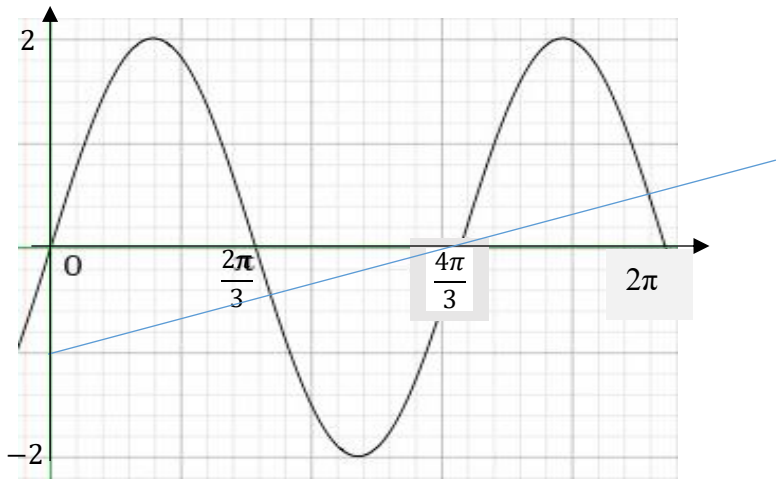
SKEMA PEMARKAHAN KERTAS 2

No.	Solution and Mark Scheme	Sub Marks	Total Marks
1.	(a) $\overrightarrow{PR} = PQ + \overrightarrow{QR}$ $= 2\underset{\sim}{y} + \frac{8}{11}\overrightarrow{PS}$ $= 2\underset{\sim}{y} + \frac{8}{11}(11\underset{\sim}{x})$ $= 2\underset{\sim}{y} + 8\underset{\sim}{x}$	K1 N1	7
	(b)(i) $\overrightarrow{PU} = PT + \overrightarrow{TU}$ $= 6\underset{\sim}{x} + \frac{k}{2}\overrightarrow{PQ}$ $= 6\underset{\sim}{x} + \frac{k}{2}(2\underset{\sim}{y})$ $= 6\underset{\sim}{x} + k\underset{\sim}{y}$	K1 N1	
	(ii) $\overrightarrow{PU} = \text{m}\,PR$ *m is a constant* $6\underset{\sim}{x} + ky = \text{m}(2\underset{\sim}{y} + 8\underset{\sim}{x})$ $ky + 6\underset{\sim}{x} = 2m\underset{\sim}{y} + 8\text{m}\underset{\sim}{x}$ *Bandingkan:* $8\text{m} = 6$ or $k = 2\text{m}$ $\text{m} = \frac{2}{3}$ $= 2(\frac{2}{3})$ $= \frac{4}{3}$ $\therefore m = \frac{2}{3}, k = \frac{4}{3}$	K1 K1 N1	
2.	 $y = \frac{3}{4\pi}x - 1$ No of solutions: 3	P1 P1 P1 N1N1	5

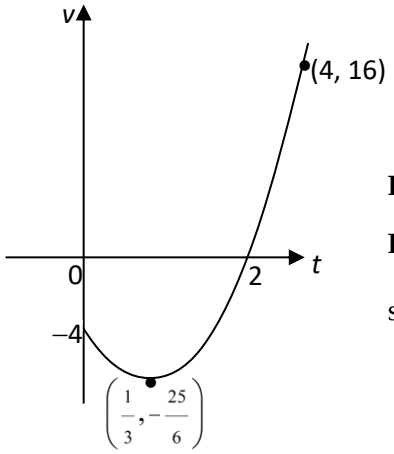
3.	$2x+4y=24$ $x=12-2y$ $[(12-2y)+y]^2=(12-2y)^2+(3y)^2$ $y(y-2)=0$ or $(x-8)(x-12)=0$ $y=0,\ y=2$ $x=12,\ x=8$ Area $=48$ cm^2	P1 K1 K1 N1 N1 N1	6
4.	(a) $\log_3 h=p$ and $\log_2 k=q$ $\frac{\log_2 k^2}{\log_2 2^3}-\frac{\log_3 h^{\frac{1}{3}}}{\log_3 3^2}$ $\frac{2\log_2 k}{3\log_2 2}-\frac{\frac{1}{3}\log_3 h}{2\log_3 3}$ $\frac{2}{3}q-\frac{1}{6}p$	P1 K1 K1 N1	7
	(b) $\log_3[\log_3(80x+3)]=\log_4 4^2$ $[\log_3(80x+3)]=9$ $80x+3=3^9$ $x=246$	P1 K1 K1 N1	
5.	(a) 36, *x*, 20.25 $\frac{20.25}{x}=\frac{x}{36}$ $x^2=729$ $x=27$ $r=\frac{27}{36}$ $r=\frac{3}{4}$ @ 0.75	K1 N1	
	(b) $T_{10}=36(0.75)^9$ = 2.703	K1 N1	

