

3472/2

Matematik
Tambahan
Kertas 2
2 ½ jam
Mei 2011



BAHAGIAN PENGURUSAN
SEKOLAH BERASRAMA PENUH DAN SEKOLAH KECEMERLANGAN
KEMENTERIAN PELAJARAN MALAYSIA

PEPERIKSAAN PERTENGAHAN TAHUN
TINGKATAN 5
2011

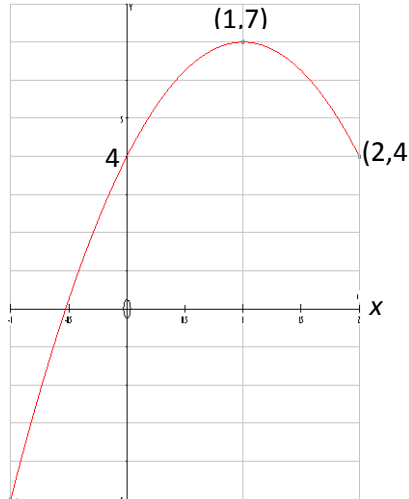
ADDITIONAL MATHEMATICS

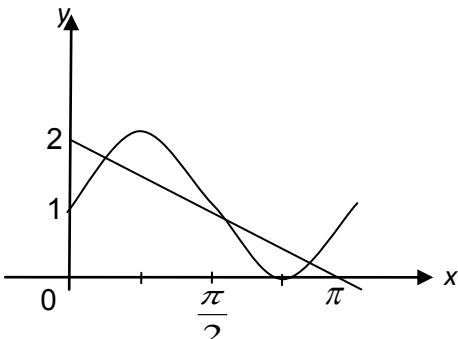
Paper 2

MARKING SCHEME

Skema Pemarkahan ini mengandungi 12 halaman bercetak

PERATURAN PEMARKAHAN – KERTAS 2

No	Solution and Mark Scheme	Sub Marks	Total Marks
1	$x = \frac{1+2y}{3} \quad \text{OR} \quad y = \frac{3x-1}{2}$ $\left(\frac{1+2y}{2}\right)^2 + 2y - \left(\frac{1+2y}{2}\right)y = 4 \quad \text{OR} \quad x^2 + 2\left(\frac{3x-1}{2}\right) - x\left(\frac{3x-1}{2}\right) = 4$ $(2y-5)(y-7) = 0 \quad \text{OR} \quad (x-2)(x-5) = 0$ $y = \frac{5}{2}, y = 7 \quad (\text{both}) \quad \text{OR} \quad x = 2, x = 5 \quad (\text{both})$ $x = 2, x = 5 \quad (\text{both}) \quad \text{OR} \quad y = \frac{5}{2}, y = 7 \quad (\text{both})$	P1 K1 K1 N1 N1	5
2(a)	$f(x) = -3x^2 + 6x + 4$ $= -3(x^2 - 2x) + 4$ $= -3[(x-1)^2 - 1] + 4$ $= -3(x-1)^2 + 7$	K1 N1	
(b)	Maximum point = (1, 7)	P1	
(c)		Shape (max) Maximum point *(1,7) y-intercept = 4 and any one point (-1,-5) or (2,4)	N1 N1 N1
			6

<p>3(a)</p>	<p>$T_n = 5, \quad a = 80, \quad d = -3$</p> <p>$80 + (n - 1)(-3) = 5$ $n = 26$</p> <p>Height of the arrangement = $26 \times 10 = 260$ cm</p>	<p>P1</p> <p>K1</p> <p>N1</p>	
<p>(b)</p>	<p>$S_{26} = \frac{26}{2}[2(80) + (26 - 1)(-3)]$ $= 1105$</p> <p>The total length of circumference of circles = $1105 \times 2\pi(5)$ $= 11050\pi$ cm</p>	<p>K1</p> <p>K1</p> <p>N1</p>	<p>6</p>
<p>4</p>	<p>(a) Mid point of AC = (-1 , 6)</p> <p>use midpoint BD = midpoint AC : $\frac{0 + p}{2} = 6$ $p = 6$</p> <p>(b) Area of ADC =</p> <p>$= \frac{1}{2} [(1)(12) + (-13)(2) + (-3)(10)] - [(1)(2) + (-3)(12) + (-13)(10)]$ $= 60 \text{ unit}^2$</p> <p>(c) Gradient of BD = $-\frac{1}{2}$</p> <p>Equation of BD = $(y - 6) = -\frac{1}{2}(x + 1)$ $2y + x = 11$ or equivalent</p>	<p>P1</p> <p>K1</p> <p>P1</p> <p>K1</p> <p>N1</p>	<p>8</p>
<p>5</p>	<p>(a)</p>  <p>Shape of sine graph</p> <p>Amplitude = 1</p> <p>Period of 1 cycle $0 \leq x \leq \pi$</p> <p>Graph shifted up by 1 unit</p>	<p>P1</p> <p>P1</p> <p>P1</p> <p>P1</p>	

