

SULIT
3472/2
Additional Mathematics
Kertas 2
Ogos
2019



**KEMENTERIAN
PENDIDIKAN
MALAYSIA**

**BAHAGIAN PENGURUSAN SEKOLAH BERASRAMA PENUH
DAN SEKOLAH KECEMERLANGAN**

**PENTAKSIRAN DIAGNOSTIK AKADEMIK SBP 2019
PERCUBAAN SIJIL PELAJARAN MALAYSIA**

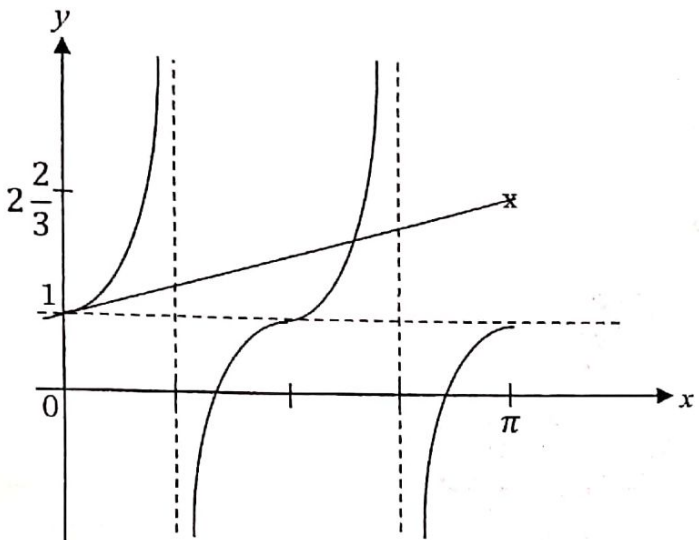
ADDITIONAL MATHEMATICS

Kertas 2

PERATURAN PEMARKAHAN

Peraturan pemarkahan ini mengandungi 11 halaman bercetak

Number	Solution and Marking Scheme	Sub Marks
1	$q = p - 1$ $(p - 2)^2 + q^2 = 5^2$ $(p - 2)^2 + (p - 1)^2 = 5^2$ $p^2 - 3p - 10 = 0$ $(p - 5)(p + 2) = 0$ $p = 5, \quad p = -2$ $q = 4, \quad q = -3$	P1 P1 K1 K1 N1 N1
2	<p>(a)</p> $m_n = \frac{1}{7} \text{ and } m_t = -7$ $3(1)^2 - p(1) = -7$ $p = 10$ <p>(b)</p> $3x^2 - 10x = 0$ $\frac{d^2y}{dx^2} = 6x - 10$ $\frac{d^2y}{dx^2} = 6(0) - 10 = -10 \text{ or } \frac{d^2y}{dx^2} = 6\left(\frac{10}{3}\right) - 10 = 10$ $\text{Maximum, } x = 0$	K1 K1 N1 K1 K1 K1 N1
3	$27^q = 3^{3q}$ $\frac{\log_2(12q - 2p)}{\log_2 4} = 1$ $\log_2\left(\frac{36}{12q - 2p}\right) = 2$ $p = -3q \text{ or } 12q - 2p = 9$ $12q - 2(-3q) = 9$ $a = \frac{1}{3} \text{ and } p = -\frac{3}{2}$	K1 K1 K1 K1 K1

Number	Solution and Marking Scheme	Sub Marks	Full Marks
4	<p>(a)</p> $\frac{\sin 2x}{\cos 2x}$ $\tan 2x$ <p>(b)</p>  <p>$y = \frac{5x}{3\pi} + 1$</p> <p>Straight line</p> <p>Number of solutions = 2</p>	<p>K1</p> <p>N1</p> <p>P1 shape</p> <p>P1 cycle</p> <p>P1 shifted</p> <p>N1</p> <p>K1</p> <p>N1</p>	<p>8</p>
5	<p>(a) $AE = \frac{1}{2}(AD + DC)$ or $CB = CA + AB$</p> <p>(i) $AE = \frac{3}{2}y + 2x$</p> <p>(ii) $CB = 2x - 3y$</p> <p>(b)</p> <p>Area of triangle ACF = 2(12)</p> <p style="padding-left: 100px;">= 24</p> <p>$\frac{1}{2}(h)(12) = 36$ or equivalent</p> <p>Shortest distance, $h = 6$</p>	<p>K1</p> <p>N1</p> <p>N1</p> <p>N1</p> <p>K1</p> <p>N1</p>	<p>6</p>

