Delta PVQ = \frac{1}{2}(13)(\sqrt{125})\sin 12.5^0$ K1

$= 15.7291\ \text{cm}^2$ N1

10

14. (a) $x + y \le 80$ N1

$x \le 2y$ N1

$2x + y \ge 80$ N1

(b) Scale for both axes correct. K1

All three lines correctly drawn. K2

At least two lines correctly drawn. K1 K2

Region R is shaded correctly. K1

(c) (i) from the graph, $x = 40$ N1

(ii) from the graph, $x = 40$,

$y = 40$ K1

Maximum cost = 40(200)+40(100)

= RM12 000 N1

10

15.(a) $x = 36$ N1

$y = 54$ N1

$z = 80$ N1

(b) n = 5 N1

$\bar{I} = \frac{125(5) + 120(8) + 105(3) + 80(4)}{20}$ K1

$= 111$ N1

(c) $\frac{280}{P_{2000}} X100 = 111$ K1

$P_{2000} = RM252.25$ N1

(d) $\frac{P_{2005}}{280} X100 = 120$

$P_{2005} = 336$

$\bar{I} = \frac{336}{252.25} X100$ K1

$\bar{I} = 133.20$ N1

10

Or $\bar{I} = \frac{150(5) + 144(8) + 126(3) + 96(4)}{20}$

$= 133.20$

Q 7.

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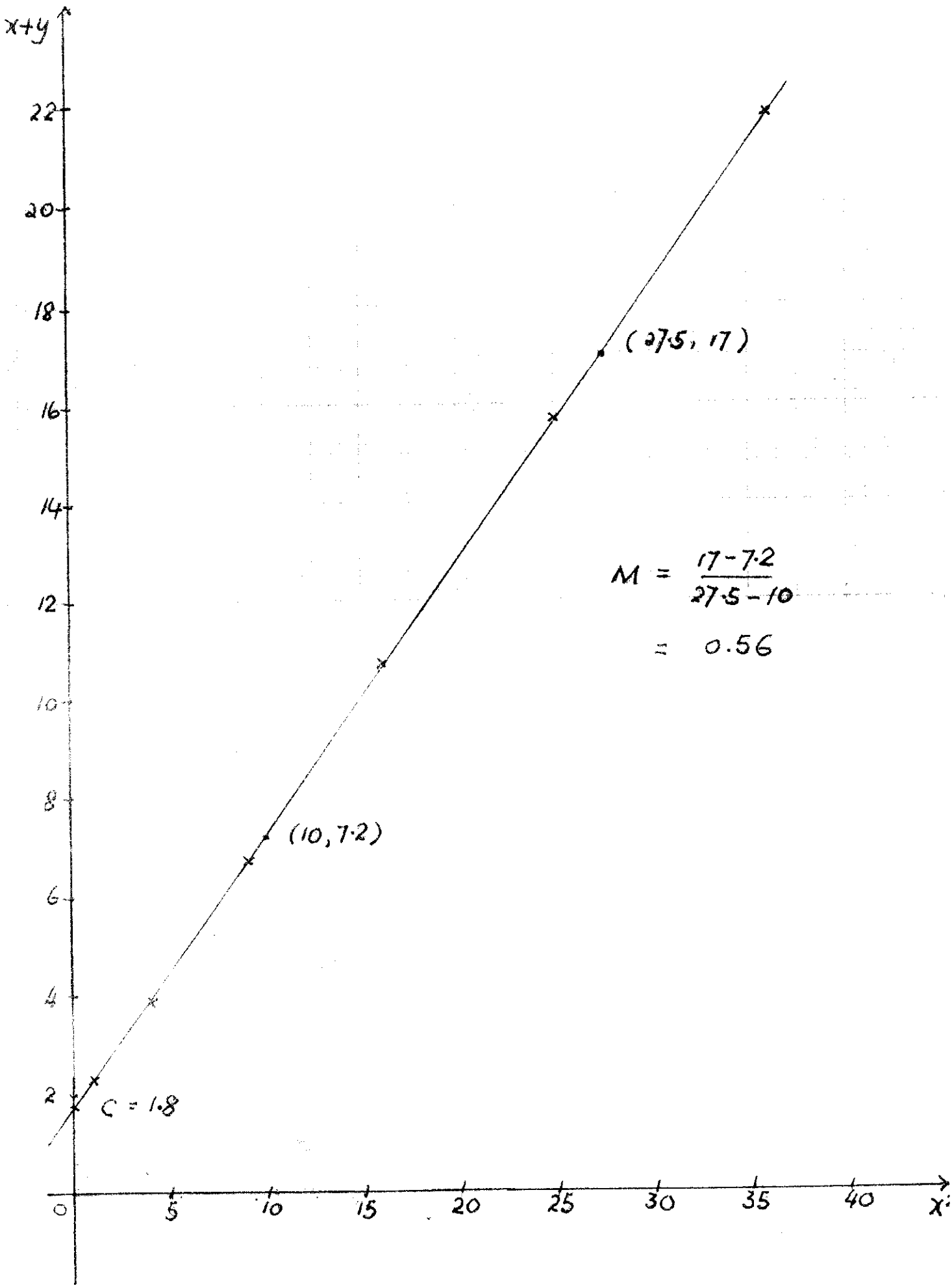
x+y
22
20
18
16
14
12
10
8
6
4
2
0
5
10
15
20
25
30
35
40
x
(27·5, 17)
(10, 7·2)
C = 1·8
M = 17 − 7·2 / 27·5 − 10
= 0·56

Additional Mathematics P 2 Q 14 2007