3472/2

Additional

Mathematics

August 2014

MODUL PENINGKATAN PRESTASI TINGKATAN 5

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ADDITIONAL MATHEMATICS

Paper 2

(MODUL 2)

MARKING SCHEME

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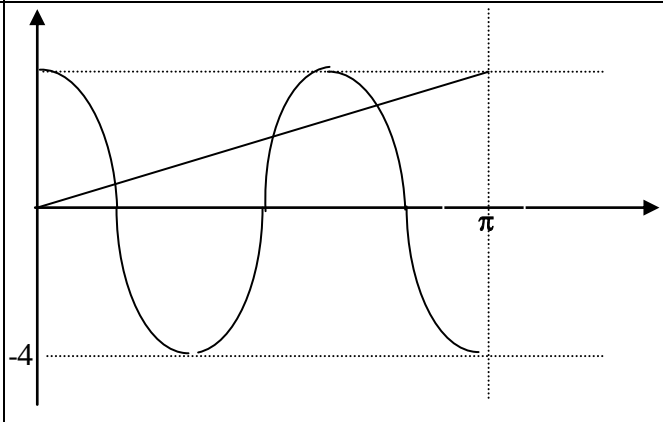
ADDITIONAL MATHEMATICS PAPER 2 2014

N0.	SOLUTION	MARKS
1	$x = 2y + 1$ or $y = \frac{x-1}{2}$	**P1**
	$x^2 + x^2 = 50$	**K1 Eliminate x/y**
	$x^2 = 25$	**K1 Solve quadratic equation**
	$x = 5 \quad x = -5$	
	$x = 5$ and $x = -5$ (both)	**N1**
	$y = 2$ and $y = -3$ (both)	**N1**
		5
2 **(a)**	$T_8 = (1)(2)^7$	**K1**
	$= 128$	**N1**
(b) **(i)**	$S_{10} = \frac{(1)(2^{10}-1)}{2-1}$	**K1**
	$= 1023$	
	$V = 1023 \times (3)(7)(5)$	**K1**
	$= 107415$	**N1**
(ii)	1023×0.8	**K1**
	$= 818.4$	**N1**
		7
3 **(a)**		**P1 cos shape correct.** **P1 Amplitude = 2 [Maximum = 1 and Minimum = -1]** **P1** $1\frac{1}{2}$ **cycle in $0 \le x \le \pi$ or**
(b)	y = $\frac{x}{\pi}$	**N1 For equation**
	draw the straight line y = $\frac{x}{\pi}$	**K1 Sketch the straight line**
	Number of solutions = 3	**N1**
		6

4 **(a)**	$10 = \frac{\sum x}{10}$ $\sum x = 100$ $4^2 = \frac{\sum x^2}{10} - 10^2$ $\sum x^2 = 1160$	**K1** **N1** **K1** **N1**
(b)	$mean = \frac{10+3}{2}$ or $\sigma = \frac{4}{2} = 2$ $= 6.5$ $\sigma^2 = 4$	**K1** **N1** **N1**
		7
5 **(a)**	$\log_5 K - \log_{125} V = 1$ $\log_5 K - \frac{\log_5 V}{3} = 1$ $\log_5 K^3 - \log_5 V = 3$ $\log_5 \frac{K^3}{V} = 3$ $\frac{K^3}{125} = V$	**K1** **K1** **N1**
(b)	$f^{-1}(x) = \frac{x-k}{2m}$ i) $\frac{1}{2m} = \frac{1}{8}$ $-\frac{k}{2m} = 3$ $m = 4$ *and* $k = -24$ ii) $\frac{1}{8}(p) + 3 = \frac{1}{2}$ $p = -20$	**K1** **K1** **N1** **K1** **N1**
		8

6		
(a)	$f(x) = \frac{(3x-1)(3x+1)}{3x-1} = 3x+1$	**K1**
	$f'(x) = 3$	**N1**
(b)	i)	
	$\frac{dy}{dx} = kx^2 + 3x$	
	$-2 = k(2)^2 + 3(2)$	**K1**
	$k = -2$	**N1**
	ii)	
	$m_{normal} = \frac{1}{2}$	**P1**
	$12 = \frac{1}{2}(2) + c$	**K1**
	$y = \frac{1}{2}x + 11$	**N1**
		7

