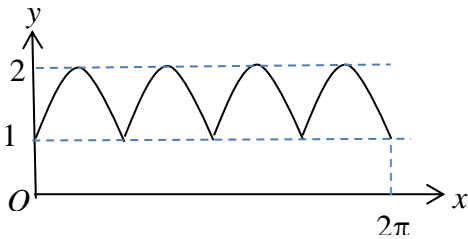


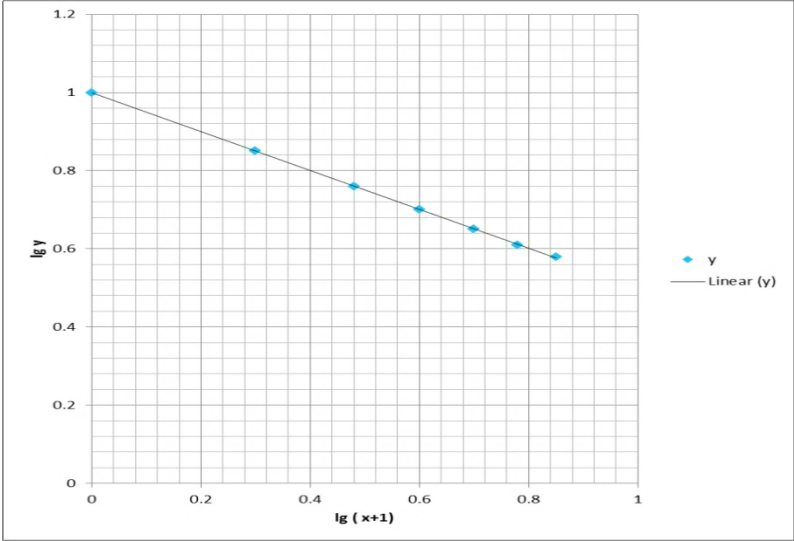
**PERATURAN PEMARKAHAN PEPERIKSAAN PERCUBAAN SPM 2017
PROGRAM INTERVENSI TERBILANG AKADEMIK SELANGOR
(PINTAS)
MATEMATIK TAMBAHAN KERTAS 2**

NO	SOLUTIONS	MARKS		
1	$xy - 8 = 2(2x - y) = 3x + 1$ $x = 1 + 2y, \text{ or } y = \frac{3x + 9}{x}$ $y(1 + 2y) - 8 = 3(1 + y) + 1$ $\text{or } 4x - 2y = 3x + 1 \Rightarrow x = 1 + 2\left(\frac{3x + 9}{x}\right)$ $2y^2 - 5y - 12 = 0 \text{ or } x^2 - 7x - 18 = 0$ $(2y + 3)(y - 4) = 0 \text{ or } (x + 2)(x - 9) = 0$ $x = -2, 9$ $y = -\frac{3}{2}, 4$	P1		
		P1		
		K1		
		K1		
		N1		
		N1		6
2	<p>(a) $r = 2$</p> $\frac{1(2^n - 1)}{2 - 1} = 255 \text{ or } \frac{2(2^n - 1)}{2 - 1} = 254$ $n = 8 \text{ or } n = 7$ <p>Number of rows = 15</p>	K1		
		N1		
		N1		
			3	
	<p>(b) $a = 1, n = 8 \text{ or } a = 2, n = 7$</p> $(2^7) \text{ or } 2(2^{7-1})$ <p>(Note: or correct listing P1 K1)</p> <p>128</p>	P1		
		K1		
		N1	3	6

NO	SOLUTIONS	MARKS			
3	(a) 14- Markah Ben = 7 or $\frac{62 + \text{Markah Shima}}{7} = 10$ Markah Ben = 7 dan Markah Shima = 8	K1		6	
	(b) $\left(\frac{5^2 + 7^2 + 7^2 + 8^2 + 12^2 + 14^2 + 17^2}{7} \right) - 10^2$ 4.071	K1	2		
	(c) min = 20, varians = 66.29	N1,N1	2		
4	(a) $\frac{\sin A}{\cos A} (1 + 2\cos^2 A - 1)$ $2 \sin A \cos A = \sin 2A$	K1	2	8	
	(b) 	P1 (sin graph) P1 (2 cycle) P1 reflect P1 translasi	4		
	(c) $2k - 1 = 2$ $k = \frac{3}{2}$	K1	2		
5	(a) A (30,40) dan C(60,20)	P1	1	7	
	(b) D (90, 60) $\sqrt{90^2 + 60^2}$ 108.17	P1 N1 K1	3		
	(c) $DA : DC = 2 : 1$ $\frac{2(60) + 30}{3}$ or $\frac{2(20) + 40}{3}$ $\left(50, \frac{80}{3} \right)$	P1 K1 N1	3		

