

SULIT
3472/2 (PP)
Additional
Mathematics
Kertas 2
Peraturan
Pemarkahan
Okt/Nov 2011
2 $\frac{1}{2}$ jam

3472/2(PP)



JABATAN PELAJARAN NEGERI TERENGGANU

PEPERIKSAAN AKHIR TAHUN 2011

TINGKATAN 4

ADDITIONAL MATHEMATICS

KERTAS 2

PERATURAN PEMARKAHAN

Peraturan pemarkahan ini mengandungi 12 halaman bercetak.

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INSTRUCTIONS FOR EXAMINERS

1. MARKING GUIDE

- 1.1 Mark all the answers.
- 1.2 Do not mark working / answer that has been cancelled.
- 1.3 Give the mark P / K / N in line with steps of calculation given by the students.
- 1.4 Give the mark P0 / K0 / N0 for the incorrect working / answer.
- 1.5 If more than one final answer is given, mark all the solution and choose the answer with the highest mark.
- 1.6 Accept other correct methods which are not given in the marking scheme.

2. NOTATION

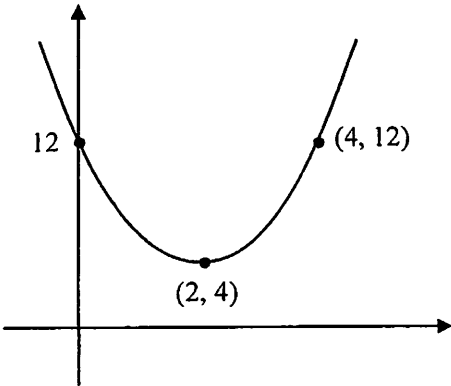
- P** – The mark is given if the working / answer in accordance with the **Knowledge** assessed as stated in the marking scheme.
- K** – The mark is given if the working / answer in accordance with the **Skills** assessed as stated in the marking scheme.
- N** – The mark is given if the working / answer in accordance with the **Values** assessed as stated in the marking scheme.
- PA** – Subtract 1 mark (only once) from the **N** mark when students make an early rounding of numbers.
- KP** – Subtract 1 mark (only once) from the **P** mark or **N** mark when students do not write the important steps of the calculations.
3. Accept answers correct to 4 significant figures unless stated otherwise in the marking scheme.
 4. Accept other correct methods which are not given in the marking scheme.
 5. Accept answers in Bahasa Melayu.
 6. Calculating total marks.

$$\frac{\sum \text{Score for Paper 1} + \sum \text{Score for Paper 2}}{180} \times 100\%$$

FINAL YEAR EXAM FORM 4 (2011)
MARK SCHEME ADDITIONAL MATHEMATICS PAPER 2

SECTION A [40 MARKS]		
No.	MARK SCHEME	Σ MARK
1	$y = 1 + 3x$ P1 OR $x = \frac{y-1}{3}$ P1 $x + x(1 + 3x) - 2(1 + 3x) = 0$ K1 $\frac{y-1}{3} + \left(\frac{y-1}{3}\right)y - 2y = 0$ K1 $3x^2 - 4x - 2 = 0$ $y^2 - 6y - 1 = 0$ $x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(3)(-2)}}{2(3)}$ K1 $x = \frac{-(-6) \pm \sqrt{(-6)^2 - 4(1)(-1)}}{2(1)}$ K1 $x = 1.72, -0.39$ N1 $y = 6.16, -0.16$ N1 $y = 6.16, -0.16$ N1 $x = 1.72, -0.39$ N1	5
2	(a) $\frac{x-3}{8}$ N1 (b) $7 - 4k$ P1 $\frac{7-4k-3}{8} = 3$ K1 (accept $\frac{7-4x-3}{8} = 3$) $k = -5$ N1 (c) $\frac{x-7}{-4}$ or $\frac{7-x}{4}$ P1 $1 - 4\left(\frac{x-7}{-4}\right)$ or $1 - 4\left(\frac{7-x}{4}\right)$ K1 $x - 6$ N1	7

