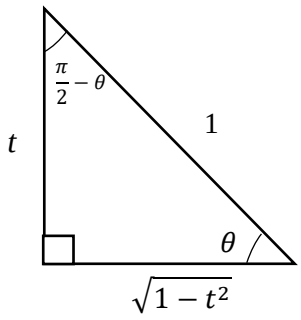
LATIHAN BERFOKUS SPM 2021
MPSM KELOMPOK M9

SKEMA PEMARKAHAN
MATEMATIK TAMBAHAN KERTAS 2

No. Soalan	Penyelesaian dan skema pemarkahan	Markah	Jumlah Markah
1	(a) b = *y-intercept* = 4 a = 2 (a > 1) (b) (k , 12) : $12 = \|2k + 4\|$ $k = 4$ (q , 0) : $0 = \|2q + 4\|$ $q = -2$ (c) $0 \leq p(x) \leq 12$	N1 N1 K1 N1 K1 N1 N1	7
2	$4x + 4y = 20$ *atau* $x + y = 5$ *atau* $x^2 + y^2 = 17$ $y = 5 - x$ *atau* $x = y - 5$ $x^2 + (5 - x)^2 = 17$ *atau* $(y - 5)^2 + y^2 = 17$ $(x - 4)(x - 1) = 0$ *atau* $(y - 4)(y - 1) = 0$ $x = 4$ atau $x = 1$ *atau* $y = 1$ atau $y = 4$ $y = 1$ atau $y = 4$ $x = 4$ atau $x = 1$	K1 K1 K1 K1 N1 N1	6
3	(a) $\tan x = \tan(180 - 2\theta)$ $= \frac{\tan 180 - \tan 2\theta}{1 + \tan 180 (\tan 2\theta)}$ $= \frac{0 - \tan 2\theta}{1 + 0}$ $= -\tan 2\theta$ $= \frac{-2\tan\theta}{1 + \tan^2\theta}$ $= \frac{2\tan\theta}{\tan^2\theta - 1}$ (b) $3(1 - 2\sin^2 y) + \sin y - 2 = 0$ $6\sin^2 y - \sin y - 1 = 0$ $(3\sin y + 1)(2\sin y - 1) = 0$ $\sin y = -\frac{1}{3}$ or $\sin y = \frac{1}{2}$	K1 K1 N1 K1 K1	

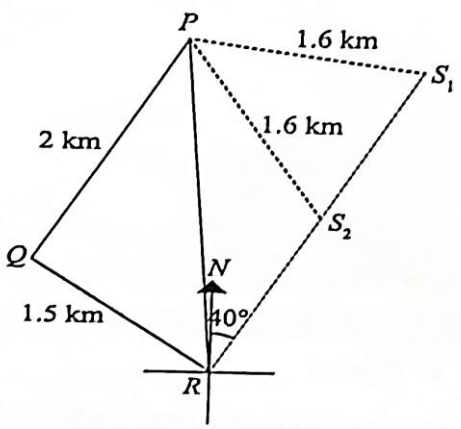
	y =199° 28' @ 199.47°, 340° 32' @ 340.53° y = 30°, 150° , 199° 28' @ 199.47°, 340° 32' @ 340.53° (c)  $sin\,(\frac{\pi}{2}-\theta)=\sqrt{1-t^2}$	N1 N1 N1	8
4	(a) $y=x^2+1$ $\frac{dy}{dx}=2x$ Kecerunan garis lurus KL $=-\frac{1}{2}$ $\frac{3-0}{1-p}=-\frac{1}{2}$ $p=7$ (b) $\int_0^1(x^2+1)dx+\frac{1}{2}$(7-1)(3) $\left[\frac{x^3}{3}+x\right]_0^1+9$ $10\frac{1}{3}unit$	K1 K1 K1 N1 K1 K1 N1	7
5	(a) $\angle BOD=\frac{1}{3}\pi\ rad=60°$ $Area\ of\ segment\ BED=\frac{1}{2}(9^2)(\frac{1}{3}\pi-\sin*60°)$ *atau setara* $=7.343\ cm^2$ (b) $AC^2=9^2+9^2-2(9)(9)\cos 120°$ $AC=\sqrt{243}=9\sqrt{3}$ cm Lengkok AB + Lengkok DC = Lengkok AC – Lengkok BD $=9\left(\frac{2}{3}\pi\right)-9\left(\frac{1}{3}\pi\right)$ $=3\pi\ cm$ Perimeter Kawasan berlorek = AC +BD + Lengkok AB + Lengkok DC $=\left(9\sqrt{3}+9+3\pi\right)cm$	P1 K1+K1 N1 K1 N1 K1 N1	8

