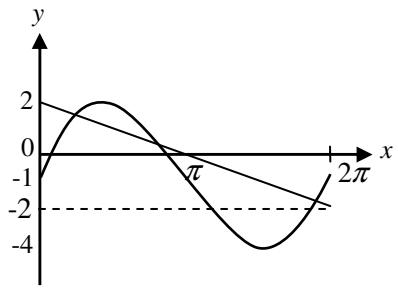
MPP3 2018
PERATURAN PEMARKAHAN ADDITIONAL MATHEMATICS
KERTAS 2

No.	PERATURAN PEMARKAHAN	Σ MARKAH
1	$x = 2y + 7$ **P1** $(2y + 7)y - (2y + 7) = 9y$ **K1** $2y^2 - 4y - 7 = 0$ $y = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(2)(-7)}}{2(2)}$ **K1** $y = 3.121, -1{\cdot}121$ **N1** $x = 13.24, 4.758//4.757$ **N1** ***OR*** $y = \frac{x-7}{2}$ **P1** $x\left(\frac{x-7}{2}\right) - x = 9\left(\frac{x-7}{2}\right)$ **K1** $x^2 - 18x + 63 = 0$ $x = \frac{-(-18) \pm \sqrt{-18^2 - 4(1)(-63)}}{2(1)}$ **K1** $x = 13.24, 4.757$ **N1** $y = 3.121, -1.121$ **N1**	**5**
2	(*a*)  shape (sine) P1 Amplitude and 1 cycle $0 \le x \le 2\pi$ P1 shifted P1 (*b*) $y = 2 - \frac{2x}{\pi}$ N1 Sketch the straight line (gradient or *y*-intercept) K1 No of solutions = 3 N1	**6**

No.	PERATURAN PEMARKAHAN	Σ MARKAH
3	(*a*) $19.5 + \left[\dfrac{\frac{1}{4}(28+k)-5}{8}\right]10 = 25.75$ **P1** untuk L = 19.5 **K1** guna rumus $k = 12$ **N1** (b) min, $\bar{x} = \dfrac{5(14.5) + 8(24.5) + 12(34.5) + 11(44.5) + 4(54.5)}{40}$ **K1** $= 34.75$ **N1** (c) $\sigma = \sqrt{\dfrac{53800}{40} - (34.75)^2}$ **K1** rumus σ atau σ^2 $= 11.72$ **N1**	**8**

4	(*a*) $\vec{DC} = \vec{DA} + \vec{AB} + \vec{BC}$	K1 tulis hukum yang digunakan	**8**
	$4\underset{\sim}{a} + \left(\frac{h+3}{2}\right)\underset{\sim}{b} = -h\underset{\sim}{a} + h\underset{\sim}{b} + k\underset{\sim}{a}$	K1	
	$\frac{h+3}{2} = h$ or $k - h = 4$	K1	
	$h = 3$ dan $k = 7$	N1	
	(*b*) $\left\|\vec{DC}\right\| = 4\begin{pmatrix} -1 \\ \frac{3}{4} \end{pmatrix} + 3\begin{pmatrix} 4 \\ 4 \end{pmatrix}$	K1	
	$= \begin{pmatrix} 8 \\ 15 \end{pmatrix}$		
	$\left\|\vec{DC}\right\| = \sqrt{8^2 + 15^2} = 17$	P1	
	Vector unit $= \frac{8\underset{\sim}{i} + 15\underset{\sim}{j}}{17}$	K1	
	$= \frac{8\underset{\sim}{i}}{17} + \frac{15\underset{\sim}{j}}{17}$	N1	

No.	PERATURAN PEMARKAHAN	Σ MARKAH
5	(*a*) $\frac{dy}{dx} = 3x^2 + 6x - 7$ K1 $\frac{dy}{dx}^{*} = 2$ $3x^2 + 6x - 7 = 2$ K1 Substitute $x = 1^{*}$ into $y = x^3 + 3x^2 - 7x + 2$ $y = (1)^3 + 3(1)^2 - 7(1) + 2$ K1 $(1, -1)$ N1 (*b*) $x = -3$ seen or implied P1 Substitute $x = -3^{*}$ into $y = x^3 + 3x^2 - 7x + 2$ $(-3)^3 + 3(-3)^2 - 7(-3) + 2$ K1 $(-3, 23)$ N1	**7**
6	(*a*) $\frac{9}{2}[2(y) + (8)(d)] = 738$ atau $\frac{17}{2}[2(y) + (16)(d)] = 986$ K1 $y = 106$ N1 $d = -6$ N1 (*b*) $106 + (n-1)(-6) = 46$ K1 $n = 11$ N1 (*c*) Cari $T_9 = 106 + (8)(-6)$ dan $T_{17} = 106 + (16)(-6)$ K1 $= 48$ N1	**7**

