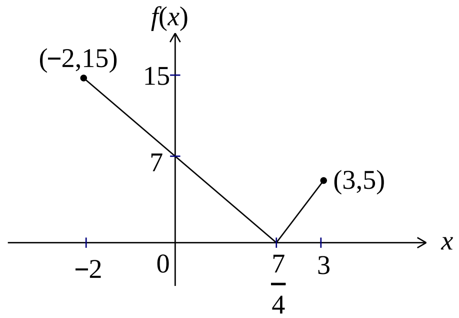
SKEMA JAWAPAN PENTAKSIRAN SUMATIF AKHIR TAHUN 2021 JPN SABAH

MATEMATIK TAMBAHAN KERTAS 2

NO.	Solution and Mark Scheme	Sub Marks	Total Marks
1.	$2k-2(3p)=8 \quad OR \quad \frac{2}{2k}+\frac{3}{2(3p)}=\frac{1}{2}$	K1	
	$k=4+3p$	P1	
	$\frac{2}{2k}+\frac{3}{2(3p)}=\frac{1}{2}$ $\frac{1}{k}+\frac{3}{6p}=\frac{1}{2}$ $2p+k=pk$		
	$2p+4+3p=p(4+3p)$	K1	**6**
	$3p^2-p-4=0$ $(3p-4)(p+1)=0$	K1	
	$p=\frac{4}{3}$, $p=-1$	N1	
	$k=8$, $k=1$	N1	
2.	(a) $\cos\left(\frac{\angle AOB}{2}\right)=\frac{24}{30}$	K1	
	$\angle AOB=1.287$	N1	
	(b)(i) $1.287(30)$	K1	
	$=38.61$	N1	
	(ii) Area of major sector OAB + Area of Triangle OAB	K1	**8**
	$\frac{1}{2}(4.997)(30)^2$	K1	
	$\frac{1}{2}(30)^2\sin 1.287$	K1	
	$\frac{1}{2}(4.997)(30)^2+\frac{1}{2}(30)^2\sin 1.287$ =2680.65	N1	

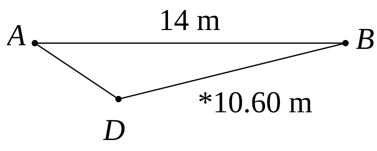
3.	(a) $h = -\frac{5}{3}$ $k = 3\times\frac{2\pi}{12} = \frac{\pi}{2}$ OR 1.571 rad (b) (i) $\tan(180^\circ - C) = \tan(A+B)$ $\frac{\tan 180^\circ - \tan C}{1+\tan 180^\circ \tan C} = \frac{\tan A + \tan B}{1-\tan A \tan B}$ $-\tan C = \frac{\tan A + \tan B}{1-\tan A \tan B}$ $\tan C = \frac{\tan A + \tan B}{\tan A \tan B - 1}$ (ii) $2\tan A = \frac{\tan A + 3}{3\tan A - 1}$ $2\tan^2 A - \tan A - 1 = 0$ $(\tan A - 1)(2\tan A + 1) = 0$ $\tan A = 1$ or $\tan A = -\frac{1}{2}$ (ignore) $A = 45^\circ$	 N1 N1 K1 K1 N1 K1 N1	**7**
4.	(a) $Q = (-4, 0)$ Let $S = (p, q)$ therefore $\frac{2(p)+1(8)}{1+2} = 4$ or $\frac{2(q)+1(6)}{1+2} = 0$ $p = -10$ $q = -3$ $S = (-10, -3)$ (b)(i) $y = 2x + 8$ $5(2x+8) - x = 22$ $x = -2$ $y = 2(-2) + 8 = 4$ $R = (-2, 4)$ (ii) Area PQR = $= \frac{1}{2}\begin{vmatrix} 8 & -4 & -2 & 8 \\ 6 & 0 & 4 & 6 \end{vmatrix}$ $= \frac{1}{2}\lvert 8(0) + (-4)(4) + (-2)(6) - 6(-4) - 0(-2) - 4(8) \rvert$ = 18 units^2	N1 K1 N1 K1 N1 K1 N1	**7**

