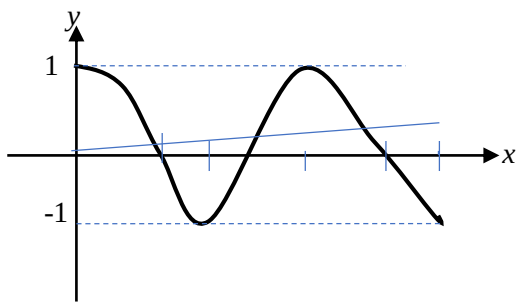
Modul Pintas Tingkatan 5
Peperiksaan Percubaan SPM 2018
Skema Jawapan Matematik Tambahan
Kertas 2 3472/2

NO	SOLUTIONS	MARKS		
1	$4x+8y=48$ *or* $4xy+x^2=135$	P1		
	$x=12-2y$ *OR* $y=\dfrac{12-x}{2}$	P1		
	$4x\left(\dfrac{12-x}{2}\right)+x^2=135$ *OR* $4(12-2y)y+(12-2y)^2=135$	K1		
	$x^2-24x+135=0$ *OR* $-4y^2+9=0$	K1		
	$(x-15)(x-9)=0$ *OR* $y=\dfrac{3}{2}$			
	Length and breadth: $x=9$, 15 (*ignore*)	N1		
	Height : $y=\dfrac{3}{2}$	N1	6	**6**
2	(*a*) 6, $\sqrt{18}$, 3 *or* 3, $\dfrac{\sqrt{18}}{2}$ *seen*	P1		
	$\sqrt{\left(\dfrac{\sqrt{18}}{2}\right)^2+\left(\dfrac{\sqrt{18}}{2}\right)^2}$ *or* 3	N1		
	$9\ cm^2$	N1	3	
	(*b*) 24, $4\sqrt{18}$, 12 <u>*OR*</u> $a=24$ *and* $r=\dfrac{\sqrt{2}}{2}$	P1		
	$S_\infty=\dfrac{24}{1-\dfrac{\sqrt{2}}{2}}$	K1		
	81.94	N1	3	**6**

NO	SOLUTIONS	MARKS		
3	$(a)\ \dfrac{75+70+59+62+68}{5}=66.8$ $\dfrac{75^2+70^2+59^2+62^2+68^2}{5}-(66.8)^2=5.706$ Syafiqah result is more consistent	P1 K1N1 N1	4	
	$(b)\ \dfrac{334+x}{6}>67.5$ $x>71$	K1 N1	2	6
4	$(a)\ \dfrac{1+\dfrac{\sin^2 x}{\cos^2 x}}{1-\dfrac{\sin^2 x}{\cos^2 x}}$ $=\dfrac{\cos^2 x+\sin^2 x}{\cos^2 x-\sin^2 x}$ $=\dfrac{1}{\cos 2x}$ $=\sec 2x$ Use identity : $\tan^2 x=\sin^2 x/\cos^2 x$ atau $\cos^2 x+\sin^2 x = 1$ atau $\cos^2 x-\sin^2 x = \cos 2x$	K1 N1	2	
	(b)  Shape of positive cos graph P1 1 ½ cycles P1 Maximum 1, minimum -1 P1		3	
	$(c)\ y=\dfrac{x}{5\pi}$ *or implied* Sketch the straight line, correct gradient or y intercept 3 solutions	N1 K1 N1	3	8

NO	SOLUTIONS	MARKS		
5	(*a*)(*i*) $(2m-n)\underline{i}+(-3m-2n)\underline{i}=\lambda(3\underline{i}-\underline{j})$ $\underline{OR}$ $\frac{(-3m-2n)}{(2m-n)}=\frac{-1}{3}$	K1		
	$(2m-n)=3\lambda$ *and* $(-3m-2n)=-\lambda$			
	$m+n=0$ *or equivalent*	N1		
	(ii) $2m - n = 0$	N1	3	
	(*b*)(*i*) $\overrightarrow{OP}=2(2\underline{i}-3\underline{j})+3(3\underline{i}-\underline{j})$	K1		
	$P=(13,-9)$	N1		
	(*ii*) $\overrightarrow{PQ}=(-13\underline{i}+9\underline{j})+(\underline{i}+2\underline{j})$	K1		
	$= -12\underline{i}+11\underline{j}$			
	Vektor unit $=\frac{1}{\sqrt{265}}(-12\underline{i}+11\underline{j})$	N1	4	7
6	(*a*) $\frac{dy}{dx}=3(2)^2-1$	K1		
	$= 11$			
	$y-6=11(x-2)$	K1		
	$y=11x-16$	N1	3	
	(*b*) $3x^2-1=11$	K1		
	$x=-2,2$	K1		
	$Q=(-2,-6)$	N1	3	7
	(c) Rectangle @ Segi empat tepat	P1	1	
7	(a) $\angle$AOB = 6.5/5	K1		
	= 1.3 rad.	N1		
	$\angle POQ$ = 0.8667 rad.	N1	3	
	(b) *MN* = 5 × sin(0.8667 rad.) = 3.811 cm	K1		
	or ON = 5 × cos(0.8667 rad.) = 3.2367 cm			
	Length of arc *PQ* = 6 × 0.8667 = 5.2002	K1		
	Perimeter = 1+*MN+ *NQ+*QP	K1		
	= 12.77 cm	N1	4	

