

3472/2(PP)
ADDITIONAL
MATHEMATICS
Paper 2
Okt 2020
2 ½ hours

PEPERIKSAAN PERCUBAAN SPM TAHUN 2020

ADDITIONAL MATHEMATICS

PERATURAN PEMARKAHAN

Kertas 2

Question	Working	Marks
1 (a)	$\overline{AC} = \overline{AB} + \overline{BC}$ $10\tilde{x} + 4\tilde{y}$	K1 N1 N1
(b) (i)	$8\tilde{x} + k\tilde{y}$	
(ii)	$\overline{AC} = \lambda \overline{AF}$ $10 = 8\lambda$ or $4 = \lambda k$ $\lambda = \frac{5}{4}$ $4 = \frac{5}{4}k$ $k = \frac{16}{5}$	P1 K1 N1
2 (a)	$L_{Q_1} = 5.5$ or $F_{Q_1} = 2$ or $f_{Q_1} = 9$ $L_{Q_3} = 20.5$ or $F_{Q_3} = 29$ or $f_{Q_3} = 8$ $Q_1 = 5.5 + \left(\frac{\frac{1}{4}(40) - 2}{9} \right) (5)$ or $Q_3 = 20.5 + \left(\frac{\frac{3}{4}(40) - 29}{8} \right) (5)$ $20.5 + \left(\frac{\frac{3}{4}(40) - 29}{8} \right) (5) - 5.5 + \left(\frac{\frac{1}{4}(40) - 2}{9} \right) (5)$	P1 K1 K1
(b)	11.18 11	N1 N1
3 (a)	$\frac{dy}{dx} = a - 2bx^{-3}$ $a = 2$ and $-2b = 16$ $b = -8$	K1 K1 N1
(b)	$2 + \frac{16}{x^3} = 0$ $(-2, 0)$ $\frac{d^2y}{dx^2} = -\frac{48}{x^4}$ $\frac{d^2y}{dx^2} = -3, < 0$ maximum point	K1 N1 K1 N1

4(a)	$T_1 = 9$ or $T_n = 21$ $9 + (n-1)(3) = 21$ $n = 5$ Tinggi = 35 cm	P1 K1 N1 N1
(b)	$T_2 = 24\pi$ or $T_3 = 30\pi$ $a = 18\pi$ $d = 6\pi$ $S_5 = \frac{5}{2}[2(18\pi) + 4(6\pi)]$ $150\pi // 471.3$	P1 K1 K1 N1
5	$10x + 10x + y + y = 160$ $10x(x) + 2(x)(y + x) = 600$ $y = 80 - 10x$ or $x = \frac{80 - y}{10}$ $6x^2 + x(80 - 10x) = 300$ $6\left(\frac{80 - y}{10}\right)^2 + y\left(\frac{80 - y}{10}\right) = 300$ $x^2 - 20x + 75 = 0$ $y^2 + 40y + 2100 = 0$ $(x - 15)(x - 5) = 0$ $(y + 70)(y - 30) = 0$ $x = 5$ and $y = 30$ $y = 30$ and $x = 5$ Panjang = 30 m , Lebar = 10 m	P1 P1 P1 K1 K1 N1 N1
6 (a)	$\angle AOC = 2.095$ rad $\cap ACB = 80(2.095)$ 167.57	P1 K1 N1
(b)	$\pi(80)^2$ or $\frac{1}{2}(80)^2 \sin 120^\circ$ $\frac{1}{2}(80)^2 (2.095)$ $\pi(80)^2 - \left[\frac{1}{2}(80)^2 (2.095) - \frac{1}{2}(80)^2 (\sin 120^\circ) \right]$ 16176	K1 K1 K1 N1

