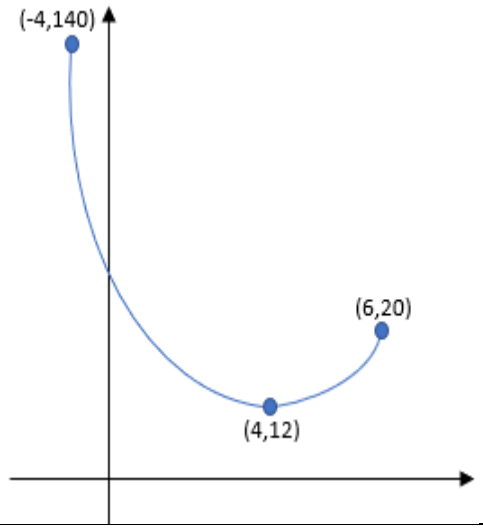
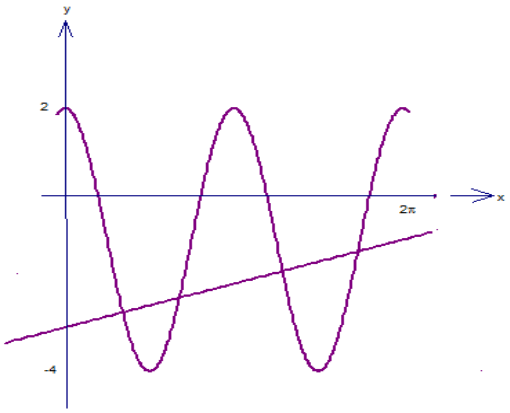
Peraturan Pemarkahan Ujian Diagnostik Tingkatan 5 Matematik Tambahan (Kertas 2 / 2021)

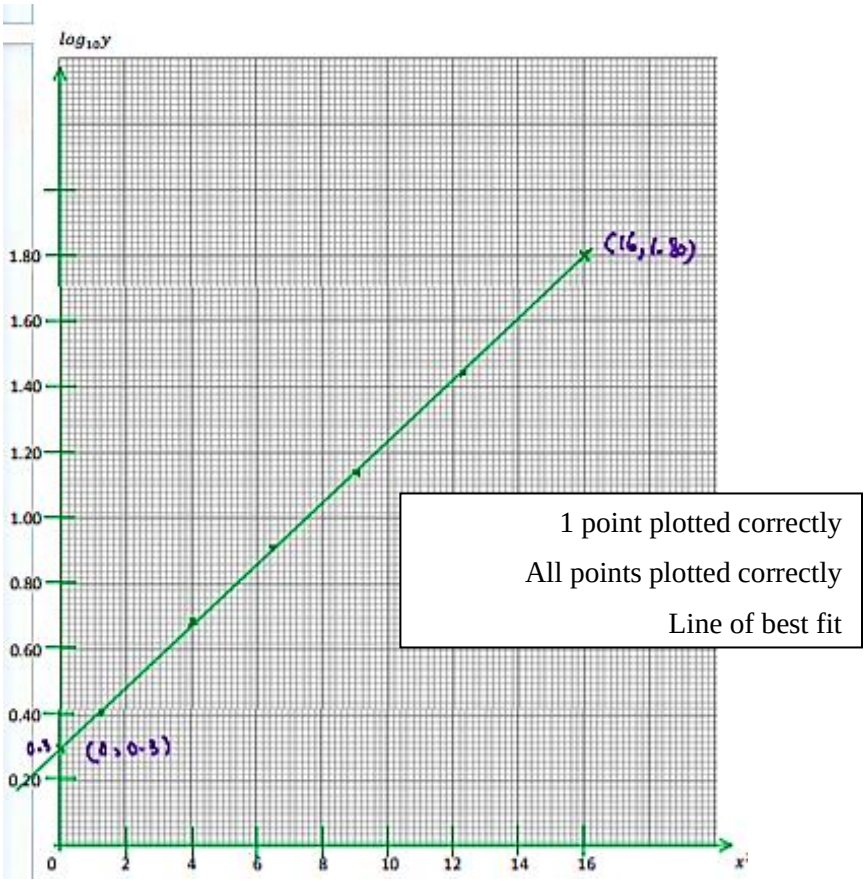
No	Solutions and marking Scheme	Sub marks	Total Marks
1	Murid/Students: x Dewasa/Adults: y Warga emas/Senior citizens: z $x = 2y + 2z$ …….…….. (1) $x + y + z = 120$ …… (2) $5x + 10y + 7.50z = 775$ …….. (3) } Either one Eliminate one of the unknown by substitution or elimination method Subtitute (1) into (2) $3y + 3z = 120$ $y + z = 40$ ……..……...…… (4) OR other valid method Subtitute (1) into (3) $5(2y + 2z) + 10y + 7.5z = 775$ $20y + 17.5z = 775$ ……..…….. (5) } Either one [(4)× 20] – (5) $20y + 20z = 800$ $20y + 17.5z = 775$ $2.5z = 250$ $z = 10$ (Warga emas/Senior citizens) $y = 30$ (Dewasa/Adults $x = 80$ (Murid/Students)	1 1 1 1 1 1	**5**