5.	(a) $\frac{5}{2}\left[2a+(5-1)d\right]=14$ or $\frac{20}{2}\left[2a+(20-1)d\right]=176$ --------------------------- ----------------------------- $5a+10d=14$ $10a+95d=88$ Solve simultaneous equations $d=0.8/\frac{4}{5}$ cm (b) $a=\frac{14-10(0.8)}{5}$ = 1.2 cm (c) $\frac{20}{2}(1.2+l)=176$ OR $T_{20}=1.2+(20-1)0.8$ $l=16.4$ cm =16.4	K1 K1 N1 K1 N1 K1 N1	**7**
6.	(a)(i) $2(k-2)-1=\frac{1}{3}\left[5-2(2)\right]$ $k=\frac{8}{3}$ (ii) $qp(x)=q(2x-1)$ $=5-2(2x-1)$ $=7-4x$ (b)  V shape (by ruler) Pass through point and the coordinates (-2, 15), (7/4, 0), (3, 5) $0\leq f(x)\leq 15$ $m=0,\ n=15$	K1 N1 N1 N1 N1 N1 N1	**7**

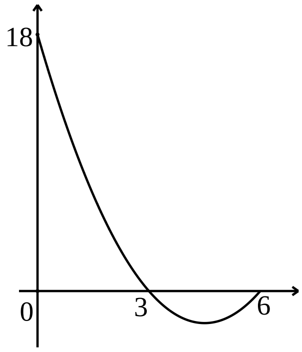
7.	(a) (i) $\frac{dy}{dx}=\frac{(6+6x)(3)-(4+3x)(6)}{(6+6x)^2}$ ----------------------------------- $\frac{dy}{dx}=\frac{-6}{(6+6x)^2}$ $P(1,\ k)$ $\frac{dy}{dx}=\frac{-6}{(6+6(1))^2}$ $m=-\frac{1}{24}$ (ii) $m_2=24$ $P(1,\ k)$ $y=\frac{4+3(1)}{6+6(1)}=\frac{7}{12}$ $(y-\frac{7}{12})=24(x-1)$ or equivalent $y=24x-\frac{281}{12}$ or $12y=288x-281$ (b) $\delta r=\frac{p}{100}\times 10=0.1p$ $\frac{dA}{dr}=8\pi r$ $\delta A=8\pi(10)\times 0.1p$ $=8p\pi$ percentage change in its surface area = $\frac{8p\pi}{4\pi(10^2)}\times 100\%$ $=2p\%$	**K1** **K1** **N1** **K1** **N1** **K1** **K1** **N1**	**8**

8.	(a)		
	$\frac{s}{t}$: 0.30, 0.45, 0.60, 0.9, 0.95	N1	
	Correct axes and uniform scale with one point plot correctly.	K1	
	All point correctly	N1	
	Line of best fit	N1	
	(b) refer to graph	P1	
	(c)	P1	10
	$\frac{s}{t}=\frac{1}{2}at+u$		
	(i) $u = 0.2$	N1	
	(ii) $\frac{1}{2}a=0.005$	K1	
	$a=0.01$	N1	
	(iii) $\frac{x}{110}=0.75$ $x=82.5$	N1	
9.	(a)(i)		
	$x^2-6x+16=6x-x^2$	K1	
	$A(2, 8)$, $B(4, 8)$	N1	
	(ii)		
	$\left[\frac{6x^2}{2}-\frac{x^3}{3}\right]_2^4$ or $\left[\frac{x^3}{3}-\frac{6x^2}{2}+16x\right]_2^4$	K1	
	----------------- ----------------------		
	$\left[3x^2-\frac{x^3}{3}\right]_2^4$ $\left[\frac{x^3}{3}-3x^2+16x\right]_2^4$		
	$\left[3(4)^2-\frac{8^3}{3}\right]-\left[3(2)^2-\frac{2^3}{3}\right]$ or $\left[\frac{4^3}{3}-3(4)^2+16(4)\right]-\left[\frac{2^3}{3}-3(2)^2+16(2)\right]$	K1	**10**
	$\frac{8}{3}$	N1	
	(b)		
	$\pi\left[\frac{x^2}{2}+6x\right]_3^k$	K1	
	$\pi\left[\left(\frac{k^2}{2}+6k\right)-\left(\frac{3^2}{2}+6(3)\right)\right]$	K1	