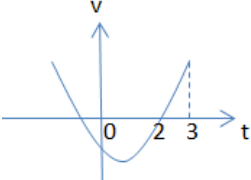
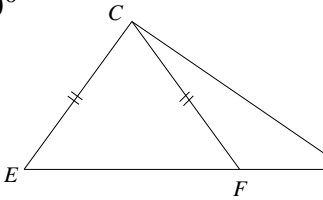
NO	SOLUTIONS	MARKS		
6	(a) $m_{normal} = \frac{1}{3}$ or $\frac{dy}{dx} = 3x^2 - 6x$ Solve $3x^2 - 6x = -3$ $x = 1$ P (1, -2)	P1		
	(b) $*-2 = \frac{1}{3} + \frac{k}{3}$ $k = -7$	K1		
	(c) $y + 2 = -3(x - 1)$ $y = -3x + 1$	K1	3	
7	(a) $\sin \frac{\theta}{2} = \frac{3}{5}$ or other valid method 36.87° or 0.6436 rad 1.287 (Note: or other valid method K1N1N1)	K1		
	(b) $5 (*1.287)$ 6.435 cm	N1		
	(c) 1.855 $Area\ of\ sektor = A_1 = \frac{1}{2}(5)^2 (*1.855)$ $Area\ of\ triangle = A_2 = \frac{1}{2}(5)^2 \sin *1.855$ $* A_1 - A_2$ $11.19\ cm^2$	N1	2	7
8	(a) $x^2 + 4 = 4x$ $k = 2$	K1		
	(b) $A_1 = \int_0^2 (x^2 + 4) dx = \left[\frac{x^3}{3} + 4x \right]_0^2$	N1	2	
		K1		
		K1		
		K1		

NO	SOLUTIONS	MARKS		
	$A_2 = \frac{1}{2}(2)(8) \text{ or } \int_0^2 4x \, dx = \left[\frac{4x^2}{2} \right]_0^2$ $A_1 - A_2 = \int_0^2 (x^2 + 4) \, dx - \frac{1}{2}(2)(8)$ <p>Area of the shaded region = $2 \left[\int_0^2 (x^2 + 4) \, dx - \frac{1}{2}(2)(8) \right]$</p> <p>5.333 unit³</p>	K1	K1	N1
	<p>(c) Volume = $\pi \int_4^5 (y - 4) \, dy = \left[\frac{y^2}{2} - 4y \right]_4^5$</p> $\left(\frac{25}{2} - 20 \right) - \left(\frac{16}{2} - 16 \right)$ <p>0.5 π // 1.5708 // 1.571</p>	K1	K1	N1
		K1	K1	N1
			3	10
9	<p>(a) (i) $n = 10, p = 0.7, q = .03$</p> $P(x \leq 8) = P(x=0) + P(x=1) + \dots + P(x=8)$ <p>or $1 - P(x=9) - P(x=10)$</p> <p>Use ${}^{10}C_r (0.3)^r (0.7)^{10-r}$</p> <p>0.85065 // 0.8507</p> <p>(ii) $6.72 = n(0.7)(0.3)$</p> <p>$n = 32$</p>	K1	K1	N1
		K1	N1	N1
		K1	K1	N1
			5	
	<p>(b) $X \sim N(56, 32)$</p> <p>(i) $P(X < 40) = P\left(Z < \frac{40-56}{32}\right)$</p> $= P(Z < -0.5)$ $= 0.3085$ <p>$0.3085 \times 500 \approx 154$ students</p> <p>ii) $P(X > m) = 0.12$</p> $P\left(Z > \frac{m-56}{32}\right) = 0.12$ $\frac{m-56}{32} = 1.175$ <p>$m \approx 93.6$ marks</p>	K1	K1	N1
		K1	K1	N1
			5	10

NO	SOLUTIONS	MARKS																
10	<p>(a)</p> <table border="1" data-bbox="343 264 1034 342"> <tr> <td>$\lg(x+1)$</td> <td>0.3</td> <td>0.48</td> <td>0.60</td> <td>0.70</td> <td>0.78</td> <td>0.85</td> </tr> <tr> <td>$\lg y$</td> <td>0.85</td> <td>0.76</td> <td>0.70</td> <td>0.65</td> <td>0.61</td> <td>0.58</td> </tr> </table> <p>(b) Refer graph paper</p> <p>Plot $\log_{10} y$ against $\log_{10} (x+1)$ (at least one point)</p> <p>6 points plotted correctly Line of best fit N1</p>  <p>(c) $\log_{10} y = -a \log_{10} (x+1) + \log_{10} b$</p> <p>(i) $-a = -\frac{1}{2}$ $a = \frac{1}{2}$</p> <p>(ii) $\log_{10} b = 1$ $b = 10$</p>	$\lg(x+1)$	0.3	0.48	0.60	0.70	0.78	0.85	$\lg y$	0.85	0.76	0.70	0.65	0.61	0.58	N1 N1	2	
$\lg(x+1)$	0.3	0.48	0.60	0.70	0.78	0.85												
$\lg y$	0.85	0.76	0.70	0.65	0.61	0.58												
		K1 N1 N1																
		P1 K1 N1 K1 N1	5															
11	<p>(a)(i) $\overrightarrow{OP} = \overrightarrow{OA} + \frac{1}{3} \overrightarrow{AB}$</p> <p>$= 10\underline{x} + 2\underline{y}$</p> <p>(ii) $\overrightarrow{AQ} = \overrightarrow{AB} + \frac{3}{5} \overrightarrow{BC}$</p> <p>$= 6\underline{y} - 6\underline{x}$</p>	K1 N1 N1	5 3	10														