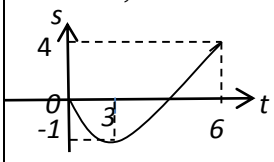
NO	SOLUTIONS	MARKS		
	(c) Area of sector $OPQ = ½ \times 6^2 \times 0.8667$ OR Area of triangle $OMN = ½ (3.811)(3.2367)$ Area of shaded region = $*15.60 - *½ (3.811)(3.2367)$ $= 9.432$	K1 K1 N1	3	10
8	$(a)(i)\ \frac{dx}{dy} = 2y = 2(1) = 2,\ \frac{dy}{dx} = \frac{1}{2}$ $y - 1 = \frac{1}{2}(x - 5)$ $2y = x - 3$	K1 K1 N1	3	
	(ii) *Area Under the Curve*: $A_1 = \int_0^1 y^2 + 4\,dy = \left[\frac{y^3}{3} + 4y\right]_0^1$ $= \frac{13}{3}$ Area of trapezium: $A_2 = \left[y^2 + 3y\right]_0^1$ *or* $\frac{1}{2}(1)(3+5) = 4$ Area of the shaded region: $A_1 - A_2$ $= \frac{1}{3}$	K1 K1 K1 N1	4	
	$b)\ Volume = \pi \int_4^6 x - 4\ dx$ $= \pi\left[\frac{x^2}{2} - 4x\right]_4^6 = \pi\left[\left(\frac{6}{2} - 4(6)\right) - \left(\frac{4}{2} - 4(4)\right)\right]$ $= 2\pi$	K1 K1 N1	**3**	10

NO	SOLUTIONS	MARKS		
9	(a) $p = 0.85, \quad q = 0.15$ $P(x \geq 6) = P(r = 6,7,8)$ $^8C_6\,(0.85)^6(0.15)^2$ or $^8C_7\,(0.85)^7(0.15)^1$ or $^8C_8\,(0.85)^8(0.15)^0$ $= {}^8C_6\,(0.85)^6(0.15)^2 + {}^8C_7\,(0.85)^7(0.15)^1 + {}^8C_8\,(0.85)^8(0.15)^0$ $= 0.8948$	P1 K1 K1 N1	4	
	$(b)(i)\ P(35 < X < 66) = P\left(\frac{35-48}{6} < Z < \frac{66-48}{6}\right)$ $= P(-2.167 < Z < 3)$ $= 1 - P(Z > 2.167) - P(Z > 3)$ $= 1 - 0.01512 - 0.00135$ $= 0.9835$ Number of students between 35 to 66 marks = 0.9835×180 = 177 students (ii) $P(x < m) = 0.05$ $P\left(Z < \frac{m-48}{6}\right) = 0.05$ 1.645 *seen* $\frac{m-48}{6} = -1.645$ $m = 38.13$	K1 N1 N1 P1 K1 N1	3 3	10
10	(a) All values of (x+2) and $\log_{10} y$ correct. *Refer graph paper* Plot $\log_{10} y$ against $(x+2)$ with correct axes, uniform scales and	N1 K1		