2 (a)	h=2t k=$\frac{3}{2}t^2$	1 1	**8**
(b)	 Shape ∪ Min. point(4,12) (-4,140) and (6,20)	1 1 1	
(c)	$2x^2-16x+44-n=0$ $(-16)^2-4(2)(44-n)\geq 0$ $n \geq 12$	1 1 1	
3 (a)	$(i)\quad m_{PR}=\frac{1}{4}$ $y-4=\frac{1}{4}(x-(-1))$ $y=\frac{1}{4}x+\frac{17}{4}$ or equivalent (ii) k = 11 $\sqrt{[11-(-1)]^2+(7-4)^2}$ 12.37 or $\sqrt{153}$	1 1 1 1 1 1	**8**
(b)	$T=\left(\frac{3(11)+1(-1)}{3+1},\frac{3(7)+1(4)}{3+1}\right)$ $=\left(8,\frac{25}{4}\right)$	1 1	

4 (a)	$-3 = -3(-1)^2 - 2p(-1) + 4$ $p = -2$	1 1	
(b)	(-1, 2) $y - 2 = -3(x + 1)$ $y = -3x - 1$ or equivalent	1 1 1	**8**
(c)	$-3x^2 + 4x + 4 = 0$ $(3x + 2)(x - 2) = 0$ $x = -\frac{2}{3}, 2$	1 1 1	
5 (a)	$\frac{1}{2}(9^2)(\frac{\pi}{3})$ or $\frac{1}{2}(9^2)(sin\ 60^\circ)$ $\frac{1}{2}(9^2)(\frac{\pi}{3})$ - $\frac{1}{2}(9^2)(sin\ 60^\circ)$ 7.343 cm^2	1 1 1	**7**
(b)	AC = $\sqrt{9^2 + 9^2 - 2(9)(9)cos\ 120^\circ}$ OR other valid method Arc AB + Arc DC = $9(\frac{2}{3}\pi) - 9(\frac{1}{3}\pi)$ Perimeter = $(9\sqrt{3} + 9 + 3\pi)$	1 1,1 1	
6 (a)	*LHS* $= 2\cos^2 x + (\tan^2 - \sec^2 x)$ OR other valid method $= 2\cos^2 x - 1$ $= \cos 2x$	 1 1	**7**
(b)			

	Shape of cosine Amplitude (y_{min}= -4, y_{max}= 2) Number of cycles in $0 \leq x \leq 2\pi\ rad = 2$ $3\cos^2 x - 1 = \frac{x}{\pi} - 3$ or $y = \frac{x}{\pi} - 3$ Number of solutions = 4	1 1 1 1 1	
7 (a)	$\frac{1}{\frac{log_m mn}{log_m m}} + \frac{1}{\frac{log_m mn}{log_m n}}$ OR change correctly base of $log_m mn$ or $log_n mn$ $log_{mn} m + log_{mn} n$ $log_{mn} mn = 1$ $2x - 1 = 6^1$ $x = \frac{7}{2}$	1 1 1 1	**7**
(b)	$5^{2x} - 5(5^x) - 50 = 0$ $(5^x + 5)(5^x - 10) = 0$ $x = 1.431$	1 1 1	

8 (a)		x^2	1.00	4.00	6.25	9.00	12.25	16.00	1 1	**10**
		$\log_{10} y$	0.40	0.68	0.91	1.15	1.44	1.80		



1 point plotted correctly — 1

All points plotted correctly — 1

Line of best fit — 1

(b)