Number	Solution and Marking Scheme	Marks	Ma
	<p>(c)</p> $\sqrt{65}$ $\sqrt{(x - (-8))^2 + (y - 1)^2} = \sqrt{65}$ $x^2 + y^2 + 16x - 2y = 0$ <p>OR</p> $\left(\frac{y - (-6)}{x - (-12)}\right) \text{ or } \left(\frac{y - 8}{x - (-4)}\right)$ $\left(\frac{y - (-6)}{x - (-12)}\right) \left(\frac{y - 8}{x - (-4)}\right) = -1$ $x^2 + y^2 + 16x - 2y = 0$	<p>P1</p> <p>K1</p> <p>N1</p> <p>P1</p> <p>K1</p> <p>N1</p>	<p>10</p>
<p>9</p>	<p>(a)</p> $\text{Diameter} = \sqrt{x^2 + 6^2}$ $\text{Radius of the pool} = \frac{\sqrt{x^2 + 36}}{2}$ $2\pi \left(\frac{\sqrt{x^2 + 36}}{2}\right) = 10\pi$ $x = 8$ <p>(b)</p> <p>(i)</p> $135 \times \frac{\pi}{180^\circ} = \frac{3}{4}\pi$ $\text{Area of sector } A = \frac{1}{2} \left(\frac{2}{3}(5)\right)^2 \left(\frac{3}{4}\pi\right)$ $= 13.09$ <p>(ii)</p> $\frac{2}{3}(5) \left(\frac{3}{4}\pi\right)$ $\frac{2}{3}(5) \left(\frac{3}{4}\pi\right) + 8 + 6 + 6 + \left(8 - \frac{2}{3}(5)\right) + \frac{2}{3}(5)$ 35.855	<p>K1</p> <p>N1</p> <p>K1</p> <p>N1</p> <p>K1</p> <p>K1</p> <p>N1</p> <p>K1</p> <p>N1</p>	<p>10</p>

Number	Solution and Marking Scheme	Sub Marks	Full Marks
10	<p>(a) (i) ${}^8C_6(0.4)^6(0.6)^2$</p> <p>0.04129</p> <p>(ii) $\sqrt{30(0.4)(0.6)}$</p> <p>2.683</p> <p>(b) (i) $z = \frac{400-300}{50}$</p> <p>$1 - P(z > 2)$</p> <p>0.9772</p> <p>(ii) $z = -0.38$</p> <p>$\frac{h-300}{50} = -0.38$</p> <p>$h = 281$</p>	<p>K1</p> <p>N1</p> <p>K1</p> <p>N1</p> <p>K1</p> <p>K1</p> <p>N1</p> <p>P1</p> <p>K1</p> <p>N1</p>	10
11	<p>(a)</p> <p>$3y^2 + 2 = \frac{25 - 5y}{4}$</p> <p>$12y^2 + 8 = 25 - 5y$</p> <p>$(y - 1)(12y + 17) = 0$</p> <p>$y = 1, y = -\frac{17}{12}$</p> <p>$Q(5,1)$</p> <p>(b)</p> <p>$Area = \int_0^1 3y^2 + 2 dy$ OR</p> <p>$= \left[\frac{3y^3}{3} + 2y \right]_0^1$</p> <p>$= [y^3 + 2y]_0^1$</p> <p>$= [1^3 + 2(1)] - 0$</p> <p>$= 3 \text{ unit}^2$</p>	<p>$Area = \int_2^5 \left(\frac{x-2}{3} \right)^{\frac{1}{2}} dx$</p> <p>$= \left[\left(\frac{x-2}{3} \right)^{\frac{3}{2}} \times 2 \right]_2^5$</p> <p>$= 5(1) - \left[\left(\frac{5-2}{3} \right)^{\frac{3}{2}} \times 2 - \left[\left(\frac{2-2}{3} \right)^{\frac{3}{2}} \times 2 \right] \right]$</p> <p>$= 3 \text{ unit}^2$</p>	<p>K1</p> <p>N1</p> <p>N1</p> <p>K1</p> <p>K1</p> <p>N1</p>