	(c) $S_n > 140$ $36\left[\frac{1-(0.75)^n}{1-0.75}\right] > 140$ $1 - 0.75^n > 0.9722$ $0.75^n < 0.0278$ $n\ log\ 0.75 < \log 0.0278$ $n > \frac{\log 0.0278}{log 0.75}$ $n > 12.46$ $n = 13$	K1 K1 N1	
6.	(a) 17.5	N1	8
	(b) L = 10.5 , $F = 6$ $f_m = 7$ $10.5 + \left(\frac{\frac{1}{4}(32) - 6}{7}\right)(5) = 11.93$ $15.5 + \left(\frac{\frac{3}{4}(32) - 13}{7}\right)(5) = 20.08$ 20.08 - 11.93 8.15	K1 K1 K1 N1	
	(c) Min = $\frac{511}{32}$ = 15.9688 // 15.97 Varians = $\frac{9303}{32} - \left(\frac{511}{32}\right)^2$ = 35.7178 // 35.72	K1 K1 N1	
7.	(a) $m = \frac{1}{2}$ $y - (-6) = \frac{1}{2}(x - (-4))$ $y = \frac{1}{2}x - 4$ // $2y - x + 8 = 0$	P1 K1 N1	10
	(b) $= \frac{1}{2}\lvert(24 + 18) - (18)\rvert$ $= 12$	K1 N1	

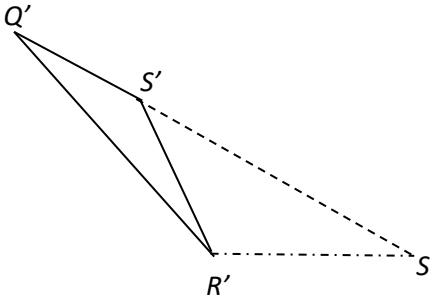
	$\frac{1}{2} \times 3 \times 6 = 9$ $12:9$ OR $4:3$	N1 N1	
	(c) $2SP = SQ$ or $\sqrt{(x-0)^2 + (y-(-6))^2}$ or $\sqrt{(x-(-3))^2 + (y-0)^2}$ $2\sqrt{(x-0)^2 + (y-(-6))^2} = \sqrt{(x-(-3))^2 + (y-0)^2}$ $3x^2 + 3y^2 + 48y - 6x + 135 = 0$	K1 K1 N1	
8.	(a) $\frac{dV}{dr} = \frac{16}{9}\pi r^2$ and $\frac{dV}{dt} = \frac{16}{9}r$ Substitute $h = 9.6$ into $h = \frac{16}{9}r$ $r = \frac{27}{5}$ Using the chain rule, $\frac{dr}{dt} = \frac{dr}{dV} \times \frac{dV}{dt}$ $= \frac{9}{16\pi r^2} \times 4\pi$ When $r = \frac{27}{5}$ $\frac{dr}{dt} = \frac{9}{16\pi\left(\frac{27}{5}\right)^2} \times 4\pi$ $= \frac{25}{324} cm\ s^{-1}$/ 0.07716 $cm\ s^{-1}$	K1 K1 K1 N1	10
	(b) $y = (x-2)^2$ ……..(1) $y = x + 4$ ……...(2) Substitute (1) into (2) $(x-2)^2 = x + 4$ $x(x-5) = 0$ $x = 0$ or 5 Based on graph, $x = 5$	K1 N1	

