SEKOLAH BERASRAMA PENUH

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KEMENTERIAN PELAJARAN MALAYSIA

PEPERIKSAAN PERTENGAHAN TAHUN TINGKATAN 5

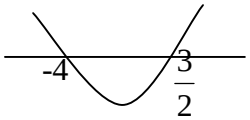
2007

ADDITIONAL MATHEMATICS

Paper 1

MARKING SCHEME

This marking scheme consists of 7 printed pages

Number	Solution and marking scheme	Sub Marks	Full Marks
1	(a) 3, 6 (b) one to many relation	**1** **1**	2
2	(a) $g^{-1}(x) = \frac{x-6}{3}$ $3y + 6 = x$ (b) -5 $g^{-1}(3) = -1$ or $fg^{-1} = \frac{5}{\frac{x-6}{3}}$	**2** B1 2 B1	4
3	$3x^2 - 11x - 4 = 0$ $-\frac{1}{3} + 4 = \frac{11}{3}$ and $\frac{-4}{3}$ or $(3x+1)(x-4)$	**2** B1	2
4	$p > \frac{9}{8}$ $(-1)^2 - 4(2)(p-1) < 0$	**2** B1	2
5	$h = -5$ and $k = -36$ $h = -5$ or $k = -36$ $\frac{-h+1}{2} = 3$ or $\frac{k}{2} = -18$ SOR = $\frac{-h+1}{2}$ or POR = $\frac{k}{2}$	**4** B3 B2 B1	4
6	a) $x = 3$ b) $(3, 10)$	**1** **1**	2
7	$x \le -4, x \ge \frac{3}{2}$ $(2x-3)(x+4) \ge 0$ or  $2x^2 + 5x - 12 \ge 0$	**3** B2 B1	3

Number	Solution and marking scheme	Sub Marks	Full Marks
8	$x = -\frac{7}{2}$ $2x - 2 - 1 = 4x + 4$ $2^{2(x-1)}$ or $2^{4(x+1)}$	**3** B2 B1	3
9	$x = \frac{8}{3}$ $2x + 3 = 5 (x -1)$ $\log_5 5 (x -1)$ or $\log_5 \frac{2x+3}{x-1}$	**3** B2 B1	3
10	$m + \frac{n}{2}$ $2\frac{\log_3 2}{\log_3 9} + \frac{\log_3 5}{\log_3 9}$ $2 \log_9 2 + \log_9 5$ $2 \log_9 2$ or $\frac{\log_3 2}{\log_3 9}$ or $\frac{\log_3 5}{\log_3 9}$	**4** B3 B2 B1	4
11	a) $a = 125$ $d = -20$ (both) $a + 4d = 45$ or $a + 6d = 5$ b) 450 $S6 = \frac{6}{2}[\ 2(125) + 5(-20)]$	**2** B1 2 B1	4
12	a) $r = \frac{1}{4}$ $T_1 = 2$ or $T_2 = \frac{1}{2}$ b) $\frac{8}{3}$ $\frac{2}{1-\frac{1}{4}}$	**2** B1 **2** B1	4

Number	Solution and marking scheme	Sub Marks	Full Marks
13	$y = \frac{5}{x^2} - \frac{7}{x}$	**3**	3
	$xy = \frac{5}{x} - 7$ $m = 5$ or $c = -7$	B2 B1	
	b) $\frac{-23}{16}$	1	1
14	$h = -2t$	**3**	3
	$h = 6k$ or $3k = -t$	B2	
	$h = \frac{3(2k) + 2(2h)}{5}$ or $t = \frac{3k + 2(3t)}{5}$ B 1	B1	
15	$5x^2 + 5y^2 - 52x - 54y + 101 = 0$	**3**	3
	$4[(x+2)^2 + (y-0)^2] = 9[x-2)^2 + (y-3)^2]$	B2	
	$2\sqrt{(x+2)^2 + (y-0)^2}$ **or** $3\sqrt{(x-2)^2 + (y-3)^2}$ **or** $2PR = 3PS$	B1	
16	$\vec{OP} = \frac{1}{2}\underline{a} + \frac{1}{2}\underline{b}$	**2**	2
	$2(\boldsymbol{OP} - OA)$ or $(\boldsymbol{OB} - \boldsymbol{OA})$ or $-a + b$	B1	
17	$n = 1$ and $m = \frac{3}{4}$	**4**	4
	$n = 1$ or $m = \frac{3}{4}$		
	$3m - 8n = 1$ and $2 + m = 5n$ $3m - 8n = 1$ o r $2 + m = 5n$	B3 B2	
	$\vec{OR} = \begin{pmatrix} -1 \\ 2 \end{pmatrix}$ or $\vec{OS} = \begin{pmatrix} 3 \\ 1 \end{pmatrix}$ or $\vec{OT} = \begin{pmatrix} 8 \\ 5 \end{pmatrix}$	B1	
18	a) 8 b) 12 c) $x = 2$	**1** **1** **2**	4
	$\frac{0(7) + 9(1) + 2(3) + 3x}{19 + x} = 1$	B1	