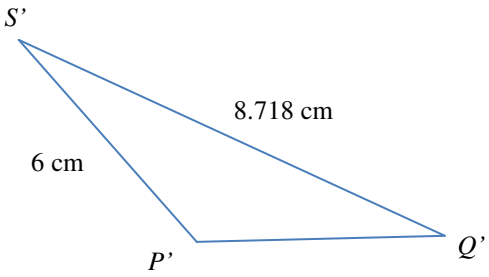
No.	PERATURAN PEMARKAHAN	Σ MARKAH
7	(*a*) (i) $P(X=6) = {}^6C_6(p)^6(1-p)^0$ atau $P(X=6) = {}^6C_6(p)^6(q)^0$ $^6C_6(p)^6(1-p)^0 = 0.046656$ K1 $p = 0.6$ N1 (ii) $P(x>4) = P(X=5) + P(X=6)$ P1 $= {}^6C_5(0.6)^5(0.4)^1 + {}^6C_6(0.6)^6(0.4)^0$ K1 $= 0.2333$ N1 (*b*)(i) $P(X>V) = 0.409$ $P\left(z > \frac{V-900}{17}\right) = 0.409$ $z = 0.23$ N1 $\frac{v-900}{17} = 0.23$ K1 $V = 903.91$ N1 (ii) $P(866 < X < 951)$ $= P\left(\frac{866-900}{17} < z < \frac{951-900}{17}\right)$ K1 $= P(-2 < z < 3)$ $= 0.9759$ N1	

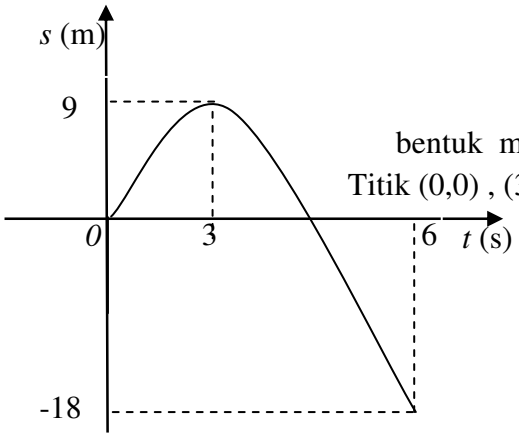
No.	PERATURAN PEMARKAHAN	Σ MARKAH
8	(*a*) 0·671 rad 38.44° **N1** (*b*) $\angle ODC = 103.12°$ **P1** $A_1 = \frac{1}{2}(12)^2(0{\cdot}671)$ atau $A_3 = \frac{1}{2}(6)^2\ (1.342)$ K1 atau $A_2 = \frac{1}{2}(6)^2 \sin 103.12°$ **K1** $A_1 - A_2 - A_3$ **K1** 6.626 **N1** (*c*) $\frac{OC}{\sin 103.12^{\circ}} = \frac{6}{\sin 38.44^{\circ}}$ atau $OC^2 = 6^2 + 6^2 - 2(6)(6)\cos 103{\cdot}12°$ atau nisbah trigonometri dan $CA = 12 - OC$ **K1** $S_{AB} = 12(0.671)$ atau $S_{BC} = 6(1.342)$ **K1** $S_{AB} + S_{BC} + CA$ **K1** = 18.71 **N1**	**10**