(c)

$$\pi \int_2^5 y^2 dx = \int_2^5 \frac{x}{3} - \frac{2}{3} dx$$

$$\pi(1)^2(5) \quad \text{or} \quad \pi \left[\left(\frac{5^2}{6} - \frac{2(5)}{3} \right) - \left(\frac{2^2}{6} - \frac{2(2)}{3} \right) \right]$$

$$\pi(1)^2(5) - \pi \left[\left(\frac{5^2}{6} - \frac{2(5)}{3} \right) - \left(\frac{2^2}{6} - \frac{2(2)}{3} \right) \right]$$

$$\frac{7}{2}\pi$$

K1

K1

K1

N1

10

12

(a)

$$\frac{RM13.50}{P_{16}} \times 100 = 116$$

$$P_{16} = RM11.64$$

K1

N1

(b)

$$\frac{180(5) + 116(4) + p(2) + 125(1)}{5 + 4 + 2 + 1} = 146$$

$$p = 131.5$$

K1K1

N1

(c)

$$\text{see } I_R = 198 \text{ or } I_S = 110.2$$

$$\bar{I} = \frac{198(5) + 110.2(4) + 131.5(2) + 125(1)}{5 + 4 + 2 + 1}$$

$$= 151.57$$

P1

K1

N1

(d)

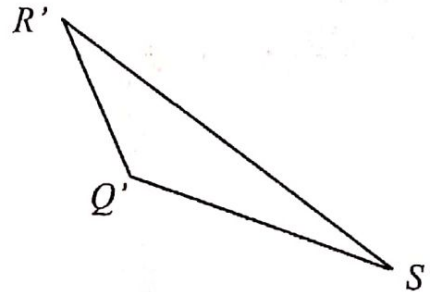
$$\frac{P_{19}}{RM18} \times 100 = 151.57$$