	<p>(b) $y = 2 - \frac{2x}{\pi}$</p> <p>Eq. of straight line ;</p> <p>Draw the straight line :</p> <p>(either gradient or y-intercept correct)</p> <p>Number of solution = 3</p>	<p>N1</p> <p>K1</p> <p>N1</p>	7
6	<p>(b)</p> <p>$\bar{x} = \frac{4350}{50}$ or 29</p> <p>$\Sigma fx^2 = 133950$</p> <p>$\sigma^2 = \frac{133950}{150} - (29)^2$</p> <p>= 7.211</p>	<p>K1</p> <p>P1</p> <p>K1</p> <p>N1</p>	8

6(a)	Skema Histogram		
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7

Linear law graph

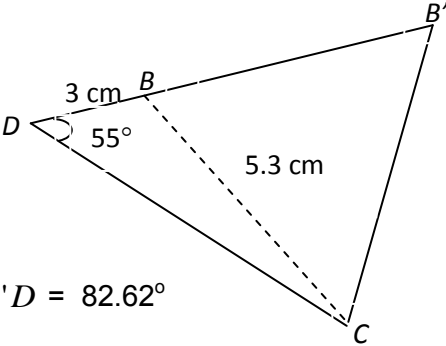
7	<p>(a)</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 10%;">x</td> <td style="width: 10%;">2</td> <td style="width: 10%;">3</td> <td style="width: 10%;">4</td> <td style="width: 10%;">5</td> <td style="width: 10%;">6</td> <td style="width: 10%;">7</td> </tr> <tr> <td>$\frac{y}{x}$</td> <td>3.20</td> <td>3.90</td> <td>4.50</td> <td>5.12</td> <td>5.75</td> <td>6.40</td> </tr> </table> <p>Note: If table is not shown, award N1 if all the points are plotted correctly.</p> <p>Plot $\frac{y}{x}$ against x (Correct axes and uniform scales) 6 *points plotted correctly Or at least 5 points correctly plotted if the table is not shown Line of best fit</p> <p>(b) $\frac{y}{x} = \frac{k}{2}x + pk$ (can be implied)</p> <p>(i) Use *m = $\frac{k}{2}$ $k = 1.26 \pm 0.05$</p> <p>(ii) Use *c = pk $p = 1.59 \pm 0.05$</p> <p>(c) $y = 21.6 \pm 0.05$</p>	x	2	3	4	5	6	7	$\frac{y}{x}$	3.20	3.90	4.50	5.12	5.75	6.40	<p>N1</p> <p>K1</p> <p>N1</p> <p>N1</p> <p>P1</p> <p>K1</p> <p>N1</p> <p>K1</p> <p>N1</p> <p>N1</p>	10
x	2	3	4	5	6	7											
$\frac{y}{x}$	3.20	3.90	4.50	5.12	5.75	6.40											