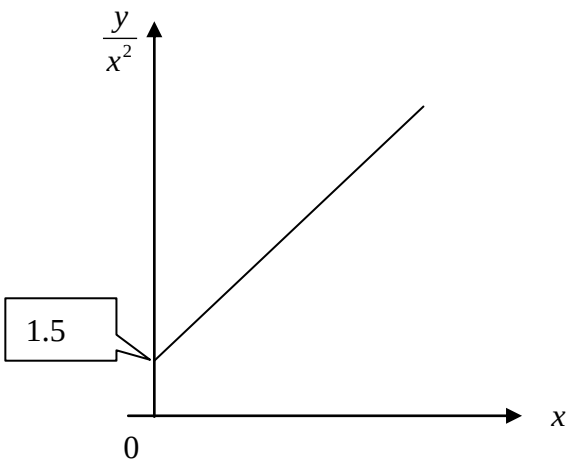
7

(a)

x	1	2	3	4	5	6
$\frac{y}{x^2}$	3.5	5.5	7.5	9.5	11.5	13.5

N1 **6 correct values** of $\frac{y}{x^2}$

(b)



K1 **Plot** $\frac{y}{x^2}$ **vs** x.
Correct axes & uniform scale

N1 **6 points plotted correctly**

N1 **Line of best-fit**

(c) $\frac{y}{x^2} = kx + \frac{p}{k}$ **P1**

(i) k = *gradient **K1**
k = **2.0** **N1**

(ii) $\frac{p}{k}$ = *y-intercept **K1**
p = **3.0** **N1**

(iii) y = 40 **N1**

10

N0.	SOLUTION	MARKS
8(a)	$\overrightarrow{TS} = \frac{2}{3}(9\underset{\sim}{x}) \quad = 6\underset{\sim}{x}$	**K1 ($\overrightarrow{TS}$ or $\overrightarrow{QR}$)**
	$\overrightarrow{QR} = \frac{\overrightarrow{PT}}{2} \quad = 4\underset{\sim}{y}$	
i)	$\overrightarrow{TR} = \overrightarrow{TP} + \overrightarrow{PQ} + \overrightarrow{QR}$	
	$= -8\underset{\sim}{y} + 9\underset{\sim}{x} + 4\underset{\sim}{y}$	
	$= 9\underset{\sim}{x} - 4\underset{\sim}{y}$	**N1**
ii)	$\overrightarrow{PS} = \overrightarrow{PT} + \overrightarrow{TS}$	**K1**
	$= 6\underset{\sim}{x} + 8\underset{\sim}{y}$	**N1**
iii)	$\overrightarrow{MS} = \overrightarrow{MR} + \overrightarrow{RS}$	
	$= \frac{\overrightarrow{TR}}{2} + \left(-3\underset{\sim}{x} + 4\underset{\sim}{y}\right)$	**K1**
	$= \left(\frac{9\underset{\sim}{x} - 4\underset{\sim}{y}}{2}\right) - 3\underset{\sim}{x} + 4\underset{\sim}{y}$	
	$= \frac{3\underset{\sim}{x}}{2} + 2\underset{\sim}{y}$	**N1**
b)	$\overrightarrow{PS} = k\overrightarrow{MS}$	
	$\overrightarrow{PS} = \overrightarrow{PT} + \overrightarrow{TS}$	
	$= 6\underset{\sim}{x} + 8\underset{\sim}{y}$	
	$6\underset{\sim}{x} + 8\underset{\sim}{y} \quad = \quad k(\frac{3}{2}\underset{\sim}{x} + 2\underset{\sim}{y})$	
	$k = 4$	**K1**
	$\therefore \overrightarrow{PS} = 4\overrightarrow{MS}$ and S is a common point or equivalent	**N1**
	$\left\|\overrightarrow{PS}\right\| = \sqrt{\left[6(\frac{1}{2})\right]^2 + \left[8(\frac{3}{4})\right]^2}$	**K1**
	$= \sqrt{45}$	**N1**