6	(a) (i) ${}^{8}P_5 = 6720$ (ii) ${}^{5}P_1 \times {}^{3}P_1 \times {}^{6}P_3 = 1800$ (b) bilangan cara tanpa syarat, $\frac{4!}{2!} = 12$ Bilangan cara digit 7 diikuti 2 3! = 6 Jawapan = 12 - 6 = 6	N1 K1N1 K1 K1 K1 N1	7
7	(a) a =18, d=15, n=60 (i) T_{60} = 18 + 59(5) = 313 (ii) $S_{60} = \frac{60}{2}$ [18 +313] = 9930 (b) Panjang sisi segiempat tepat $= \frac{40200}{150}$ = 268 cm T_n =18 + (n−1) (5) = 268 n = 51 B : 1, 4, 7, 10, … 3n−2 M : 2,5,8,11, … 3n – 1 H : 3,6,9,12, … 3n 3n =51 n = 17 Maka, segiempat tepat berwarna ke – 51 mempunyai luas 40200 cm^2 dan berwarna hijau.	K1 N1 K1 N1 K1 K1 K1 N1	7
8	(a) (i) $\overrightarrow{LS} = \overrightarrow{LB} + \overrightarrow{BS}$ = 4$\underline{x}$ + 10$\underline{y}$ (ii) BL : LP = 3 : 1 dan PC : CS = 1:1 $\overrightarrow{BC} = \overrightarrow{BP} + \overrightarrow{PC}$ = 16$\underline{x}$ + $\frac{1}{2}\overrightarrow{PS}$ =16$\underline{x}$ + $\frac{1}{2}(\overrightarrow{PB} + \overrightarrow{BS})$ = 16$\underline{x}$ + 5$\underline{y}$	K1 N1 K1 K1 N1	

	(b) Biarkan $\overrightarrow{BT} = \lambda \overrightarrow{BC}$ dan $\overrightarrow{LT} = k\overrightarrow{LS}$ $\overrightarrow{BT} = \overrightarrow{BL} + \overrightarrow{LT}$ $\lambda \overrightarrow{BC} = 12\underline{x} + k\overrightarrow{LS}$ $\lambda(16\underline{x} + 5\underline{y}) = 12\underline{x} + k(4\underline{x} + 10\underline{y})$ $k = \frac{1}{2}\lambda$ $\lambda = \frac{6}{7}$ Maka, $\overrightarrow{BT} = \frac{6}{7}\overrightarrow{BC}$ $BT : BC = 6:7$ $BT : TC = 6:1$	K1 K1 K1 K1 N1	10
9	(a) $t = 0, a = -12$ (b) $v = \int(4t - 12)dt$ $v = 2t^2 - 12t + c$ $t = 0, v = 0, c = 10$ $v = 2t^2 - 12t + 10$ $\frac{dv}{dt} = 0, \quad t = 3$ $v = -8ms^{-1}$ (c) $2t^2 - 12t + 10 = 0$ $(t-1)(t-5) = 0$ $t = 1 \; atau \; t = 5$ (d) $s = \int_0^1 (2t^2 - 12t + 10)dt + \int_1^4 (2t^2 - 12t + 10)dt$ $S = \left[\frac{2t^3}{3} - 6t^2 + 10t\right]_1^4$ Jumlah jarak $= \frac{14}{3} + 18$ $= \frac{68}{3}$	P1 K1 K1 N1 K1 N1 K1 K1 K1 N1	10
10	(a) Jadual (Sekurang-kurangnya 2 t.p) $\frac{y}{x} = (2q-3)x + \frac{p}{q}$ Plot graf $\frac{y}{x}$ melawan x *6 titik diplot dengan betul Garis penyuaian terbaik (Semua *titik diplot dengan betul)	N1 P1 K1 N1 N1	