$x + 2$	1	2	3	4	5	6
$\log_{10} y$	0.92	1.00	1.08	1.12	1.24	1.32

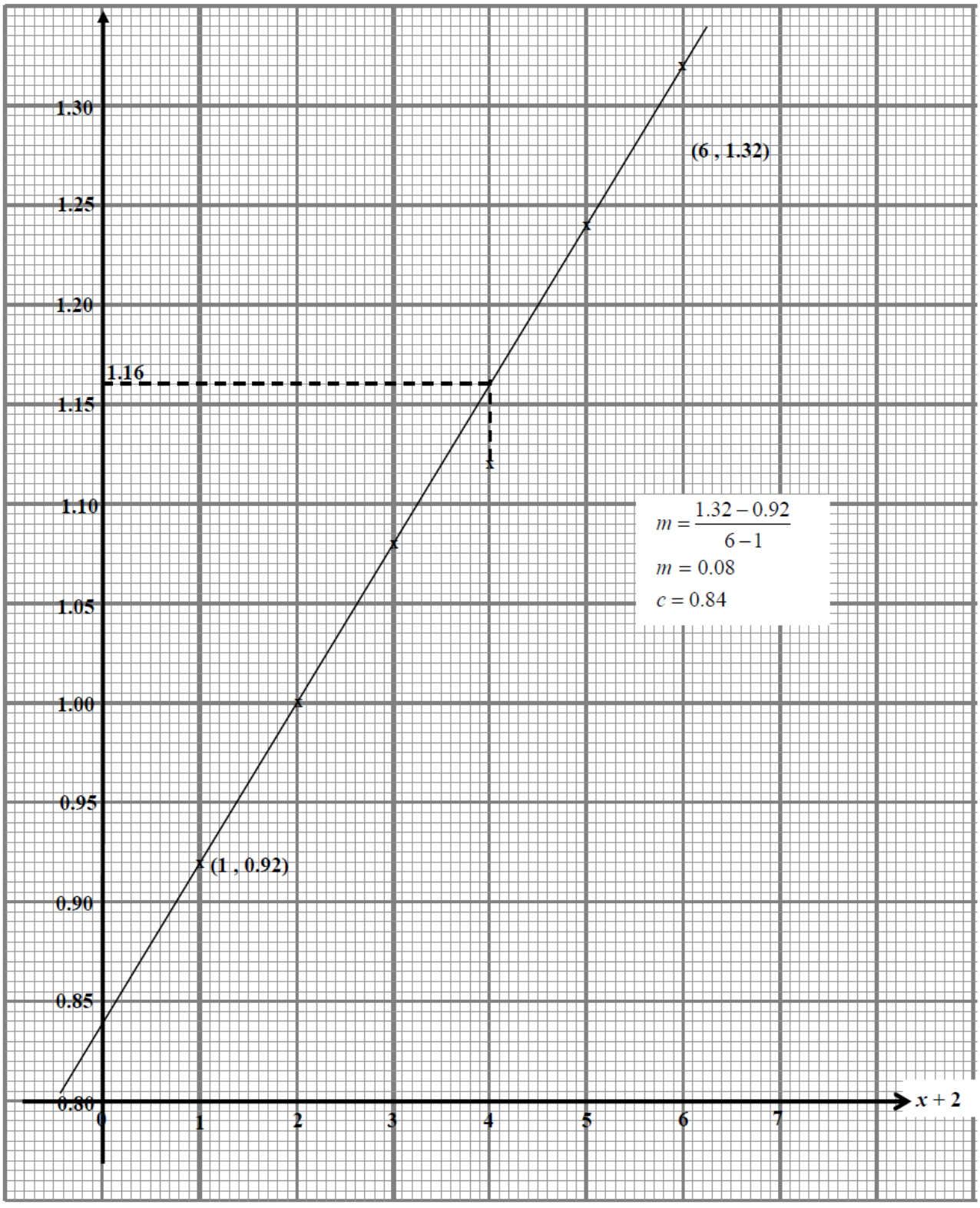
NO	SOLUTIONS	MARKS		
	at least one point. 6 points plotted correctly Line of best fit	N1 N1	4	
	b) (i) 14.45 (*ii*) $\log_{10} y = \log_{10} p(x+2) - \log_{10} q$ *Use* $-\log_{10} q = c$ $\log_{10} q = -0.84$ $q = 0.1445$ *Use* $\log_{10} p = m$ $\log_{10} p = 0.08$ $p = 1.202$	N1 P1 K1 N1 K1 N1	6	10
11	(*a*) $m_{BC} = \frac{1}{2}$, $m_{AX} = -2$ $y - 2 = -2(x-8)$ $y = -2x + 18$	P1 K1 N1	3	
	(b) Solve simultaneously : $y = -2x + 18$ and $2y = x + 10$ $X = (5.2, 7.6)$ $\frac{x+4(2)}{5} = 5.2$ *or* $\frac{y+4(6)}{5} = 7.6$ $C(18, 14)$	K1 N1 K1 N1	4	
	(*c*) *Area of* $\Delta ABC = \frac{1}{2}\left\|(8(6)+2(14)+18(2)) - (2(2)+18(6)+8(14))\right\|$ *Area of trapezium* $= 2\times$ * *Area of* ΔABC $= 112\ unit^2$	K1 K1 N1	3	10