	$y = (x-2)^2$, on the x-axis, $y = 0$ $(x-2)^2 = 0$ $x = 2$ Volume generated = $\pi \int_2^5 (x-2)^4\, dx$ $= \pi \left[\frac{(x-2)^5}{5}\right]_2^5$ $= \pi \left[\frac{243}{5} - 0\right]$ $= \frac{243}{5}\pi$	K1 K1 K1 N1	
9.	(a) x | 0.8 | 2.5 | 4.0 | 5.8 | 7.5 | 9.1 $\log_{10}(T+8)$ | 0.442 0.44 | 0.741 0.74 | 1.006 1.01 | 1.320 1.32 | 1.620 1.62 | 1.900 1.90 Paksi betul dan seragam dan 1 titik ditanda betul Semua titik ditanda betul Garis lurus penyuaian terbaik	N1 K1 K1 N1	10
	(b) $\log_{10}(T+8) = (\log_{10} n)x + \log_{10} K$ $\log_{10} n = gunakan\ kecerunan$ n = 1.489 $\log_{10} K = gunakan\ pintasan$ K = 1.995	P1 K1 N1 K1 N1	
	(c) $\log_{10}(T+8) = 1.44$ T = 19.54	N1	
10.	(i) $P(x \geq 2) = 1 - P(x=1) - P(x=0)$ $= 1 - {}^5C_1 \left(\frac{1}{3}\right)^1 \left(\frac{2}{3}\right)^4 - {}^5C_0 \left(\frac{1}{3}\right)^0 \left(\frac{2}{3}\right)^5$ $= \frac{131}{243}$ atau 0.5391 (ii) $\mu = 19$, $\sigma = 3.559$	K1 N1 N1 N1	10