No.	MARK SCHEME	Σ MARK
3	<p>(a) $2x^2 - 12x + 6 - p = 0$ $2(-2)^2 - 12(-2) + 6 - p = 0$ K1 $p = 38$ N1</p> <p>$2x^2 - 12x - 32 = 0$ $k + 1 = 8$ K1 $k = 7$ N1</p> <p style="text-align: center;">OR</p> <p>$SOR: -2 + k + 1 = -\frac{(-12)}{2}$ or $POR: -2(k + 1) = \frac{6 - p}{2}$ K1</p> <p>Try to solve equation :</p> <p>$k = 7$ or $-2(7 + 1) = \frac{6 - p}{2}$ K1</p> <p>$k = 7$ N1 $p = 38$ N1</p> <p style="text-align: center;">OR</p> <p>$(x + 2)[x - (k + 1)] = 0$ $x^2 - x(k + 1) + 2x - 2(k + 1) = 0$</p> <p><u>Compare :</u> $4 - 2(k + 1) = -12$ or $-4(k + 1) = 6 - p$ K1</p> <p>$k = 7$ or $-4(7 + 1) = 6 - p$ K1</p> <p>$k = 7$ N1 $p = 38$ N1</p> <p>(b) $(-12)^2 - 4(2)(3 - 2p) > 0$ K1 for using $b^2 - 4ac > 0$</p> <p>$p > -\frac{15}{2}$ N1</p>	6

No.	MARK SCHEME	Σ MARK
4	<p>(a) $2\left(x + \frac{-p}{2(2)}\right)^2 + q - \frac{(-p)^2}{4(2)}$ [K1 for $\left(x + \frac{-p}{2(2)}\right)^2$]</p> <p>$q - \frac{(-p)^2}{4(2)} = 4$ <u>or</u> $2 + \frac{-p}{2(2)} = 0$ K1</p> <p>$p = 8$ N1 $q = 12$ N1</p> <p>$f(x) = 2(x - 2)^2 + 4$ N1</p> <p>(b) </p> <p>P1 minimum shape P1 for (2, 4) <u>and any other two points</u></p> <p>(c) $f(x) = -2(x - 2)^2 - 4$ N1</p>	8

No.	MARK SCHEME	Σ MARK
5	<p>(a) $x = \log_2 p$ or $y = \log_2 q$ P1 $\log_2 8 + \log_2 p - \log_2 q$ K1 for + or - $3 + x - y$ N1</p> <p>(b) (i) $T = 4(1.2)^9$ K1 $= 20.64$ N1 (Give K1N1 for 20.64)</p> <p>(ii) $20 = 4(1.2)^x$ K1 $\log 20 = \log 4 + x \log 1.2$ K1 $x = 8.827$ N1</p>	8
6	<p>(a) $\frac{dy}{dx} = 27 - \frac{8}{x^3}$ K1 $27 - \frac{8}{x^3} = 0$ K1 $x = \frac{2}{3}, y = 27$ Turning point = $\left(\frac{2}{3}, 27\right)$ N1</p> <p>(b) $\frac{d^2y}{dx^2} = 24x^{-4}$ or $\frac{24}{x^4}$ K1 $= \frac{24}{\left(\frac{2}{3}\right)^4}$ $= \frac{243}{2} (> 0)$ N1 Minimum point N1</p>	6

SECTION B [40 MARKS]		
No.	MARK SCHEME	Σ MARK
7	<p>(a) (i) $Q(0, 6)$ N1</p> <p>(ii) $m_{QR} = -\frac{4}{3}$ P1</p> <p>$y - 6 = -\frac{4}{3}(x - 0)$ K1</p> <p>$4x + 3y = 18$ <u>or</u> equivalent N1</p> <p style="text-align: center;">OR</p> <p>$y = -\frac{4}{3}x + 6$ K1P1N1</p> <p>(b) $S\left(\frac{9}{2}, 0\right)$ <u>or</u> $(4.5, 0)$ <u>or</u> $\left(4\frac{1}{2}, 0\right)$ P1</p> <p>$(0, 6) = \left(\frac{2\left(\frac{9}{2}\right) + 3x}{2 + 3}, \frac{2(0) + 3y}{2 + 3}\right)$ K1</p> <p>$R(-3, 10)$ N1</p> <p>(c) $\sqrt{(x+3)^2 + (y-10)^2}$ K1</p> <p>$\sqrt{(x+3)^2 + (y-10)^2} = 5$ K1</p> <p>$x^2 + y^2 + 6x - 20y + 84 = 0$ N1</p>	10

No.	MARK SCHEME	Σ MARK
8	<p>(a) 1.047 rad P1</p> <p>(b) Arc length = $5(1.047^*)$ K1 $= 5.235$ N1</p> <p>(c) Area = $\frac{1}{2}(5)^2(1.047^*)$ K1 $= 13.09 \text{ cm}^2$ N1</p> <p>(d) Area $PTS = \frac{1}{2}(20)^2(0.5235)$ K1 P1 for 0.5235 <u>or</u> 0.5237 $= 104.7 \text{ cm}^2$</p> <p>Area $\Delta OPQ = \frac{1}{2}(5)(5)(\sin 120^\circ)$ <u>or</u> $\frac{1}{2}(2.5)(8.66)$ K1</p> <p>Area of shaded region $= \text{Area } PTS - \text{Area } \Delta OPQ - \text{Area } OQR$ K1 for subtracting (both) $= 80.78 \text{ cm}^2$ N1</p>	10
9	<p>(a) Refer to the graph on page 9.</p> <p>(b) 1320 P1 $\frac{1320}{40}$ K1 33 N1</p> <p>(c) 29.5 P1 $29.5 + \left(\frac{\frac{3}{4}(40) - 14}{17} \right) 10$ K1 38.91 N1</p>	10