7(a)	<table border="1"> <tbody> <tr> <td>$\log_{10}(x+1)$</td> <td>0.18</td> <td>0.30</td> <td>0.48</td> <td>0.60</td> <td>0.70</td> <td>0.78</td> </tr> <tr> <td>$\log_{10} y$</td> <td>0.97</td> <td>0.66</td> <td>0.19</td> <td>-0.12</td> <td>-0.38</td> <td>-0.60</td> </tr> </tbody> </table>	$\log_{10}(x+1)$	0.18	0.30	0.48	0.60	0.70	0.78	$\log_{10} y$	0.97	0.66	0.19	-0.12	-0.38	-0.60	N1
$\log_{10}(x+1)$	0.18	0.30	0.48	0.60	0.70	0.78										
$\log_{10} y$	0.97	0.66	0.19	-0.12	-0.38	-0.60										
(b)	<p>One point plotted correctly with correct scale</p> <p>All 6 points plotted correctly</p> <p>Line of best fit</p>	K1 K1 N1														
(c)	<p>$\log_{10} y = \log_{10} p - k \log_{10}(x+1)$</p> <p>i) $-k =$ * gradient</p> <p>$k =$ * 2.617</p> <p>ii) $\log_{10} p =$ * y - intercept</p> <p>$p =$ * 27.54</p> <p>iii) $y =$ 3.02</p>	P1 K1 N1 K1 N1 N1														
8(a) (i)	$m_{RQ} = \frac{2}{3}$ and $m_{PQ} = -\frac{3}{2}$	K1														
	$y = -\frac{3}{2}x + 2$	N1														
(ii)	<p>Solve $y = -\frac{3}{2}x + 2$ and $3y - 2x - 19 = 0$</p> <p>Q(-2,5)</p>	K1 N1														
(b) (i)	$\frac{0(n-m) + (-5)(m)}{n} = -2 \quad \text{or} \quad \frac{2(n-m) + \left(\frac{19}{2}\right)(m)}{n} = 5$ <p>$m : n = 2 : 5$</p>	K1 N1														
(ii)	$\frac{1}{2} \left[(0)(3) + (-5)\left(\frac{19}{2}\right) + (-5)(2) \right] - \left[(2)(-5) + (3)(-5) + \left(\frac{19}{2}\right)(0) \right]$ <p>$16\frac{1}{4}$</p>	K1 N1														
(iii)	$\sqrt{(x - (-2))^2 + (y - 5)^2} = 5$ <p>$x^2 + y^2 + 4x - 10y + 4 = 0$</p>	K1 N1														

9(a)

$$\tan(x+2x) = \frac{\tan x + \tan 2x}{1 - \tan x \tan 2x}$$

$$\text{use } \tan 2x = \frac{2 \tan x}{1 - \tan^2 x}$$

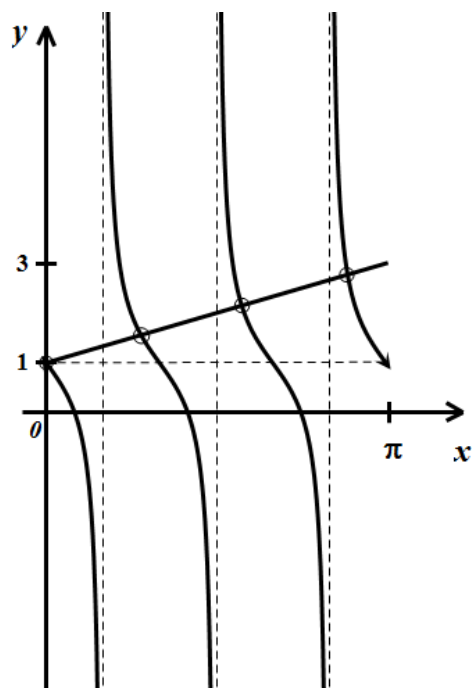
$$\frac{3 \tan x - \tan^3 x}{1 - 3 \tan^2 x}$$

K1

K1

N1

(b)



Shape (tan)