Number	Solution and marking scheme	Sub Marks	Full Marks
19	a) $\theta = 2$ $\frac{1}{2}(2.5)^2\theta = 6.25$ 10 $S_{AB} = 2.5\ (2)$	**2** B1 **2** B1	4
20	0^o , 120^o , 240^o , 360^o $x = 120^o$, 240^o or 0^o , 360^o $(2\cos 2x + 1)(\cos x - 1) = 0$ $2\cos 2x - \cos x - 1 = 0$	**4** B3 B2 B1	4
21	a) p b) $\sin 2A = 2p\sqrt{1-p^2}$ $\cos A = \sqrt{1-p^2}$	**1** **2** B1	3
22	$t = \frac{5}{2}$ $2t - 3 = 2$ $2y = -x + \frac{25}{2}$ $m_2 = -\frac{1}{2}$	**2** B1 **2** B1	4
23	- 6 $[\ 4(2) - 10\ ] \times 3$ $\frac{dy}{dx} = 4x - 10$	**3** B2 B1	3
24	$k = -4$ $k^2 + 3k - 4 = 0$ $x^2 + 3x$	**3** B2 B1	3
25	$\frac{3}{2}$ $\frac{1}{4}[4 - (-2)]$ $\frac{1}{4}[\frac{3x+1}{x^2}]$ o r $\frac{1}{4}y$ or $\frac{x^2(3) - (3x+1)(2x)}{(x^2)^2}$	**3** B2 B1	3

END OF MARKING SCHEME

SULIT
3472/1
Additional Mathematics
Paper 2
Mei
2007

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KEMENTERIAN PELAJARAN MALAYSIA

PEPERIKSAAN PERTENGAHAN TAHUN
TINGKATAN 5

2007

ADDITIONAL MATHEMATICS

Paper 2

MARKING SCHEME

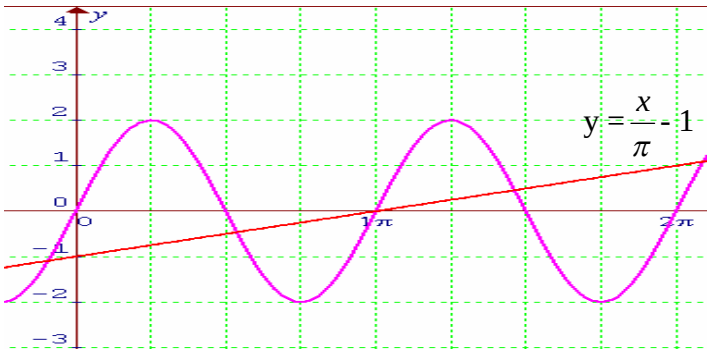
This marking scheme consists of 9 printed pages