No.	PERATURAN PEMARKAHAN		Σ MARKAH
9	(a) $8x = 9 - x^2$	K1	
	$A(1,8)$	N1	
	(b) (i) $R = \frac{1}{2}(1)(8)$ or $\int_0^1 8x\ dx$	K1	
	$S = \int (9 - x^2)\,dx \quad = 9x - \frac{x^3}{3}$	K1	
	and Use the limit $\int_1^{3^*} (9 - x^2)dx$ $\left[\left(9(3^*) - \frac{(3^*)^3}{3}\right) - \left(9(1) - \frac{(1)^3}{3}\right)\right]$	K1	
	$R + S$		**10**
	$\frac{1}{2}(1)(8) + \int_1^{3^*} (9 - x^2)dx$	K1	
	$13\frac{1}{3}$	N1	
	(ii) $\pi\int (9 - x^2)^2 dx$		
	$\pi\left(81x - 6x^3 + \frac{x^5}{5}\right)$	K1	
	Use the limit $\int_1^3$ $\pi\left[\left(81(3) - 6(3)^3 + \frac{(3)^5}{5}\right) - \left(81(1) - 6(1)^3 + \frac{(1)^5}{5}\right)\right]$	K1	
	$54\frac{2}{5}\pi$	N1	

No.	PERATURAN PEMARKAHAN	Σ MARKAH
11	(*a*) $\frac{1}{2}\left\|3(-5)-(-9(4))\right\|$ **K1** $\frac{21}{2}$ unit^2 / 10.5 unit^2 **N1** (*b*) mid point $\left(-3,-\frac{1}{2}\right)$ or $m_{2=}-\frac{4}{3}$ **P1** $-\frac{1}{2}=-\frac{4}{3}(-3)+c$ or $y-\left(-\frac{1}{2}\right)=-\frac{4}{3}\left(x-(-3)\right)$ **K1** $6y + 8x + 27 = 0$ atau setara **N1** (*c*) $x=\frac{2(3)+3(-9)}{5}$ or $y=\frac{2(4)+3(-5)}{5}$ **K1** $C\left(-\frac{21}{5},-\frac{7}{5}\right)$ **N1** (*d*) $2\sqrt{(x-3)^2+(y-4)^2}$ or $\sqrt{(x+9)^2+(y+5)^2}$ **K1** $4\left[x^2-6x+9+y^2-8y+16\right]=(x^2+18x+81+y^2+10y+25)$ **K1** $x^2 + y^2 - 14x - 14y - 2 = 0$ **N1**	**10**

No.	PERATURAN PEMARKAHAN	Σ MARKAH
12	(*a*) $\frac{w}{4.50}\times 100 = 120$ K1 $w = 5.40$ N1 (*b*) $y = x + 3$ …….(I) P1 $\frac{y}{x}\times 100 = 130$ …….(II) $\frac{x+3}{x}\times 100 = 130$ K1 (try to solve equation) $x = 10, y = 13$ N1(both) (*c*) $\frac{7(120)+3(140)+4(130)+2(120)}{16}$ K1 $= 126.25$ N1 (*d*) $\frac{126.25\times 120}{100} = 151.5$ K1 $\frac{P_{18}}{20}\times 100 = 151.5$ K1 $= 30.30$ N1	

No.	PERATURAN PEMARKAHAN		Σ MARKAH
13	(*a*) (i) $SQ^2 = 6^2 + 10^2 - 2(6)(10)\cos 60°$	**K1**	
	$= 8.718$	**N1**	
	(ii) $\frac{8.718}{\sin\theta} = \frac{3}{\sin 13°}$	**K1**	
	$\theta = 40.82°$	**N1**	
	$\angle SRQ = 139.18°$	**N1**	
	(b) (i) 	**N1**	
	ii) $\angle S'P'Q' = 120°$		
	$\frac{6}{\sin Q'} = \frac{8.718}{\sin 120°}$	**K1**	
	$\angle P'Q'S' = 36.59°$		
	$\angle P'S'Q' = 23.41°$	**N1**	
	$\Delta P'Q'S' = \frac{1}{2}(6)(8.718)\sin 23.41°$	**K1**	
	$= 10.39$	**N1**	

No.	PERATURAN PEMARKAHAN		Σ MARKAH
15			
	(a) $\left\|\int_2^3 3+2t-t^2\right\| + \left\|\int_3^4 3+2t-t^2\right\|$	had salah satu K1	
		penambahan K1	
	$\left[3t-t^2-\frac{t^3}{3}\right]$	pengamiran K1	
	4 m	N1	
	(b) $2t-t^2+3=0$	K1	
	$s=3t+t^2-\frac{t^3}{3}+c$	K1	
	$s=3(3)+(3)^2-\frac{(3)^3}{3}$	K1	
	$S_{max} = 9$ m	N1	
	(c) 	bentuk maksimum N1 Titik (0,0) , (3,9) dan (6,-18) N1	