9		
a)	$x^2 = 3x + 4$ $x^2 - 3x - 4 = 0$ $(x+1)(x-4) = 0$ $x = 4, y = 16$ $K(4,16)$	**K1 for solving quad.eqn.** **N1** **N1**
b)	$y = 4$ $x = 2$ Area $B = (4)(2) - \int_0^2 x^2 dx$ $= 8 - \left[\frac{x^3}{3}\right]_0^2$ $= 8 - \left[\frac{2^3}{3}\right]$ $= \frac{16}{3} cm^2$	**K1 use area of rectangle -** $\int (y)\,dx$ **K1 integrate correctly and Sub. the limit correctly** **N1**
c)	Volume $A = \pi \int_4^{16} y dy - \left[\frac{1}{3}\pi(4)^2(12)\right]$ $= \pi\left[\frac{y^2}{2}\right]_4^{16} - 64\pi$ $= \pi\left[\frac{16^2}{2} - \frac{4^2}{2}\right] - 64\pi$ $= \pi\left[\frac{256}{2} - \frac{16}{2}\right] - 64\pi$ $= 56\pi$	**K1** **K1 correct limit** **K1 integrate correctly** **N1**
		10

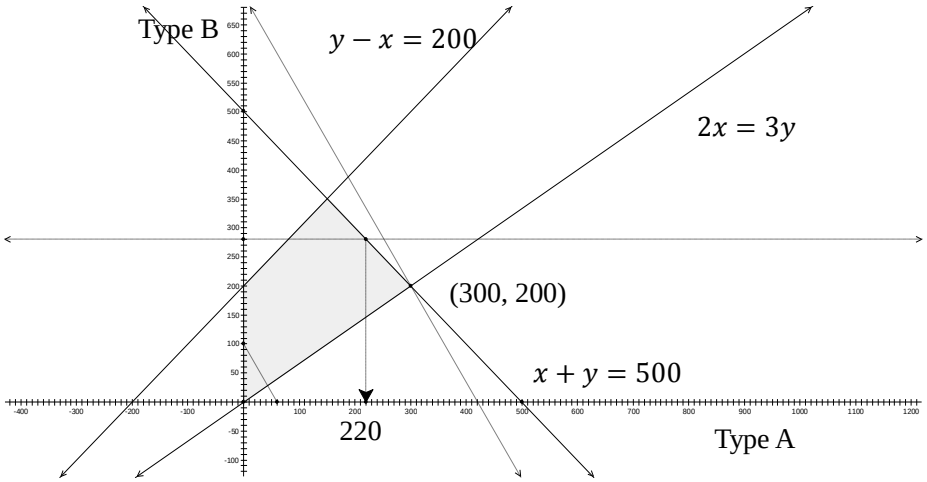
N0.	SOLUTION	MARKS
10		
(a)	60^o	**P1**
	1.047 rad	**N1**
(b)		
	$S_{OB} = 8(1.047)$ or $S_{BC} = 8(2.095)$ OR $S_{AC} = 8(3.142)$	**K1 Use** $s = r\theta$
	= 8.38 = 16.76 = 25.14	**N1**
	Perimeter = 8.38+16.76+8 or Perimeter = 25.14 + 8	**K1**
	= 33.14 = 33.14	**N1**
(c)	Area of $OAB = \frac{1}{2}(8)^2(1.047)$	**K1 Use formula** $A = \frac{1}{2}r^2\theta$
	$= 33.50\ \text{cm}^2$	
	Area of triangle $OAB = \frac{1}{2}(8)^2 \sin 60$	**K1**
	= 27.71	
	Area of the shaded region = 33.50 – 27.71	**K1**
	$= 5.79\ \text{cm}^2$	**N1**
		10

N0.	SOLUTION	MARKS
11		
(a)	X= Students passed Mathematics	
(i)	p = 0.85 , q = 1- 0.85 = 0.15 , n = 6	**P1**
	$P(X=6) = {}^{6}c_{6}(0.85)^{6}(0.15)^{0}$	**K1 Use P (X=r) =** $^{n}C_{r}\ p^{r}\ q^{n-r}$
	=0.3772	**N1**
(ii)	P (Y≥2) = 1 – P(Y=0) – P(Y = 1)	
	Or $= P(Y=2)+P(Y=3)+.....+P(Y=6)$	**K1**
	$= 1 - {}^{6}c_{1}(0.15)^{1}(0.85)^{5} - {}^{6}c_{0}(0.15)^{0}(0.85)^{6}$	
	=0.2235	**N1**
(b)		
(i)	μ= 52 , σ =10	
	$P(40 < X < 60) = P (\frac{40-52}{10} < Z < \frac{60-52}{10})$	**K1 Use Z =** $\frac{X-\mu}{\sigma}$
	= P(-1.2 < Z < 0.8)	**K1**
	= 0.6731	**N1**
(ii)		
	n = 0.6731 x 500	**K1**
	n = 337	**N1**
		10