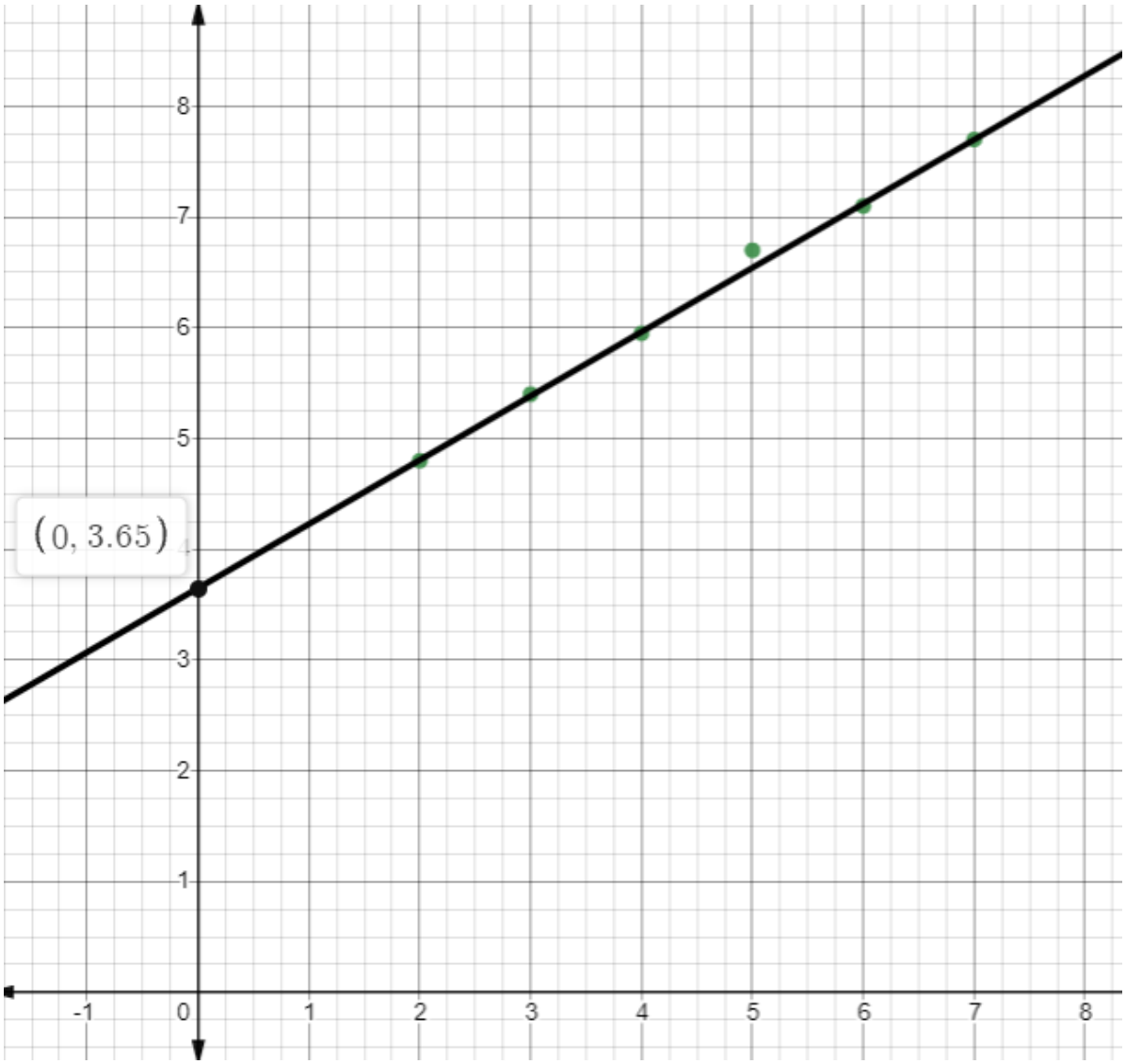
x	2	3	4	5	6	7
$\frac{y}{x}$	4.8	5.4	5.95	6.7	7.1	7.7