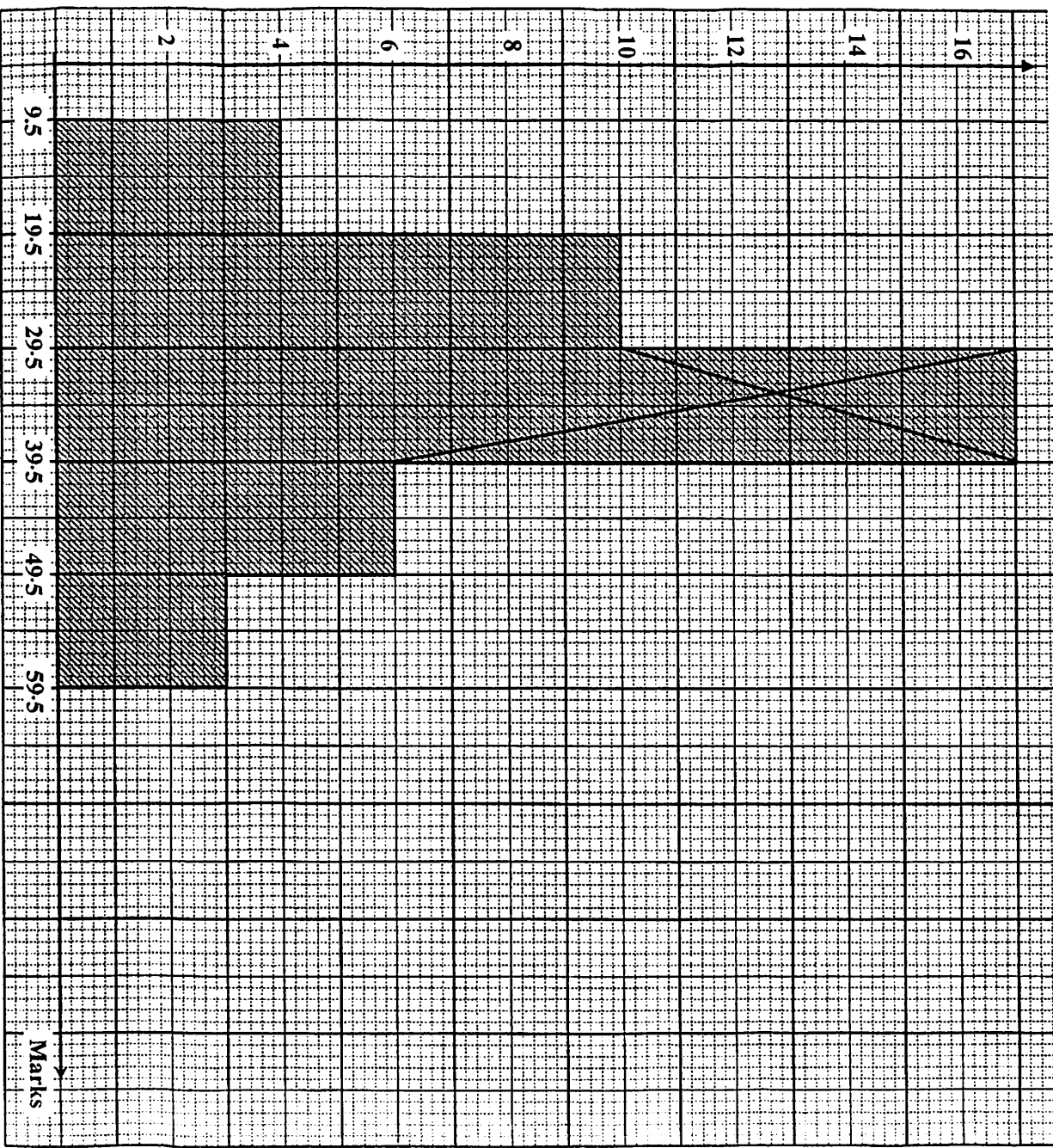
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No. 9

No. of students



- (a)
- K1 for the bars with constant width and proportional height.
 - K1 for boundary
 - K1 for method used
 - N1 mode = 33.5 ± 0.5