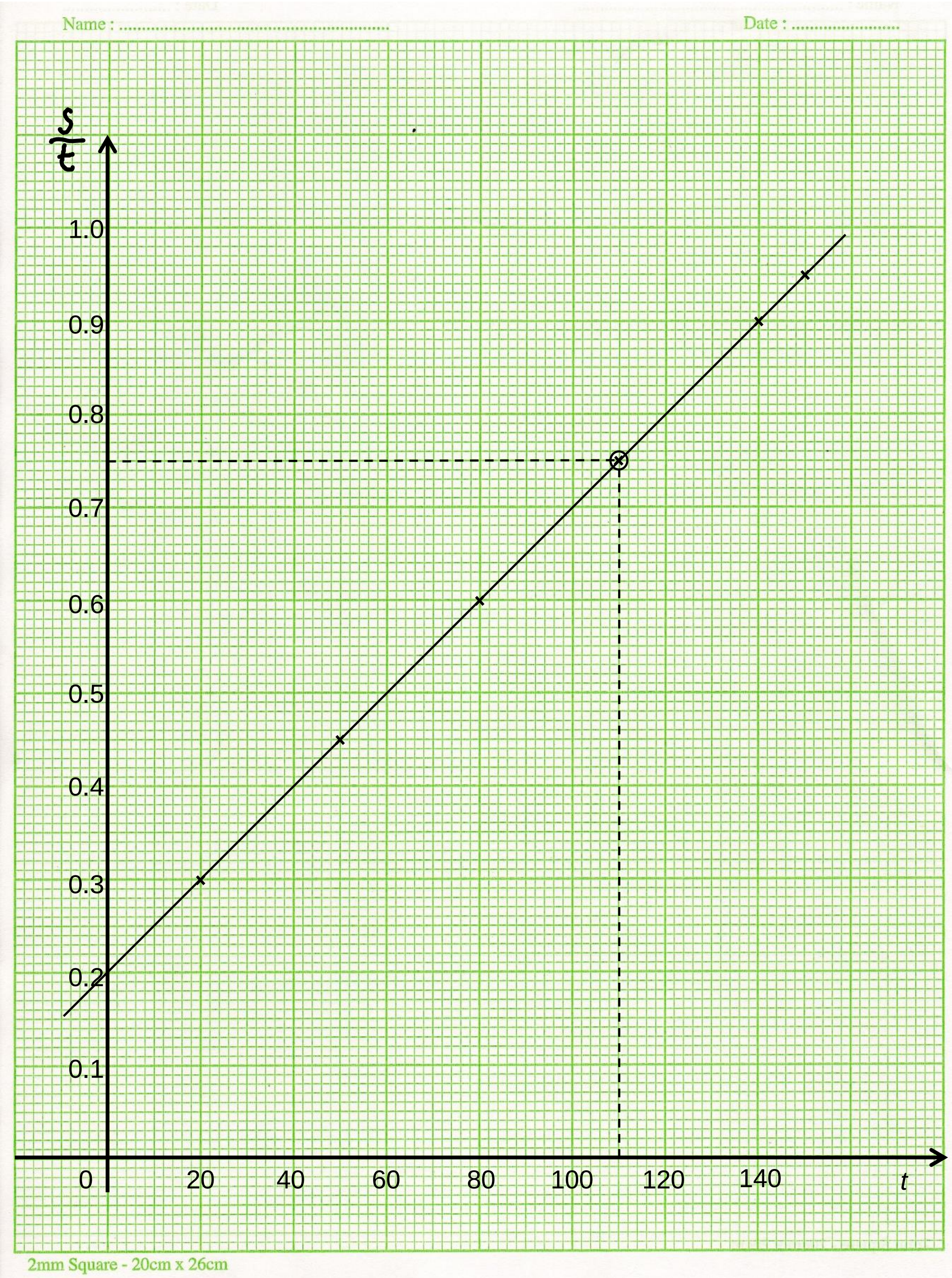
	$\pi\left[\frac{k}{2}+6k-\frac{45}{2}\right]$ or $\pi(3k-9)$ $\pi\left[\frac{k}{2}+6k-\frac{45}{2}\right]-\pi(3k-9)=\frac{85}{2}$ $k=8$	K1 K1 N1	
10.	(a) $\sqrt{4^2+p^2}=5$ $p=\pm 3$ $p=-3$ (b) $\tan\theta=\frac{3}{4}$ $\alpha=36.87°\approx 37°$ Arah perahu ***A*** 127° (c) $\overrightarrow{OA}_{new}=\begin{pmatrix}-2\\8\end{pmatrix}+t\begin{pmatrix}4\\-3\end{pmatrix}$ or $\overrightarrow{OB}_{new}=\begin{pmatrix}q\\-2\end{pmatrix}+t\begin{pmatrix}3\\-1\end{pmatrix}$ $\begin{pmatrix}-2\\8\end{pmatrix}+t\begin{pmatrix}4\\-3\end{pmatrix}=\begin{pmatrix}q\\-2\end{pmatrix}+t\begin{pmatrix}3\\-1\end{pmatrix}$ $8-3t=-2-t$ $10=2t$ $t=5$ $\overrightarrow{OA}_{new}=\begin{pmatrix}-2\\8\end{pmatrix}+5\begin{pmatrix}4\\-3\end{pmatrix}$ $\overrightarrow{OA}_{new}=\begin{pmatrix}18\\-7\end{pmatrix}$ Position vector of meeting point $18\underset{\sim}{i}-7\underset{\sim}{j}$	K1 N1 K1 N1 N1 K1 K1 K1 N1 N1	**10**
11.	(a) (i) ${}^{n}C_4(0.25)^4(0.75)^{n-4}=3\left[{}^{n}C_3(0.25)^3(0.75)^{n-3}\right]$ $n=39$ (ii) Variance $=39(0.75)(0.25)$ $=7.313$ (b)(i) $P(Z<\frac{150-165}{11.7})$ = 0.09992 (ii) $P(X>k)=\frac{1}{10}$ $\frac{k-165}{11.7}=1.281$ $k=179.99$	K1K1 N1 K1 N1 K1 N1 K1 K1 N1	10