NO	SOLUTIONS	MARKS		
12	$(a)\ x=\frac{20}{8}\times 100$ $=250$	K1 N1	 2	
	$(b)\quad \frac{110(y)+80(2y)+*250(3)+150(2)}{y+2y+3+2}=120$ $y=5$	K1 K1 N1	 3	
	$(c)\ Seen\ :\ A=\frac{110}{100}\times 110 \quad or \quad B=\frac{80}{100}\times 110$ $=121 \qquad =88$ $121*(5)+88*(10)+250(3)+150(2)$ $\bar{I}\ =\ \frac{121*(5)+88*(10)+250(3)+150(2)}{*5+*10+3+2}$ $=126.75$	K1 K1 K1 K1 N1	 5	10
13 (a)(i)	$t=3, v=0 \Rightarrow 27k-6h=0$ $s=\int 3kt^2-2ht\,dt$ $=kt^3-ht^2+c$ $t=0,\ s=0,\quad c=0\Rightarrow s=kt^3-ht^2$ $t=3, s=-1 \quad \Rightarrow -1=27k-9h$ Solve simultaneously: $27k-6h=0,\quad 27k-9h=-1$ $k=\frac{2}{27},\ h=\frac{1}{3}$	K1 K1 K1 K1 N1	 5	
(a)(ii)	$v=\frac{2}{9}t^2-\frac{2}{3}t$ $a=\frac{dv}{dt}=\frac{4}{9}t-\frac{2}{3}=0$ $t=\frac{3}{2}s$	 K1 N1	 2	

NO	SOLUTIONS	MARKS		
	(*b*) $s=\frac{2}{27}t^3-\frac{1}{3}t^2$ $t=6,\ s=4$ $t=0\ and\ t=4.5, s=0$ $t=3,\ \ s=-1$  S = 1+1+4= 6m	P1: Shape K1: Points: (6,4), (3,-1), (0,0) N1	3	10
14	(*a*) $7^2=5^2+6^2-2(5)(6)kos\angle BAE$ $\angle BAE=78.46^o$ / /$78^o28'$	K1 N1	2	
	(*b*) $\frac{\sin\angle ACD}{8}=\frac{\sin^*78.46}{10}$ $\angle ACD=51.61^o$ / / $51^o37'$ $\angle ADC=49.93^o$ / /$49^o56'$	K1 N1 N1	3	\
	(*c*) $AC^2=10^2+8^2-2(10)(8)kos\angle *49.93^o$ *or* $\frac{AC}{\sin^*49.95^o}=\frac{10}{\sin^*78.46^o}$ *or* $\frac{AC}{\sin^*49.93^o}=\frac{8}{\sin^*=51.61^o}$ 7.81	K1 N1	2	
	(*d*) $A_1=Luas\ \Delta\ ACD=\frac{1}{2}\times8\times10\times\text{Sin}^*49.93^o$ *atau* $A_2=Luas\ \Delta\ ABE=\frac{1}{2}\times6\times5\times\text{Sin}^*78.46^o$ $*A_1-*A_2$ 15.91	K1 K1 N1	3	10
15	(*a*) (I) $x+y\le70$ (II) $x\le2y$ (III) $x-\frac{1}{2}y\le25$	NI N1 N1	3	

NO	SOLUTIONS	MARKS		
	(b) Refer to graph paper One *straight line drawn correctly All * straight line drawn correctly Correct region	 K1 N1 N1	 3	
	(c) (i) Maximum (40,30) $K = 2.50x + 1.80y$ Maximum cost = RM 154 $(ii)\ 15 \le y \le 40\ \log_{10} p = m$	N1 K1 N1 N1	4	10

10 (b)


1.30
1.25
1.20
1.16
1.15
1.10
1.05
1.00
0.95
0.90
0.85
0.80
0
1
2
3
4
5
6
7
(6 , 1.32)
(1 , 0.92)
$m = \frac{1.32 - 0.92}{6 - 1}$
$m = 0.08$
$c = 0.84$
$x + 2$

15 (b)

(b)	Satu *garis lurus dilukis betul	K1
	Semua *garis lurus dilukis betul	N1
	Rantau R betul	N1