SKEMA PERMARKAHAN MATEMATIK TAMBAHAN KERTAS 2
PEPERIKSAAN PERTENGAHAN TAHUN TINGKATAN 5, 2007

Number	Solution and marking scheme	Sub Marks	Full Marks
1	$y = 5 - 2x$ **OR** $x = \frac{5-y}{2}$ $x^2 + (5-2x)^2 = 10$ **OR** $\left(\frac{5-y}{2}\right)^2 + y^2 = 10$ $(x-3)(x-1) = 0$ **OR** $(y-3)(y+1) = 0$ $x = 3, 1$ $\quad y = 3, -1$ $y = -1, 3$ $\quad x = 1, 3$	P1 K1 K1 N1 N1	**5**
2(a)	$\frac{p}{3-8} = -1$ **OR** $p(-1) - q = -4$ $p = 5$ $q = -1$	K1 N1 N1 ***3***	
(b)	$gf(x) = 5\left(\frac{5}{3-4x}\right) + 1$ $\frac{28-4x}{3-4x}, x \neq \frac{3}{4}$	K1 N1 ***2***	
(c)	$\frac{28-4k}{3-4k} = 3$ $k = -\frac{19}{8}$	K1 N1 ***2***	**7**
3(a)	$\frac{dy}{dx} = 2x - 6$ $2x - 6 = 0$ $x = 3$ $(3, -9)$	K1 K1 N1 ***3***	
(b)	$\frac{dy^2}{dx^2} = 2$ $(x^2 - 6x)(2) + x(2x-6) + 8 = 0$ $4x^2 - 18x + 8 = 0$ $(2x-1)(x-4) = 0$ $x = \frac{1}{2}, x = 4$	P1 K1 K1 N1 ***4***	**7**

Number	Solution and marking scheme	Sub Marks	Full Marks
4(a)	$\frac{6-3}{k+2}\times\frac{3+2}{-2-3}=-1$ $\frac{3}{k+2}\times\frac{5}{-5}=-1$ $k=1$	K1 N1 ***2***	
(b)	$\frac{1}{2}\begin{vmatrix}1 & -2 & 3 & 1\\ 6 & 3 & -2 & 6\end{vmatrix}$ $\frac{1}{2}\left\|(3+4+18)-(-12+9-2)\right\|$ $\frac{1}{2}\|30\|$ 15	 K1 N1 ***2***	
(c)	$\frac{y+2}{x-3}=1$ $y=x-5$ $S(5,0)$	K1 N1 N1 ***3***	**7**
5(a)	Histogram refer to the graph All frequencies and label for x-axis correct for at least 3 bars including the modal class Correct Histogram Method correct Mode= 18.5	 N1 N1 K1 N1 ***4***	
(b)	L=15.5 Or F=7 Or $fm=18$ Median = $15.5+\left[\frac{\frac{1}{2}(48)-7}{18}\right]5$ = 20.222	P1 K1 N1 ***3***	**7**
6(a)	$\tan 28^o 39' = \frac{10}{AC}$ $AC=18.3033(18.30\rightarrow 18.31)$	K1 N1 ***2***	
(b)	$\theta=1.071$ $L_1=\frac{1}{2}(10)^2(1.071)$ $L_2=\frac{1}{2}(10)(18.3033)$ $L=L_2-L_1$ = $37.9665(37.97\rightarrow 37.99)$	P1 K1 K1 K1 N1 ***5***	**7**
7	Refer to the graph		**10**

Number	Solution and marking scheme	Sub Marks	Full Marks
8(a)	i. $T_{36} = 200 + (35)5$ =375 workers	K1 N1	
	ii. $a = 6000$ and $d = 150$	P1	
	$S_{36} = \frac{36}{2}[2(6000) + 35(150)]$	K1	
	= RM 310500.00	N1 ***5***	
(b)	i. $\frac{a(1-r^3)}{1-r} = 0.875\left(\frac{a}{1-r}\right)$	K1	
	$r = \sqrt[3]{0.125}$ solve for r	K1	
	$r = 0.5$	N1	
	ii. $\frac{a(1-0.5^3)}{1-0.5} = 350$	K1	
	$a = 200$	N1 ***5***	**10**
9(a)	$\overrightarrow{PQ} = \overrightarrow{PO} + \overrightarrow{OQ}$ or $\overrightarrow{MN} = \overrightarrow{MO} + \overrightarrow{ON}$ $= -3\underline{a} + 4\underline{b}$ $= -2\underline{a} + 2\underline{b}$	K1 N1 N1	***3***
(b)	$\overrightarrow{OY} = \overrightarrow{OP} + \overrightarrow{PY}$ $\overrightarrow{OY} = \overrightarrow{OP} + h\overrightarrow{PQ}$	K1	
	$= 3(1-h)\underline{a} + 4h\underline{b}$	N1	***2***
(c)	$\overrightarrow{OX} = \overrightarrow{ON} + \overrightarrow{NX}$ $= \underline{b} + \underline{a}$	K1	
	$\overrightarrow{OY} = k\overrightarrow{OX}$ $= k(\underline{a} + \underline{b})$	N1	***2***
(d)	3-3h =k and 4h = k	K1	
	3 – 3h = 4h	K1	
	$h = \frac{3}{7}$ and $k = \frac{12}{7}$	N1	***3*** **10**