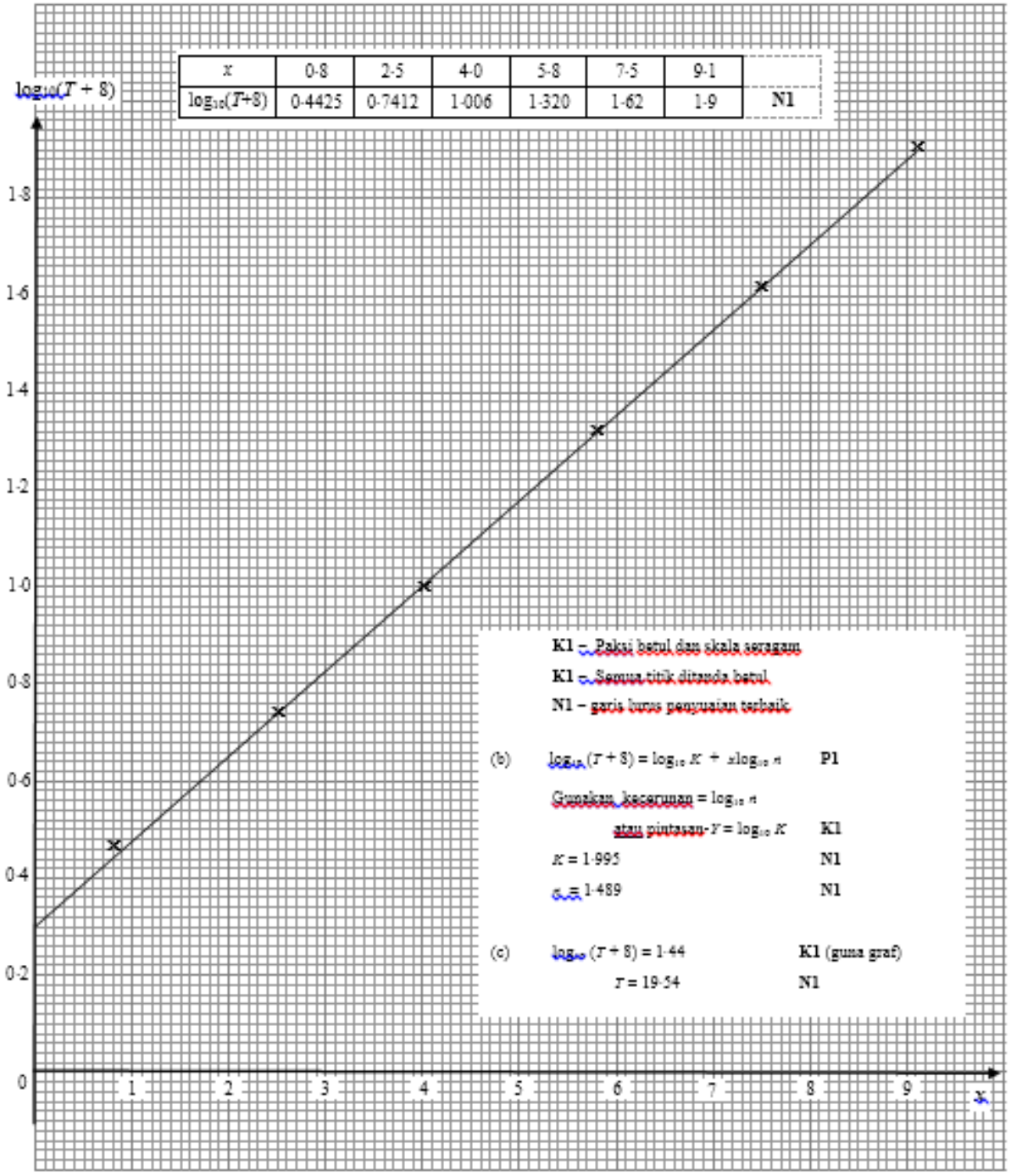
	(b) (i) $P(x > 3.75)$ $= P\left(z > \frac{3.75-3.672}{\sqrt{0.2704}}\right)$ $= P(z > 0.15)$ $= 0.4404$ (ii) $P(3.0 < x < 3.75)$ $= P\left(\frac{3.0-3.672}{\sqrt{0.2704}} < x < \frac{3.75-3.672}{\sqrt{0.2704}}\right)$ $= P(-1.292 < z < 0.15)$ $= 1 - 0.4404 - 0.0981$ $= 0.4615$ $= 46.15\ \%$	K1 N1 K1 K1 N1 N1	
11.	(a) $OR = RQ = PR = 7$ cm Tan $\alpha = 1$ $\alpha = \frac{\pi}{4}$ rad $= 0.7855$ rad	K1 N1	
	(b) $7(1.571)$ or $7(2.3565)$ $\sqrt{7^2 + 7^2 - 2(7)(7)(\cos 135^0)}$ Perimeter $= 7 + 7 + 7(2.3565) + \sqrt{7^2 + 7^2 - 2(7)(7)(\cos 135^0)}$ $= 54.4268$	K1 K1 K1 N1	
	(c) $\frac{1}{4} \times \pi \times 7^2$ $\left(\frac{1}{2} \times 7^2 \times 2.3565 - \frac{1}{2} \times 7^2 \times \sin 135^0\right)$ Area $= \frac{1}{4} \times \pi \times 7^2 + \left(\frac{1}{2} \times 7^2 \times 2.3565 - \frac{1}{2} \times 7^2 \times \sin 135^0\right)$ $= 78.8996$	K1 K1 K1 N1	