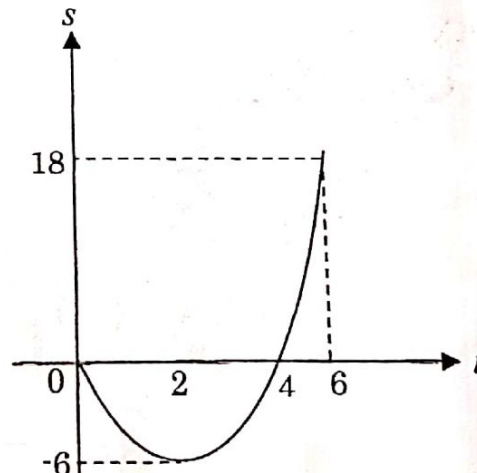
$$P_{19} = RM27.28$$

K1

N1

1

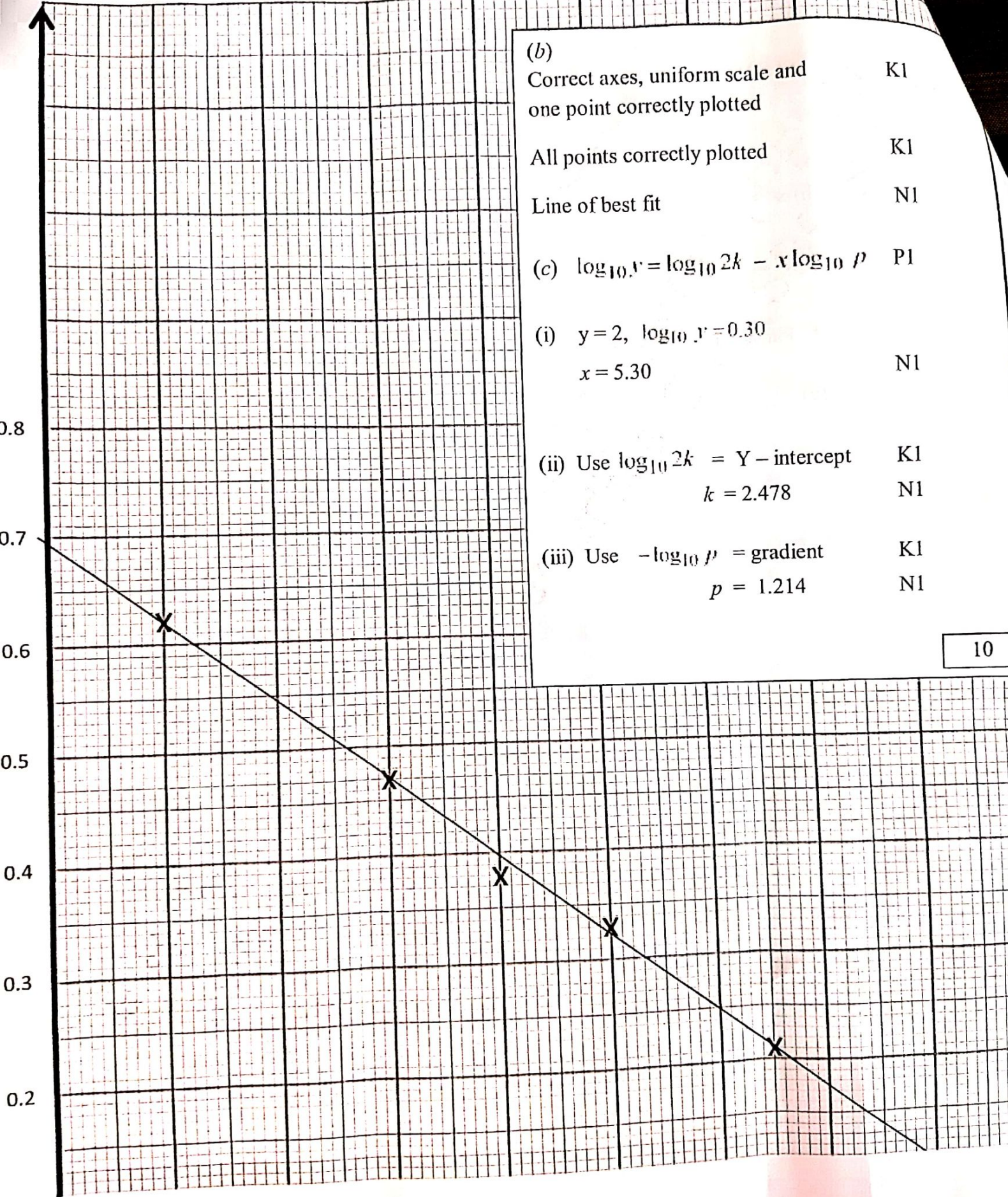
Number	Solution and Marking Scheme	Sub Marks	M
13	<p>(a)(i) $8.3^2 = 5.1^2 + 11.9^2 - 2(5.1)(11.9)\cos\angle SQR$</p> <p>$\angle SQR = 35.57^\circ$</p> <p>(ii) $\angle PQS = 79.43^\circ$</p> $\frac{PS}{\sin 79.43^\circ} = \frac{11.9}{\sin 65^\circ}$ <p>$PS = 12.91\text{cm}$</p> <p>(iii) $\frac{1}{2}(5.1)(11.9)\sin 35.57^\circ$ or $\frac{1}{2}(11.9)(12.91)\sin 35.57^\circ$</p> $\frac{1}{2}(5.1)(11.9)\sin 35.57^\circ + \frac{1}{2}(11.9)(12.91)\sin 35.57^\circ$ <p>62.33 cm^2</p>	<p>K1</p> <p>N1</p> <p>P1</p> <p>K1</p> <p>N1</p> <p>K1</p> <p>K1</p> <p>N1</p>	
	<p>(b)(i)</p> 	<p>N1</p>	
	<p>(ii) $\angle SQ'R = 144.43^\circ$</p>	<p>N1</p>	10

Number	Solution and Marking Scheme	Sub Marks	Full Marks
14	<p>(a) (i) 3</p> <p>(ii) $3t - 6 < 0$</p> <p>$0 \leq t < 2$</p> <p>(b) $s = \frac{3t^2}{2} - 6t$</p> <p>$s = \frac{3(2)^2}{2} - 6(2)$ or $s = -6m$</p> <p>Particle P does not reach point Y.</p> <p>(c)</p>  <p>Shape of graph or (6, 18) and (2, -6)</p> <p>All correct</p> <p>Total distance = $2 6 + 18$ = 30</p>	<p>N1</p> <p>K1</p> <p>N1</p> <p>K1</p> <p>K1</p> <p>N1</p> <p>N1</p> <p>N1</p> <p>K1</p> <p>N1</p>	<p></p> <p></p> <p></p> <p></p> <p></p> <p></p> <p></p> <p></p> <p></p> <p>10</p>
15	Refer to graph paper		1