$\log_{10} y = -\log_{10} n\, x^2 + \log_{10} k$ — 1

$\log_{10} k = {}^{*}c$ — 1

terima $1.95 \leq k \leq 2.05$ — 1

$-\log_{10} n = {}^{*}m$ — 1

terima $0.80 \leq n \leq 0.82$ — 1

9 (a) i	$\overrightarrow{AM} = \frac{1}{2}\left(\overrightarrow{AO} + \overrightarrow{OB}\right)$ $= -\frac{1}{2}\,\boldsymbol{a} + \frac{1}{2}\,\boldsymbol{b}$	1 1	
(ii)	$\overrightarrow{AP} = \left(\overrightarrow{AO} + \overrightarrow{OP}\right)$ or $\overrightarrow{OM} = \left(\overrightarrow{OA} + \overrightarrow{AM}\right)$ $\overrightarrow{AP} = -\boldsymbol{a} + \frac{1}{3}\,\boldsymbol{b}$	1 1	
(iii)	$\overrightarrow{OM} = \frac{1}{2}\,\boldsymbol{a} + \frac{1}{2}\,\boldsymbol{b}$	1	
(b)	$\overrightarrow{OQ} = \frac{1}{2}h\,\boldsymbol{a} + \frac{1}{2}\,h\,\boldsymbol{b}$ **or** $\overrightarrow{OQ} = (1 - k)\boldsymbol{a} + \frac{1}{3}\,k\,\boldsymbol{b}$ **or** $\overrightarrow{AQ} = -k\boldsymbol{a} + \frac{1}{3}\,\boldsymbol{b}$ $\frac{1}{2}h = 1 - k$ or $\frac{1}{2}h = \frac{1}{3}\,k$ solve simultaneous equation to find *h* or *k* $h = \frac{1}{2}$, $k = \frac{3}{4}$	1 1 1 1,1	**10**
10 (a)	$\frac{dy}{dx} = \frac{1}{2}(x-5)^{-\frac{1}{2}}$ $m_2 = -2$ $y - 1 = -2(x-6)$ $y = -2x + 13$	1 1 1 1	
(b)	$= \left[\frac{y^3}{3} + 5y\right]_0^1 - \frac{1}{2}(1)(6+4)$ or other valid method $= \frac{1}{3}$	1 , 1 1	**10**
(c)	$Volume = \pi \int_5^6 (x-5)\,dx$ $= \pi \left[\frac{x}{2} - 5x\right]_5^6$ $= 0.5\,\pi$	1 1 1	

11 (a)	$12C_r \left(\frac{3}{5}\right)^r \left(\frac{2}{5}\right)^{n-r}$ P(X=10) +P(X=11) + P(X=12) $12C_{10} \left(\frac{3}{5}\right)^{10} \left(\frac{2}{5}\right)^2 + 12C_{11} \left(\frac{3}{5}\right)^{11} \left(\frac{2}{5}\right)^1 + 12C_{12} \left(\frac{3}{5}\right)^{12} \left(\frac{2}{5}\right)^0$ 0.08344	1 1 1 1	**10**
(b) (i)	P($X \geq 40$) = $P(Z \geq \frac{40-48}{16})$ = P ($Z \geq -0.5$) = 1 – P($Z \leq -0.5$) = 0.6915 % of students who passed = 69.15	1 1 1	
(ii)	z = 1.751 $\frac{X-48}{16} = 1.751$ X = 76.02	1 1 1	
12 (a)	(a) $\angle PRQ = 180^o - 50^o - 48^o$ $= 82^o$	1	**10**
(i)	$\frac{55}{\sin 48^o} = \frac{PQ}{\sin 82^o}$ PQ = 73.29 m	1 1	
(ii)	$25^2 = 70^2 + 55^2 - 2(70)(55) \text{ kos } \angle RPS$ $\angle RPS = 18.54^o$	1 1	
(iii)	$\frac{1}{2}$ (55)(73.29) sin 50^o 1543.94	1 1	
(b)	∡PRX = 50° or ∡PXR = 80° kos $50^o = \frac{27.5}{PX}$ or $\frac{PX}{\sin 50^\circ} = \frac{55}{\sin 80^\circ}$ 42.78	1 1 1	

13 (a)	$\frac{96}{80}$ x 100 = x or $\frac{60}{y}$ x 100 = 125 or $\frac{z}{50}$ x 100 = 150 $\boldsymbol{x}$ = 120 $\boldsymbol{y}$ = 48 $\boldsymbol{z}$ = 75	1 1 1 1	**10**
(b)	i) $\frac{120(3)+125(h)+150(5)}{3+h+5}$ = 136 125h + 1110 = 136(8 + h) 125h + 1110 = 1088 + 136h $\boldsymbol{h}$ = 2 ii) $\frac{x}{16000}$ x 100 = 136 $\boldsymbol{x}$ = RM21760.00	1 1 1 1	
(c)	$I_{2006/2000} = \frac{120 \times 100}{100}$ = 132	1 1	
14 (a)	v = 24	1	**10**
(b)	2t -10 = 0 5^2- 10(5) +24 = -1	1 1 1	
(c)	t^2 – 10t + 24 < 0 (t - 6) (t - 4) < 0 4 < t < 6	 1 1	
(d)	S = $\int t^2 - 10t + 24\ dt = \frac{t^3}{3} - 5t^2 + 24t + c$ Ganti t = 4 , s = $37\frac{1}{3}$ atau t = 5, s = $36\frac{2}{3}$ Jumlah jarak = $37\frac{1}{3} + (37\frac{1}{3} - 36\frac{2}{3})$ = 38	1 1 1 1	

15 (a)	I : $x + y \leq 80$ II : $y \leq 4x$ III : $y - x \geq 10$	1 1 1	
(b)	Draw correctly at least one straight line from the *inequalities which involves x and y. Draw correctly all the three straight lines. Note: Accept dotted line Region shaded correctly.	1 1 1	**10**
(c)	i) $30 \leq y \leq 60$ ii) maximum point $(16,64)$ Use $60x + 70y$ for any point in the *region the maximum total fees = RM5440	1 , 1 1 1	

Lampiran 1