	(b) $Kecerunan, 2q - 3 = \frac{*7.7 - *3.65}{*7 - *0}$ q = 1.7893 *Pintasan-y* = 3.65 $\frac{p}{1.7893} = 3.65$ p = 6.531	K1 N1 N1 K1 N1	10
11	(a) (i) P(X=3) = $^6C_3$ x $(0.4)^3$ x (0.6) = 0.2765 (ii) P (X ≥ 1) = 1- P(X=0) = 1- $^6C_0$ x $(0.4)^o$ x $(0.6)^6$ = 0.9533 (b) (i) P(Z < $\frac{174-170}{8}$) P(Z < 0.5) = 1- 0.3085 = 0.6915 (ii) P (X > p) = 0.15 $\frac{p-170}{8}$ = 1.036 p – 170 = 8.288 p = 178.288	K1 N1 K1 K1 N1 K1 N1 K1 K1 N1	10
12	(a) $\frac{110}{100} = \frac{114}{a}$ $a = 103.64$ (b) (i) $x = \frac{1050}{750} \times 100$ $x = 140$ Peratus kenaikan kos makanan ialah 40%. (ii) $\frac{Kos}{750}$ x 100 = 108 RM 810 (c) Indeks harga makanan = $\frac{140}{108}$ x 100 = 129.63 Indeks harga pakaian = $\frac{114}{110}$ x 100 = 103.64 Indeks harga Elektrik = $\frac{119}{115}$ x 100 = 103.48	K1 N1 K1 N1 K1 N1 K1	

	Indeks harga pengangkutan = $\frac{112}{y}$ x 100 = $\frac{11200}{y}$ Indeks harga lain-lain= $\frac{113}{105}$ x 100 = 107.62 $\frac{129.63(80)+103.64(60)+103.48(100)+\frac{11200}{y}(70)+107.62(50)}{360} = 109.6$ $y = 109.83 \approx 110$ $(3\ a.b)$ (d) $\frac{2500 \times 100}{109.6}$ RM 2281	K1 N1 N1	10
13	(a) $25x + 15y \leq 1200$ *or* $5x + 3y \leq 240$ $35x + 45y \leq 2520$ *or* $7x + 9y \leq 504$ $x \leq 2y$ (b) Rujuk pada graf soalan 13 Lukis sekurang-kurangnya 1 garis lurus yang betul daripada *ketaksamaan yang melibatkan *x* dan *y*. *Ketiga-tiga garis lurus dilukis dengan betul (Terima garis putus-putus) Rantau berlorek ditanda dengan betul (c) (i) $15 \leq y \leq 30$ (ii) Titik maksimum *(27, 35) Keuntungan maksimum = 30(*27) + 35(*35) RM 2035	P1 P1 P1 K1 N1 N1 N1 N1 K1 N1	10
14	(a) $PR^2 = 2^2 + 1.5^2 - 2(2)(1.5)\cos 65°$ PR = 1.927 km **(b)**  	K1 N1 P1 K1	

	$\frac{\sin \angle PSR}{1.927} = \frac{\sin 40°}{1.6}$ $\angle PSR = 50.73° \; atau \; 129.27°$ (c) 180° - 50.73°- 40° = 89.27° Luas/ Area = $\frac{1}{2}$ x 1.6 x 1.927 x sin 89.27° = 1.541 km^2	K1 N1N1 K1 K1 N1	10
15	(a) (i) $m_{normal} = m_2 = \frac{5}{2x-5}$ $m_{tangen} = m_1 = \frac{dy}{dx}$ $\frac{dy}{dx} = -(\frac{2x-5}{5})$ $x = \frac{1}{2}, \quad \frac{dy}{dx} = \frac{4}{5}$ $y - 4 = \frac{4}{5}\left(x - \frac{1}{2}\right)$ $y = \frac{4}{5}x + \frac{18}{5}$ (ii) minimum, $\frac{dy}{dx} = 0$ $x = k, \quad -\left(\frac{2k-5}{5}\right) = 0$ $k = \frac{5}{2}$ (b) $\frac{dy}{dx} = -4x + 8$ $-4m + 8 = 0$ $m = 2$ $y = -2(2)^2 + 8(2) + 5$ $y = 13$ Titik pegun (2,13)	 K1 N1 K1 N1 K1 N1 K1 N1	10

Graf Soalan 10



Graf Soalan 13