8	<p>(a) $(OR)(0.9273) = 13.91$</p> $OR = 15 \text{ cm}$ <p>(b) $OP = 9 \text{ cm}$</p> $\text{Area} = \frac{1}{2}(9)^2(0.9273) - \frac{1}{2}(9)^2 \sin 0.9273$ $= 5.156 \text{ cm}^2$ <p>(c) $PR = 6 \text{ cm}$</p> $RQ = 15 \sin 0.9273 \quad \text{or} \quad \sqrt{15^2 - 9^2}$ <p>Perimeter = arc length $PQ + PR + RQ$</p> $= 9(0.9273) + 6 + 15 \sin 0.9273$ $= 26.35 \text{ cm}$	<p>K1</p> <p>N1</p> <p>P1</p> <p>K1K1</p> <p>N1</p> <p>P1</p> <p>K1K1</p> <p>N1</p>	10
9	<p>(a) (i) $\overline{BD} = \overline{BC} + \overline{CD}$</p> $\overline{BD} = -8\underline{b} + 3\underline{a}$ <p>(ii) $\overline{CE} = \overline{CD} + \overline{DE}$</p> $= 3\underline{a} + \frac{1}{4}(8\underline{b} - 3\underline{a})$ $= \frac{9}{4}\underline{a} + 2\underline{b}$ <p>(b) (i) $\overline{EA} = h(\frac{9}{4}\underline{a} + 2\underline{b})$</p> <p>(ii) $\overline{EA} = \overline{EB} + \overline{BA}$</p> $= \frac{3}{4}(8\underline{b} - 3\underline{a}) + k\underline{a}$ $= 6\underline{b} - \frac{9}{4}\underline{a} + k\underline{a} \quad \text{or} \quad \underline{a}\left(-\frac{9}{4} + k\right) + 6\underline{b}$	<p>N1</p> <p>K1</p> <p>N1</p> <p>K1</p> <p>K1</p> <p>N1</p>	

	<p>Equate the coefficient of <u>a</u> and <u>b</u> and solve the simultaneous equation</p> $\frac{9}{4}h = -\frac{9}{4} + k \quad \text{and} \quad 2h = 6$ $h = 3, k = 9 \quad (\text{both})$ <p>(c) $\frac{1}{2}(12)(t) = 42 \quad [t = \text{perpendicular distance}]$</p> $t = 7 \text{ cm}$	<p>K1</p> <p>N1</p> <p>K1</p> <p>N1</p>	10
10	<p>(a) $4 - x = (x - 2)^2$</p> $x = 0, x = 3$ <p>A(0,4) B(3,1)</p> <p>(b) Area = $\frac{1}{2}(3)(4+1) - \int_0^3 (x-2)^2 dx$</p> $= \frac{15}{2} - \left[\frac{(x-2)^3}{3} \right]_0^3$ $= \frac{15}{2} - \left[\frac{(3-2)^3}{3} - \frac{(0-2)^3}{3} \right]$ $= 4.5$ <p>(c) Volume = $\pi \int_2^3 (x-2)^4 dx + \frac{1}{3}(\pi)(1)^2(1)$</p> $= \left[\frac{(x-2)^5}{5} \right]_2^3 + \frac{\pi}{3}$ $= \frac{8}{15}\pi$	<p>K1</p> <p>N1N1</p> <p>K1K1</p> <p>K1</p> <p>N1</p> <p>K1</p> <p>K1</p> <p>N1</p>	10

11	<p>(a) (i) $\frac{dy}{dx} = 2$</p> <p>(ii) $m_{normal} = -\frac{1}{2}$</p> $y - 2 = -\frac{1}{2}(x + 1)$ $2y + x = 3$ <p>(b) $x = 2, \frac{dy}{dx} = 5(2)^2 + 3(2)$</p> $= 26$ $\delta y = (26)(-0.02)$ $= -0.52$ <p>(c) $y = \frac{5x^3}{3} + \frac{3x^2}{2} + c$</p> $2 = \frac{5(-1)^3}{3} + \frac{3(-1)^2}{2} + c$ $c = \frac{13}{6}$ $y = \frac{5x^3}{3} + 3x + \frac{13}{6}$	<p>P1</p> <p>P1 K1</p> <p>N1</p> <p>P1</p> <p>K1</p> <p>N1</p> <p>K1</p> <p>K1</p> <p>N1</p>	<p>10</p>
12	<p>(a) $\frac{x}{5} \times 100 = 165 = 115$ or $\frac{6.9}{y} \times 100 = 115$ or $\frac{4.50}{4.00} \times 100 = z$</p> <p>$x = 8.25$ / $y = 6.00$ / $z = 112.5$</p> <p>(b) (i) $\bar{I} = \frac{(165 \times 125) + (*112.5 \times 100) + (115 \times 70) + (120 \times 65)}{360}$</p> <p>[* follow thro' from (a)]</p> $\Sigma W = 360$ or 72 $= 132.6$ <p>(ii) $\frac{3700}{P_{2009}} \times 100 = 132.6^*$ [* follow thro' from b(i)]</p> $P_{2009} = \text{RM } 2790.35$	<p>K1</p> <p>N2,1,0</p> <p>K1</p> <p>P1</p> <p>N1</p> <p>K1</p> <p>N1</p>	