Number	Solution and marking scheme	Sub Marks	Full Marks
10(a)	a) $\tan x + \cot x$ $= \frac{\sin x}{\cos x} + \frac{\cos x}{\sin x}$ $= \frac{\sin^2 x + \cos^2 x}{\sin x \cos x}$ $= \frac{1}{\sin x \cos x}$ $\frac{1}{\sin x \cos x} = 2$ $2\sin x \cos x = 1$ $\sin 2x = 1$ $2x = 90^o, 450^o$ $x = 45^o, 225^o$	K1 } } N1 K1 N1 ***4***	
(b)	 sine curve 2 period of 2π maximum = 2 and minimum = -2 equation of straight line: y = $\frac{x}{\pi} - 1$ or $\frac{x-\pi}{\pi}$ the straight line graph number of solutions = 3	P1 P1 P1 N1 K1 N1 ***6***	**10**

Number	Solution and marking scheme	Sub Marks	Full Marks
11(a)	$16 = x^2$ Area or rectangle =32 cm Area= $\int_{-4}^{-2} x^2 dx = \left[\frac{x3}{3}\right]_{-4}^{-2}$ Area of the shaded region $= 32 - \left[\frac{x^3}{3}\right]_{-4}^{-2}$ $= 32 - \left[\frac{-8}{3} + \frac{64}{3}\right]$ $= \frac{40}{3}$	K1 K1 (Find area of rectangle) K1 (Integrate to find L_2) K1 (L_1 - L_2) K1 (Use limit) N1 ***6***	
	OR $x^2 = 16$ Area = $\int_{-4}^{-2}(16 - x^2)dx$ $= \left[16x - \frac{x^3}{3}\right]_{-4}^{-2}$ $= \left(-32 + \frac{8}{3}\right) - \left(-64 + \frac{64}{3}\right)$ $= \frac{40}{3}$	K1 K1 (Area of rectangle) K1 ($L_1 - L_2$) K1 (Integrate) K1 (Use limits) N1	
(b)	$V = \pi\left[\frac{x^2}{2} + x\right]_2^p = 20\pi$ $\left(\frac{p^2}{2} + p\right) - (2+2) = 20$ $(p-6)(p+8) = 0$ $\therefore p = 6$	K1 K1 K1 N1 ***4***	**10**

Number	Solution and marking scheme	Sub Marks	Full Marks
12(a)	$AC^2 = 8^2 + (3.5)^2 - 2(8)(3.5)\cos 40^\circ$ $AC = 5.775$ $AD = 5.775$	K1 N1 N1 ***3***	
(b)	$\frac{8}{\sin C} = \frac{5.775}{\sin 40^\circ}$ $\angle C = 62.92^\circ$ // $\angle C = 62.93^\circ$ $\angle ACB = 180 - 62.92^\circ$ // $180^\circ - 62.93^\circ$ $\angle ACB = 117.07^\circ$ // 117.08°	K1 N1 K1 N1 ***4***	
(c)	$\angle A = 77.08^\circ$ Area of triangle = $\frac{1}{2}(8)(5.775)\sin 77.08^\circ$ $= 22.5152$ // 22.5143	P1 K1 N1 ***3***	**10**
13(a)	a) $\frac{18}{p} \times 100 = 120$ $p = 15$ $q = 40$ $r = \frac{33}{30} \times 100 = 110$	K1 N1 N1 N1 ***4***	
(b)	$\frac{140m + 240 + 750 + {}^{*}(110)5}{13 + m}$ $\frac{140m + 240 + 750 + {}^{*}(110)5}{13 + m} = 123.53$ $m = 4$ // 4.0006	P1 K1 N1 ***3***	
(c)	$\frac{Q_{2005}}{425} \times 100$ $\frac{Q_{2005}}{425} \times 100 = 123.53$ $Q_{2005} = RM525.00$	K1 K1 N1 ***3***	**10**