12.	(a) (i) 36° $14^2 + 18^2 - 2(14)(15)\cos{*}36°$ = 10.60 (ii) $\frac{\sin\angle ACB}{14} = \frac{\sin{*}36}{{*}10.60}$ OR $14^2 = {*}10.60^2 + 18^2 - 2(10.60)(18)\cos\angle ACB$ 50.96° (b) (i)  A, B, D labelled (angle D is obtuse) and $\angle ADB$ = 129.04° (ii) $\angle ABD$ = 180 – *129.04° – *36° or equivalent = 14.96° Area = $\frac{1}{2}$(*10.60)(14)(sin*14.96) =19.15 (19.12 ↔ 19.19)	P1 K1 N1 K1 N1 N1 P1 K1 K1 N1	**10**
13.	(a) $x + y > 40$ $6x + 5y \le 900$ $x : y \le 3 : 5$ $\frac{x}{y} \le \frac{3}{5}$ or $3y \ge 5x$ (b) Draw correctly at least one straight line from *inequalities Draw correctly all the straight line Region shaded correctly (Perfect) C) Minimum point = (0,40) or (0, 41), Maximum point = (62,105) Minimum total sales = 5(0) + 3(40) or 5(0) + 3(41) or Maximum total sales = 5(62) + 3(105) Range of total sales = $120 < L \le 625$ or $123 \le L \le 625$	N1 N1 N1 K1 N1 N1 N1N1 K1 N1	**10**

14.	(a) $x = \frac{24 \times 100}{110} = \text{RM}21.82$ $y = \frac{18}{12} \times 100 = 150$ $z = \frac{130 \times 9.50}{100} = \text{RM}12.35$ (b)(i) $\frac{110(230) + 116(520) + 150(380) + 130(670) + 125(200)}{230 + 520 + 380 + 670 + 200}$ =127.36 (ii) $\frac{Q_{2018}}{50000} \times 100 = 127.36$ $Q_{2018} = \text{RM}63680$ (c) $I_{2020/2016} = \frac{110 \times 127.36}{100}$ 140.10	N1 N1 N1 K1K1 N1 K1 N1 K1 N1	**10**
15.	(a)(i) 18 ms^{-1} (ii) $t^2 - 9t + 18 = 0$ and solve the quadratic equation ------------------- $t = 3,\ t = 6$ $s = \int (t^2 - 9t + 18)dt$ $= \frac{t^3}{3} - \frac{9t^2}{2} + 18t + c$ $t = 0, s = 0 \rightarrow c = 0$ $s = \frac{t^3}{3} - \frac{9t^2}{2} + 18t$ max $s = \frac{(3)^3}{3} - \frac{9(3)^2}{2} + 18(3)$ $= 22\frac{1}{2} / 22.5$ m (b) $s_3 = \frac{(3)^3}{3} - \frac{9(3)^2}{2} + 18(3) = 22.5$ or $s_6 = \frac{(6)^3}{3} - \frac{9(6)^2}{2} + 18(6) = 18$ $AB =$ $22.5 - 18$ m = 4.5 m	N1 K1 K1 K1 N1 K1 N1	**10**

	(c) (i) *y*-intercept = 18 *x*-intercept = 3, 6		
			
	U shape	P1 N1	
	Pass through point and the coordinates (0,18), (3, 0), (6, 0)	N1	
	(ii) Total distance = 22.5 + 4.5 = 27 m		

Question 8
(b)


Name : ....
Date : ....
s/t
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
20
40
60
80
100
120
140
t
2mm Square - 20cm x 26cm

Question 13
(a)