3 Cycle for $0 \leq x \leq \pi$

Negative graph

Shifted in range $0 \leq x \leq \pi$

$$y = \frac{2x}{\pi} + 1$$

Draw the straight line

Number of solutions = 4

P1

P1

P1

P1

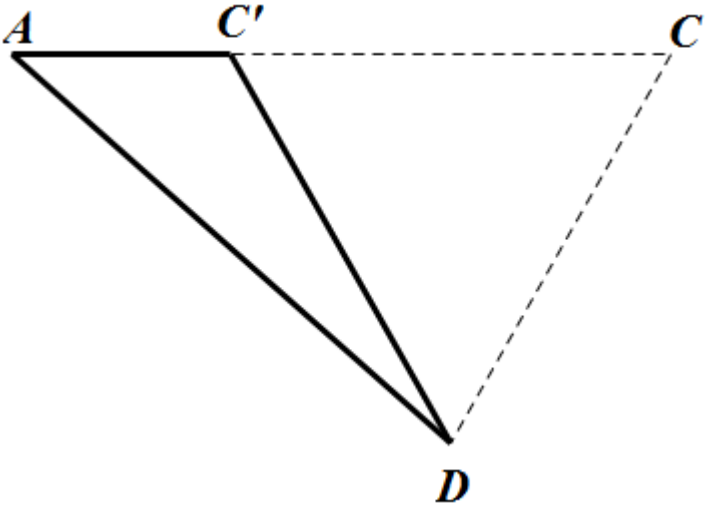
N1

K1

N1

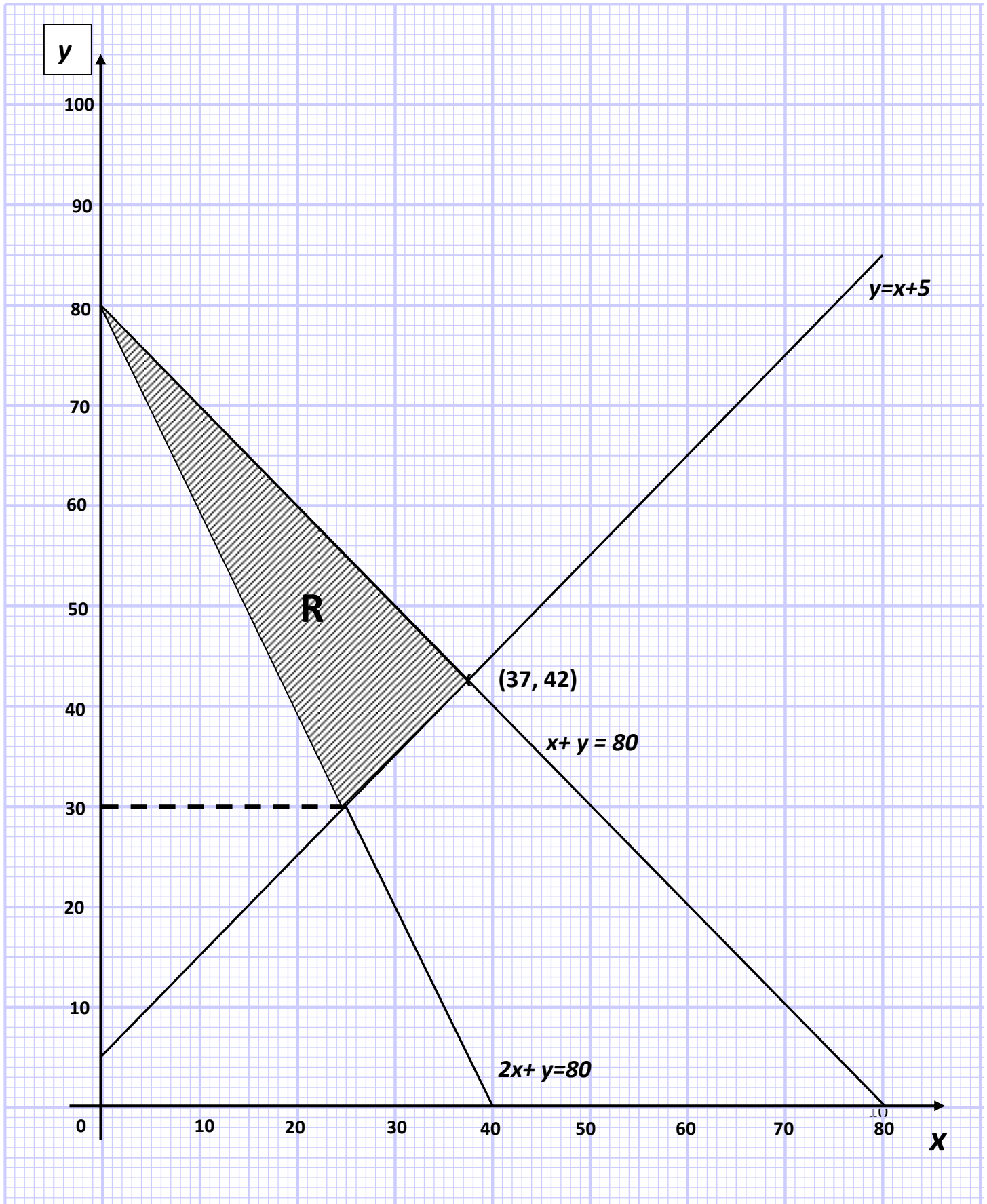
10(a)	<p>(i) $z = -0.5$</p> $\frac{58 - \mu}{5} = -0.5$ $\mu = 60.5$ <p>(ii) $P\left(z > \frac{65 - 60.5}{5}\right)$</p> $= 0.1841$ $n(A) = 65$	<p>P1</p> <p>K1</p> <p>N1</p> <p>K1</p> <p>N1</p> <p>N1</p>
(b)	<p>(i) ${}^6C_0 (m)^0 (1-m)^6 = \frac{1}{729}$</p> $m = \frac{2}{3}$ <p>(ii) $P(X < 2) = 1 - P(X = 0) - P(X = 1)$ or ${}^6C_1 \left(\frac{2}{3}\right)^1 \left(\frac{1}{3}\right)^5$</p> $\frac{716}{729}$	<p>K1</p> <p>N1</p> <p>K1</p> <p>N1</p>
11(a)	$x^2 + 4 = 4x \quad \text{OR} \quad \frac{dy}{dx} = 2x = 4$ $k = 2$	<p>K1</p> <p>N1</p>
(b)	$\int (x^2 + 4) dx = \left[\frac{x^3}{3} + 4x \right] \quad \text{OR} \quad \int (y-4)^{\frac{1}{2}} dy = \left[\frac{(y-4)^{\frac{3}{2}}}{\frac{3}{2}} \right]$ $2 \left(\frac{1}{2} \times 2 \times 8 \right) = 16 \quad \frac{1}{2} \times 4 \times 8 = 16$ $\left[\frac{(2)^3}{3} + 4(2) \right] - \left[\frac{(-2)^3}{3} + 4(-2) \right] = \frac{64}{3} \quad \left[\frac{((8)-4)^{\frac{3}{2}}}{\frac{3}{2}} \right] - \left[\frac{((4)-4)^{\frac{3}{2}}}{\frac{3}{2}} \right] = \frac{16}{3}$ $\frac{64}{3} - 16 \quad 16 - 2 \left(\frac{16}{3} \right)$ $\frac{16}{3}$	<p>K1</p> <p>K1</p> <p>K1</p> <p>K1</p> <p>N1</p>