x	1	2	3	4	5	6
$\frac{y}{x}$	3.8	5.6	6.83	8.3	10.2	11.8

N1

$\frac{y}{x} = kx + p$ P1

p = y – intercept = 2.2 N1

k = gradient

$k = \frac{11.8 - 3.8}{6 - 1}$ K1

$= 1.6$ N1

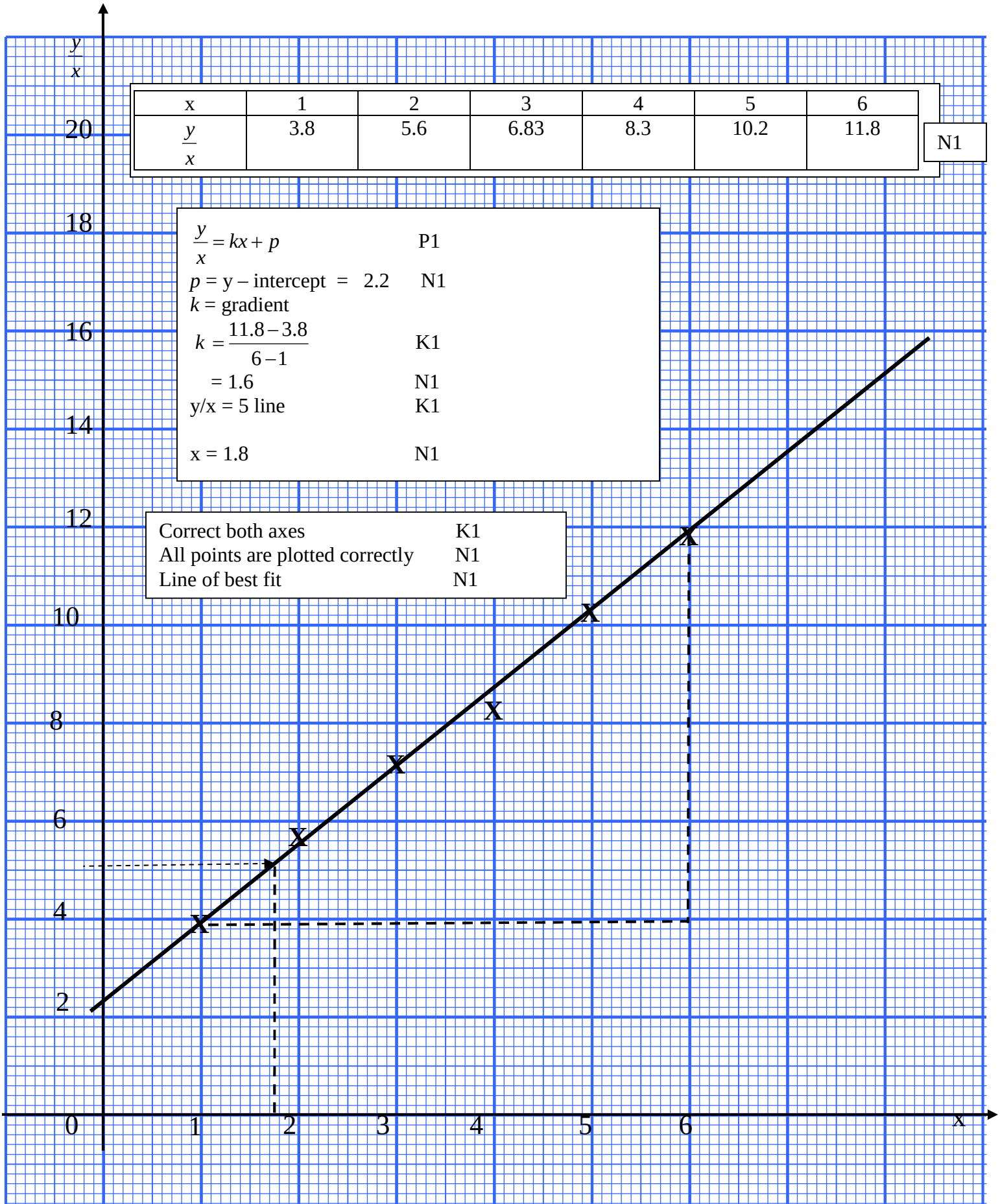
y/x = 5 line K1

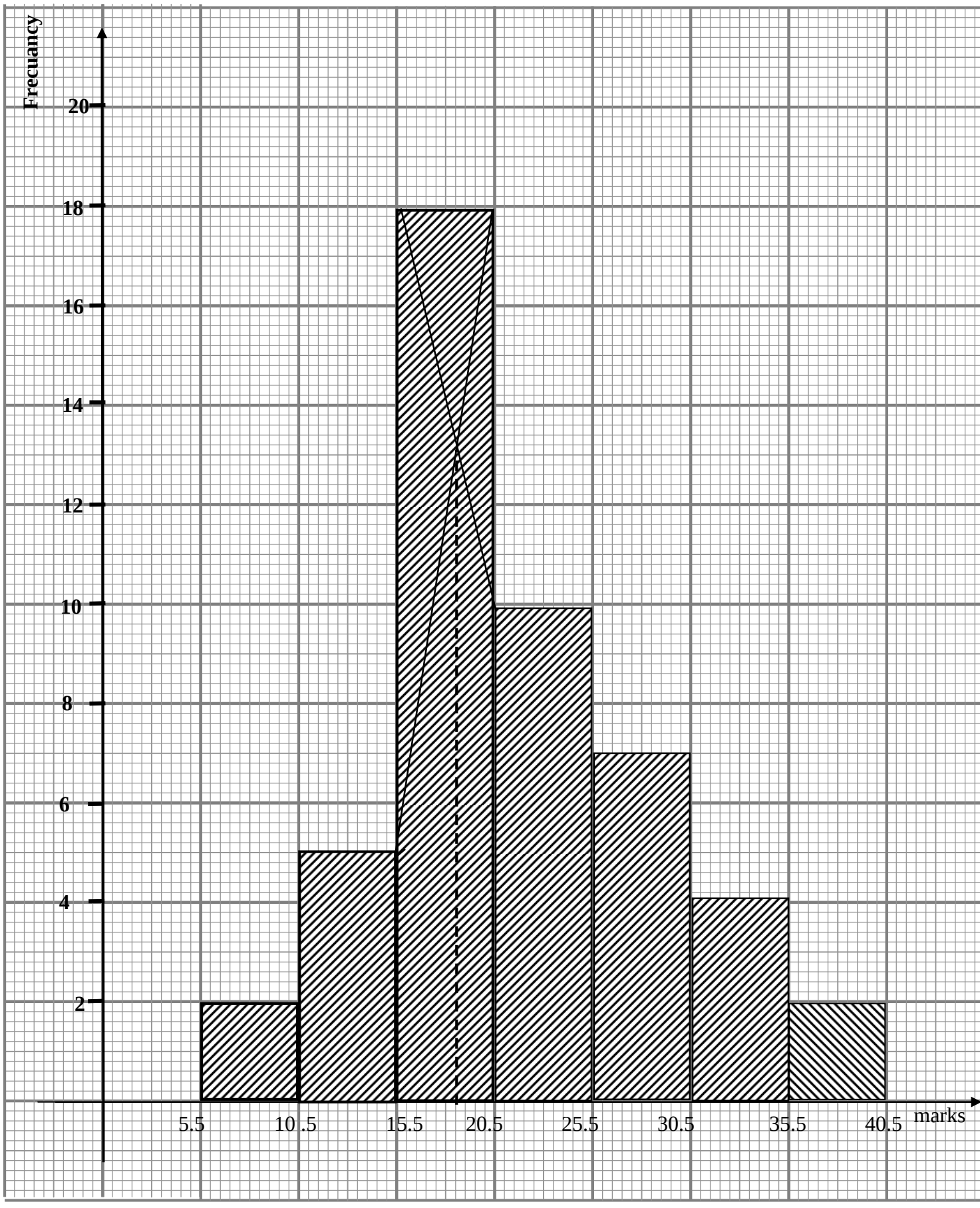
x = 1.8 N1

Correct both axes K1

All points are plotted correctly N1

Line of best fit N1




Frecuancy
20
18
16
14
12
10
8
6
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2
5.5
10 .5
15.5
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25.5
30.5
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marks