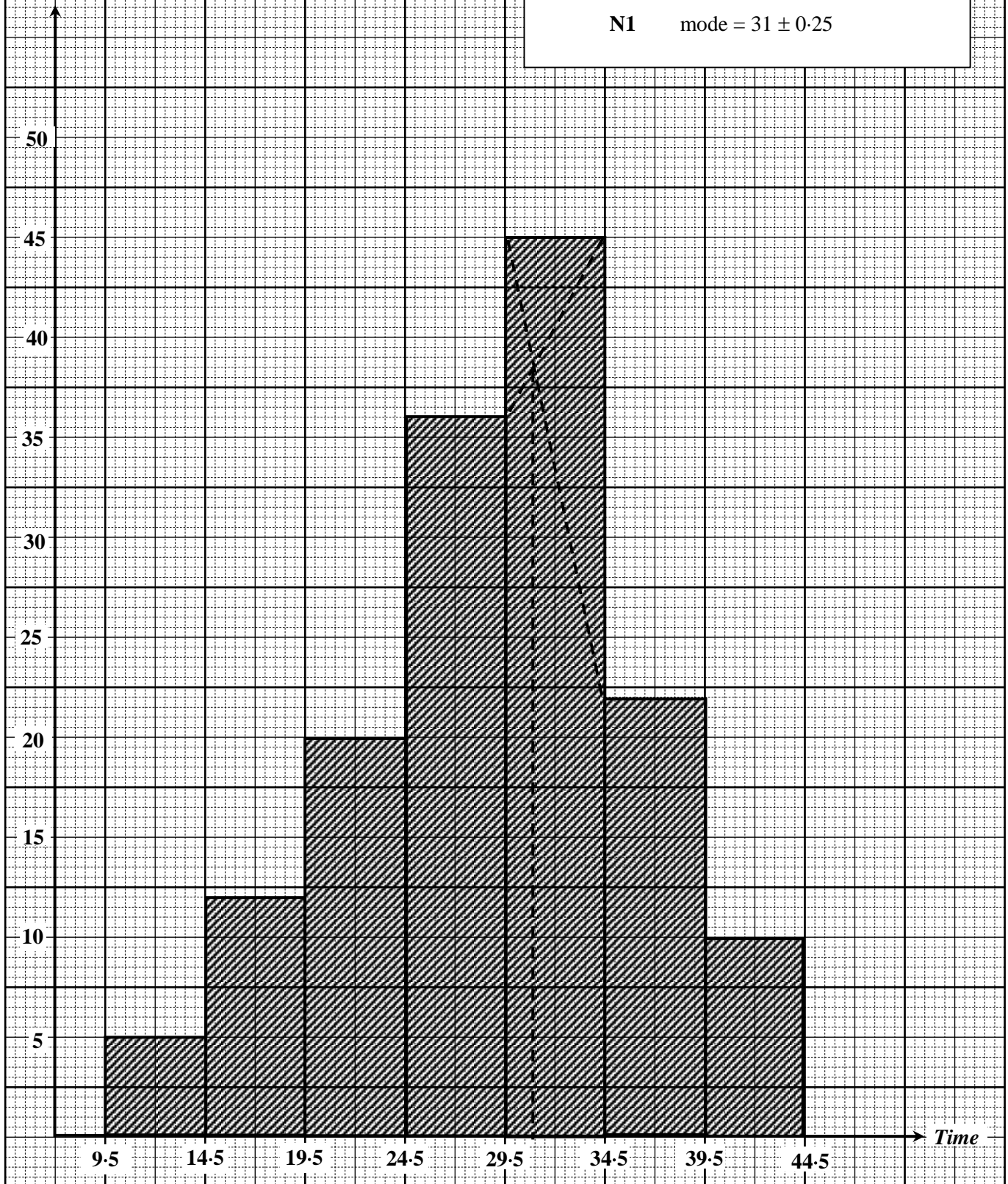
	<p>(c) $I_{\frac{2011}{2009}} = \frac{130}{100} \times 132.6^*$ [* follow thro' from b(i)]</p> <p style="text-align: center;"><u>OR</u></p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>year</td> <td>2009</td> <td>2010</td> <td>2011</td> </tr> <tr> <td>Cost</td> <td>2790.35</td> <td>3700</td> <td>4810</td> </tr> </table> <p style="text-align: center;">$\frac{4810}{2790} \times 100$ K1</p> <p style="text-align: center;">= 172.4</p>	year	2009	2010	2011	Cost	2790.35	3700	4810	<p>K1</p> <p>N1</p>	<p>10</p>
year	2009	2010	2011								
Cost	2790.35	3700	4810								
<p>13</p>	<p>(a) $I_{\frac{2009}{2007}} = \frac{160}{100} \times \frac{100}{135} \times 100$</p> <p style="text-align: center;">= 118.5</p> <p>(b) (i) $x = \frac{12.60}{9.40} \times 100$</p> <p style="text-align: center;">= 134.0 or 134.04 or 134</p> <p>(ii) $118 = \frac{P_{2007}}{9.40} \times 100$ or $P_{2007} = \frac{12.60}{134} \times 118$</p> <p style="text-align: center;">$P_{2007} = \text{RM}11.09$ = RM11.10</p> <p>(c) (i) $P_{2005} = \frac{125.50}{137.50} \times 100$</p> <p style="text-align: center;">= RM91.27</p> <p>(ii) $\frac{118(5) + 135(k) + 175(3)}{5 + k + 3} = 137.5$</p> <p style="text-align: center;">$k = 6$</p>	<p>K1</p> <p>N1</p> <p>K1</p> <p>N1</p> <p>K1</p> <p>K1</p> <p>N1</p> <p>K1</p> <p>N1</p>	<p>10</p>								
<p>14</p>	<p>(a) $\frac{1}{2} (7)(8) \sin B = 20$</p> <p style="text-align: center;">$\angle ABC = 45.58^\circ$</p> <p style="text-align: center;">$\angle ABC = 180^\circ - 45.58^\circ = 134.42^\circ$ (obtuse)</p>	<p>K1</p> <p>K1</p> <p>N1</p>									