12.	(a) $a = pt + q$ $v = \int (pt + q)\, dt$ $v = \frac{pt^2}{2} + qt + c$ $t = 0,\ v = -4,\ c = -4$ $v = \frac{pt^2}{2} + qt - 4$ $v = 0,\ t = 2 \rightarrow 2p + 2q = 4$ $v = 16,\ t = 4 \rightarrow 8p + 4q = 20$ atau setara Selesaikan persamaan serentak (sehingga tinggal satu anu) $p = 3$ dan $q = -1$	K1 Guna $v = \int a\, dt$ N1 P1 Kedua – dua persamaan K1 N1	10
	(b) (i)  **P1** Bentuk U **P1** Titik $\left(\frac{1}{3}, -\frac{25}{6}\right)$ dan dua titik lain sama ada (0, –4), (2, 0), (4, 16)		
	(ii) Jumlah jarak yang dilalui $= \left\| \int_0^2 (\frac{3}{2}t^2 - t - 4)\, dt \right\| + \int_2^4 (\frac{3}{2}t^2 - t - 4)\, dt$	K1 Guna $s = \int v\, dt$ untuk salah satu	

	$= \left\lvert \left[\frac{3t^3}{2(3)} - \frac{t^2}{2} - 4t\right]_0^2 \right\rvert + \left[\frac{3t^3}{2(3)} - \frac{t^2}{2} - 4t\right]_2^4$ $= \lvert -6 \rvert + \left[8-(-6)\right]$ $= 20$	K1 menambah luas N1	
13.	(a) $\frac{P_{13}}{10.20} \times 100 = 105$ or $\frac{8.60}{P_{11}} \times 100 = 130$ (i) 10.71 (ii) 6.62	K1 N1 N1	10
	(b) $\bar{I} = \frac{105(5) + 120(k) + 160(5) + 130(1)}{5 + k + 5 + 1} = 129$ $120k + 1455 = 129(11 + k)$ $k = 4$	K1 K1 N1	
	(c) $\bar{I} = \frac{115.5(5) + 120(4) + 160(5) + 123.5(1)}{5 + 4 + 5 + 1}$ $= 132.07$ $\frac{P_{15}}{20.80} \times 100 = 132.07$ 27.47	K1 N1 K1 N1	
14.	(a) $300x + 600y \leq 60000$ @ $x + 2y \leq 200$ $x \leq y$ $x + y \geq 80$	N1 N1 N1	10
	(b) 1 straight lines correctly drawn All straight lines correctly drawn R shaded correctly	K1 N1 N1	
	(c) (i) when x = 30 Minimum y is y = 50 (ii) Total allocation used = 300(30) + 600(50) = 39000 Allocation left used = 60000 - 39000 = 21000	N1 N1 K1 N1	

15.	(a)(i) $\angle QRS = 115°$ $SQ^2 = 4^2 + 5^2 - 2(4)(5)\text{kos } 115°$ $SQ = 7{\cdot}610$	 P1 K1 N1	10
	(a)(ii) $\frac{\sin \angle QSR}{5} = \frac{\sin 115°}{7.610}$ $\angle QSR = 36{\cdot}55°$ atau $36° 33'$	K1 N1	
	(a)(iii) luas $\Delta PQS = \frac{1}{2} \times 5 \times 5 \sin 50° + \frac{1}{2} \times 5 \times 4 \sin 115°$ $= 18{\cdot}64 \text{ cm}^2$	K1K1 N1	
	(b)(i)  Note: **N1** untuk lakaran rajah dan label bucu	N1	
	(b)(ii) $\angle Q'S'R' = 180° - 36{\cdot}55°$ $= 143{\cdot}45°$	N1	

Soalan 9 (a)



x	0·8	2·5	4·0	5·8	7·5	9·1	
$\log_{10}(T+8)$	0·4425	0·7412	1·006	1·320	1·62	1·9	N1

K1 – Paksi betul dan skala seragam

K1 – Semua titik ditanda betul

N1 – garis lurus penyuaian terbaik

(b) $\log_{10}(T+8) = \log_{10} K + x\log_{10} n$ P1

Gunakan kecerunan $= \log_{10} n$

atau pintasan-$Y = \log_{10} K$ K1

$K = 1{\cdot}995$ N1

$n = 1{\cdot}489$ N1

(c) $\log_{10}(T+8) = 1{\cdot}44$ K1 (guna graf)

$T = 19{\cdot}54$ N1

Graph for Question 14