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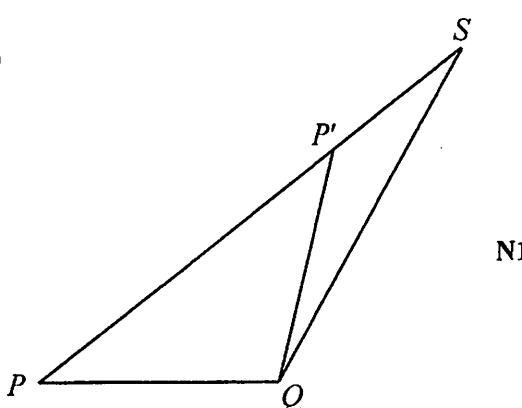
No.	MARK SCHEME	Σ MARK
10	<p>(a) $\frac{dy}{du} = \frac{9}{2}u^2$ <u>or</u> $\frac{dx}{du} = 3$ <u>or</u> $\frac{du}{dx} = \frac{1}{3}$ K1</p> <p>Use $\frac{dy}{dx} = \frac{dy}{du} \times \frac{du}{dx}$</p> <p style="padding-left: 40px;">$= \frac{9}{2}u^2 \times \frac{1}{3}$ K1</p> <p style="padding-left: 40px;">$= \frac{3}{2}u^2$</p> <p style="padding-left: 40px;">$= \frac{(x-1)^2}{6}$ N1</p> <p><u>OR</u> $y = \frac{3}{2} \left(\frac{x-1}{3} \right)^3$ <u>or</u> $\frac{(x-1)^3}{18}$ K1</p> <p style="padding-left: 40px;">$\frac{dy}{dx} = \frac{3(x-1)^2}{18}$ K1</p> <p style="padding-left: 40px;">$= \frac{(x-1)^2}{6}$ N1</p> <p>(b) (i) $\frac{dy}{dx} = 8x - 6$ K1</p> <p style="padding-left: 40px;">$= 8(2) - 6$</p> <p style="padding-left: 40px;">$= 10$ N1</p> <p>(ii) $\delta y = (8x - 6)(-k)$ K1</p> <p style="padding-left: 40px;">$= -10k$ N1</p> <p>(c) $\frac{dV}{dt} = \frac{dV}{dx} \times \frac{dx}{dt}$</p> <p style="padding-left: 40px;">$4 \cdot 4 = 3x^2 \times \frac{dx}{dt}$ K1 P1 for $\frac{dV}{dx} = 3x^2$</p> <p style="padding-left: 40px;">$\frac{dx}{dt} = 0.09167$ N1</p>	10

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SECTION C [20 MARKS]		
No.	MARK SCHEME	Σ MARK
11	(a) $\frac{150(2)+130(4)+100(8)+110(6)}{20}$	K1 P1 for ΣW
	114	N1
	(b) $\frac{Q_{10}}{95} \times 100 = 130$	K1
	$Q_{10} = \text{RM } 123.50$	N1
	(c) $\frac{130 \times 150}{100}$	K1 P1 for 130
	195	N1
	(d) $\frac{B_{10}}{12500} \times 100 = 114$	K1
	14250	N1
		10

No.	MARK SCHEME	Σ MARK
12	<p>(a) (i) $\frac{\sin 53^\circ}{SQ} = \frac{\sin 32^\circ}{5}$ OR $\frac{\sin 53^\circ}{SQ} = \frac{\sin 95^\circ}{9.399}$ K1</p> <p>$SQ = 7.535$ (accept 7.536) N1</p> <p>(ii) $5^2 = 4^2 + (*7.535)^2 - 2(4)(*7.535) \cos \angle QSR$ K1</p> <p>$\angle QSR = 37.57^\circ$ or $37^\circ 34'$ N1</p> <p>(iii) Area of $\triangle PQS = \frac{1}{2}(5)(9.399) \sin 53^\circ$</p> <p>OR</p> <p>Area of $\triangle PQS = \frac{1}{2}(5)(7.535) \sin 95^\circ$</p> <p>OR</p> <p>Area of $\triangle PQS = \frac{1}{2}(9.399)(7.535) \sin 32^\circ$ K1</p> <p>OR $= \frac{1}{2}(5)(7.535) \sin 29.20^\circ$</p> <p>Area of $\triangle QRS = \frac{1}{2}(4)(7.535) \sin 37.57^\circ$ K1</p> <p>Area of $PQRS = \triangle PQS + \triangle QRS$ K1</p> <p>$= 27.96 \text{ cm}^2$ N1</p> <p>(b) (i)  N1</p> <p>(ii) 127° N1</p>	10

END OF MARK SCHEME