14	<p>(b) $AC = 7^2 + 8^2 - 2(7)(8) \cos 134.42^\circ$ $= 13.83 \text{ cm}$</p> <p>(c) $\frac{\sin D}{13.83} = \frac{\sin 40}{11}$ $\angle ADC = 126.08^\circ$</p> <p>(d) $\angle ACD = 13.92^\circ$ $\frac{1}{2}(11)(13.83)\sin 13.92^\circ + 20$ $= 38.30$</p>	K1 N1 K1 N1 P1 K1 N1	10
15	<p>(a) $\frac{\sin C}{3} = \frac{\sin 55}{5.3}$ $\angle C = 27.62^\circ$ $\angle DBC = 180^\circ - 27.62^\circ - 55^\circ = 97.38^\circ$</p> <p>(b) $\angle ADE = 55^\circ$ $(AE)^2 = 9^2 + 4^2 - 2(4)(9) \cos 55^\circ$ $AE = 7.463 \text{ cm}$</p> <p>(c) (i) </p> <p>(ii) $\angle CB'D = 82.62^\circ$</p> <p>(iii) $\angle BC'B = 180^\circ - 2(82.62^\circ)$ $= 14.76^\circ$ $\text{Area} = \frac{1}{2}(5.3)(5.3)\sin 14.76^\circ$ $= 3.578 \text{ cm}^2$</p>	K1 N1 N1 K1 N1 P1 P1 P1 K1 N1	10

No. 6

- (a)
- K1** for the bars with constant width and proportional height.
 - K1** for boundary/mid point
 - N1** all correct
 - N1** mode = 31 ± 0.25

No. of students



SULIT

SKEMA mid year F5 P2 SBP 2011

No. 7