N0.	SOLUTION	MARKS
12		
(a)	$a = k - 6t$	**K1**
	$k - 6(2.5) = 0$	
	$k = 15$	**N1**
(b)	$s = \frac{15}{2}t^2 - t^3$	**K1**
	$\frac{15}{2}t^2 - t^3 = 0$	**K1**
	t = 7.5 s	**N1**
(c)		
	$15t - 3t^2 = 0$	**K1**
	$t = 5$	**N1**
(d)		
	Total distance	
	$= \left[\frac{15t^2}{2} - t^3\right]_0^5 + \left[\left|\frac{15t^2}{2} - t^3\right|_5^7\right]$	**K1 (for Integration; either one and substitute the limit** $\int_0^5$ *or* $\int_5^7$ **)**
	d = 62.5 + 38	**K1 (for use and summation)**
	= 100.5	**N1**
		10

N0.	SOLUTION	MARKS
13 (a)	(i) $\text{KM}^2 = 6.60^2 + 5.30^2 - 2(6.60)(5.30)kos115°$ $\text{KM} = 10.06\ cm$	**KI (PetuaKosinus)** **N1**
	(ii) $\frac{\sin \angle KMN}{6.60} = \frac{\sin 115°}{10.06}$ $\angle KMN = 36.48°$	**K1 (Petua Sinus)** **N1**
	(iii) $\angle LKM = 180° - 85° - \angle LMK$ $= 95° - \left[\frac{\sin \angle LMK}{3} = \frac{\sin 85°}{10.06}\right]$ $= 95° - 17.28°$ $= 77.72°$	**K1** (GunaPetua Sinus) **K1** **N1**
(b)	(i) **Luas *sisiempat KLMN*** $= \text{Luas } \Delta KMN + \text{Luas } \Delta KLM$ $= \frac{1}{2} \times 6.60 \times 5.30 \times Sin\ 115° + \frac{1}{2} \times 3 \times 10.06 \times Sin\ 77.72°$ $= 15.851 + 14.745$ $= 30.60\ cm^2$	**K1** **K1** **N1**
		10

N0.	SOLUTION	MARKS
14		
(a)	(i) $x = 1.80 \times \frac{120}{100}$	**K1**
	$x = \mathbf{2.16}$	**N1**
	i) $2 \times \frac{y}{100} = 2.80$	**K1**
	$y = \mathbf{140}$	**N1**
(b)	Lihat 45º	**K1**
	$\boldsymbol{I}_{2012/2010} = \frac{110(80°)+120(35°)+150(45°)+122(160°)+140(40°)}{360°}$	**K1**
	= **124.64**	**N1**
(c)	$\boldsymbol{I}_{2014/2010} = 124.64 \times \frac{110}{100}$	**K1**
	= 137.10	
	$\boldsymbol{Q}_{2014} = 500 \times \frac{137.10}{100}$	**K1**
	= **RM685.50**	**N1**
		10

N0.	SOLUTION	MARKS
15		
(a)	i) $2x \leq 3y$	**N1**
	ii) $x + y \leq 500$	**N1**
	iii) $y - x \leq 200$	**N1**
(b)	• Sekurang-kurangnya 1 garislurusdilukis dengan betul yang melibatan*x* dan *y*.	**K1**
	• Semuagarislurusdilukisbetul.	**K1**
	• Kawasandilorek dengan betul	**N1**
		
(c)	**i)** Bilanganmaksimumbantal*A* = **220**	**N1**
	ii) Titikmaksimum (300, 200)	**P1**
	Keuntunganmaksimum;	
	$20x + 12y = k$ $20(300) + 12(200) = k$	**K1**
	k = **RM8 400**	**N1**
		10

END OF MARKING SCHEME