NO	SOLUTIONS	MARKS		
	b) $\overline{AR} = h(6\underline{y} - 6\underline{x})$ $= -6h\underline{x} + 6h\underline{y}$ $\overline{AR} = \overline{AO} + \overline{OR} = \overline{AO} + k\overline{OP}$ $= -10\underline{x} + k(10\underline{x} + 2\underline{y})$ $= (10k - 10)\underline{x} + 2k\underline{y}$ $\therefore 6h = 2k$ $-6h = 10k - 10$ $h = \frac{5}{18}, \quad k = \frac{5}{6}$	K1		
		K1		
		K1		
		N1, N1		
	(c) $\overline{OS} = \overline{OA} + \overline{AS}$ $10\underline{y} = 10\underline{x} + m(6\underline{y} - 6\underline{x})$ $m = \frac{5}{3}$	K1	N1	10
12	(a) $\frac{x}{168} \times 100 = 125$ or $y = \frac{99}{90} \times 100$ $x = RM\ 210$ $y = 110$	K1		
		N1		
		N1	3	
	(b) $m + n = 35$ $\frac{(125 \times 25 + 120m + 105n + 110 \times 40)}{100} = 115$ $8m + 7n = 265$ $8(35 - n) + 7n = 265$ $m = 20$ $n = 15$	K1		
		K1		
		K1		
		K1		
		N1		
		N1	5	
	(c) $\bar{I} = \frac{120}{100} \times 115$ $= 138$	K1		
		N1		
			2	10

NO	SOLUTIONS	MARKS		
13	(a) $200 \leq x \leq 500$ $x + y \leq 700$ $x - 2y \leq 200$	N1		
	(b) Graf (satu garis betul) (semua garis betul) (rantau betul)	K1		
	(c) (i) Maximum number of arts students = 450 (ii) (500, 200) $k = 800x + 600y$ $= 800(500) + 600(200)$ $= \text{RM } 520\,000$	N1		
14	(a) $(2t + 3)(t - 2) = 0$ $t = 2$ $a = 4t - 1$ $= 4(2) - 1$ $= 7 \text{ m s}^{-2}$	K1		
	(b) $a = 4t - 1 = 0$ $t = \frac{1}{4} \text{ s}$ $v = 2\left(\frac{1}{4}\right)^2 - \left(\frac{1}{4}\right) - 6$ $v = -6\frac{1}{8} \text{ ms}^{-1} // -\frac{49}{8} \text{ ms}^{-1} // -6.125 \text{ ms}^{-1}$	K1		
	(c) $s = \int (2t^2 - t - 6) dt$ $= \frac{2t^3}{3} - \frac{t^2}{2} - 6t$ $S_2 = \frac{16}{3} - 2 - 12 = -8\frac{2}{3}$ $S_3 = 18 - \frac{9}{2} - 18 = -4\frac{1}{2}$	K1		
			3	
			3	
			4	10

NO	SOLUTIONS	MARKS		
	$d = 8\frac{2}{3} - [-8\frac{2}{3} - (-4\frac{1}{2})] = 12\frac{5}{6}m // \frac{77}{6}m // 12.83m$ <p>OR $\left \int_0^2 v dt \right + \int_2^3 v dt$ K1</p> <p>Correct integration K1</p> <p>Correct limit K1</p> <p>Correct answer N1</p> 	N1		
15	(a) $AE^2 = 20^2 + AE^2 - 2(AE)(20)\cos 30^\circ$ AE = 11.55 cm	K1 N1	2	
	(b) (i) $\frac{1}{2} (20)(11.55) \sin 30^\circ = 2 (\frac{1}{2}) (CE)(10) \sin 60^\circ$ 6.668 cm (ii) $CD^2 = 6.668^2 + 10^2 - 2(6.668)(10) \cos 60^\circ$ 8.819 cm	K1, K1 N1 K1 N1	5	
	(c)(i) $\frac{\sin \angle CDE}{*6.668} = \frac{\sin 60^\circ}{*8198.}$ 40.90 ⁰ (i) 	K1 N1 N1	3	10

Question 10

Graph $\log_{10} y$ against $\log_{10}(x+1)$

$\log_{10} y$

1.0

0.9

0.8

0.7

0.6

0.5

0.4

0.3

0.2

0.1

0.1

0.2

0.3

0.4

0.5

0.6

0.7

0.8

$\lg(x+1)$