(c)	$\int (y-4)dy = \frac{y^2}{2} - 4y$ $\pi \left[\left(\frac{(5)^2}{2} - 4(5) \right) - \left(\frac{(4)^2}{2} - 4(4) \right) \right]$ $\frac{1}{2}\pi$	<p>K1</p> <p>K1</p> <p>N1</p>
12(a)	<p>-3</p> <p>(b)</p> $(t-3)(2t+1)=0$ $t=3$ $S = \frac{2t^3}{3} - \frac{5t^2}{2} - 3t$ $S_3 = \frac{2(3)^3}{3} - \frac{5(3)^2}{2} - 3(3)$ $\frac{27}{2} \text{ m, di kiri // } -\frac{27}{2}$ <p>(c)</p> $a = 4t - 5$ $t < \frac{5}{4}$ <p>(d)</p> $2 \left \frac{27}{2} \right + \left(\frac{2(5)^3}{3} - \frac{5(5)^2}{2} - 3(5) \right)$ $\frac{197}{6}$	<p>N1</p> <p>K1</p> <p>N1</p> <p>K1</p> <p>K1</p> <p>N1</p> <p>K1</p> <p>N1</p>

13(a)(i)	$\frac{1}{2}(15)(CD)\sin(104^\circ) = 29$ $CD = 3.985$	K1 N1
(ii)	$AC = 18.25$ $AD^2 = 18.25^2 + 3.985^2 - 2(18.25)(3.985)\cos 35^\circ$ $AD = 14.07$	P1 K1 N1
(iii)	$\frac{\sin \angle CAD}{3.985} = \frac{\sin 35^\circ}{14.07}$ $\angle CAD = 9.349^\circ$	K1 N1
(b)(i)		N1
(ii)	$\frac{AC'}{\sin(180^\circ - 145^\circ - 9.349^\circ)} = \frac{3.985}{\sin 9.349^\circ}$ 10.62 cm	K1 N1

14(a)	$x + y \leq 80$ $y - x \geq 5$ $80x + 40y \geq 3200$	N1 N1 N1
(b)	Draw one graph correct Draw all graph correct Area R	K1 K1 N1
(c)	(i) 30 (ii) Max point (37,42) $k = 80(x) + 40(y)$ Max fees = $80(37) + 40(42)$ RM 4640	N1 N1 K1 N1
15(a)	$\frac{P_{18}}{90} \times 100 = 110$ RM 99	K1 N1
(b)	$I_{18/15} = 136.95$ $I_{17/15} = \frac{136.95}{110} \times 100$ 124.5	P1 K1 N1
(c)	$I_{payung} = 135 \quad I_{kasut} = 120$ $\frac{(135)(120) + 120(180) + I_{Beg}}{360} = 124.5$ $I_{beg} = 117$ $\frac{X}{30} \times 100 = 117$ RM 35.10	P1 K1 N1 K1 N1

Graph for **Question 15 [LINEAR PROGRAMMING]**



Question 7(b)