x						
$\log_{10} y$	0.62	0.47	0.38	0.33	0.21	0.10

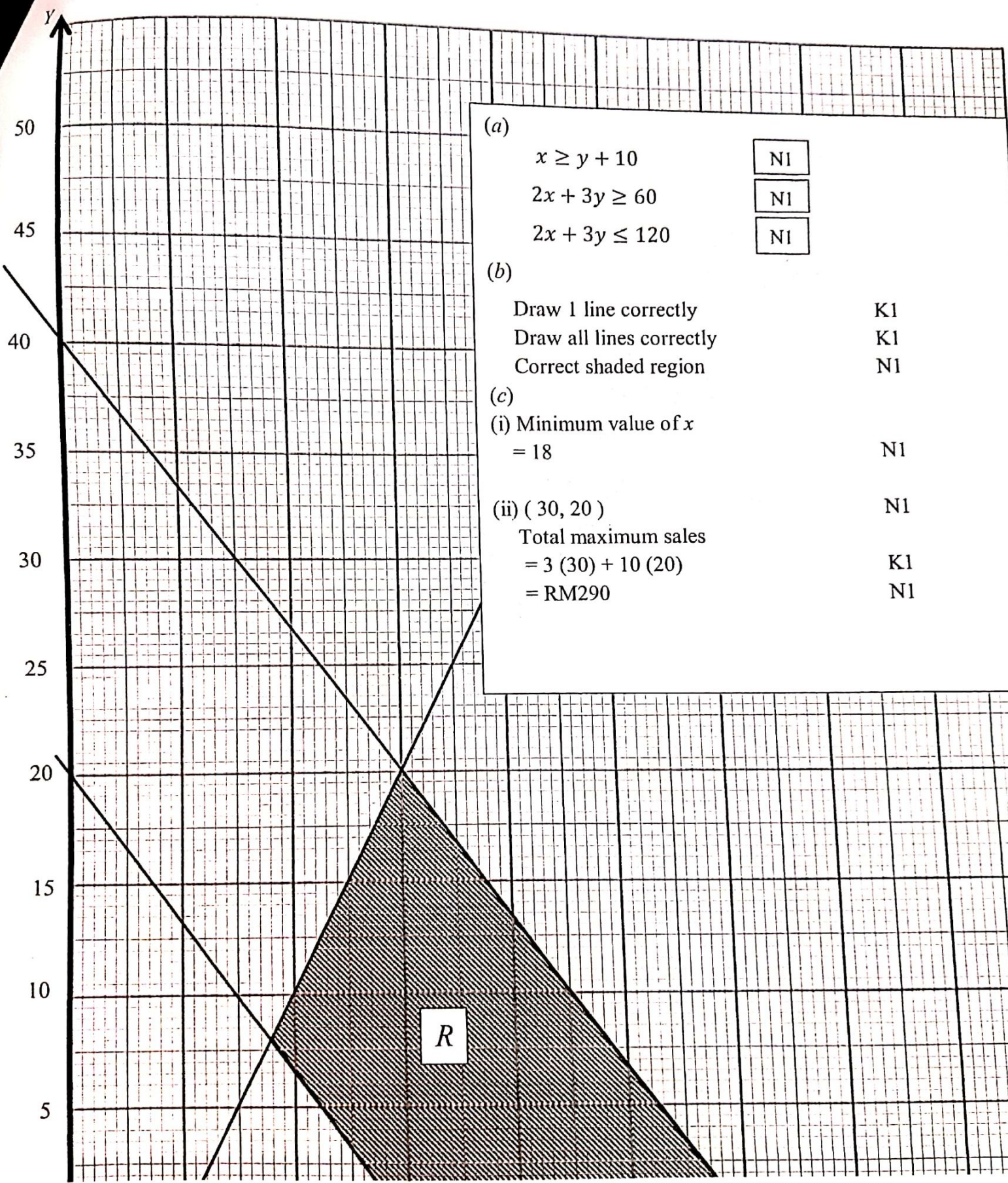
N1

$\log_{10} y$



- (b) Correct axes, uniform scale and one point correctly plotted K1
 All points correctly plotted K1
 Line of best fit N1
- (c) $\log_{10} y = \log_{10} 2k - x \log_{10} p$ P1
- (i) $y = 2, \log_{10} y = 0.30$
 $x = 5.30$ N1
- (ii) Use $\log_{10} 2k = Y - \text{intercept}$ K1
 $k = 2.478$ N1
- (iii) Use $-\log_{10} p = \text{gradient}$ K1
 $p = 1.214$ N1

QUESTION 15



- (a)
- | | |
|--------------------|-----------------------------|
| $x \geq y + 10$ | <input type="checkbox"/> N1 |
| $2x + 3y \geq 60$ | <input type="checkbox"/> N1 |
| $2x + 3y \leq 120$ | <input type="checkbox"/> N1 |
- (b)
- | | |
|--------------------------|----|
| Draw 1 line correctly | K1 |
| Draw all lines correctly | K1 |
| Correct shaded region | N1 |
- (c)
- (i) Minimum value of x
= 18 N1
- (ii) (30, 20) N1
 Total maximum sales
 = 3 (30) + 10 (20) K1
 = RM290 N1