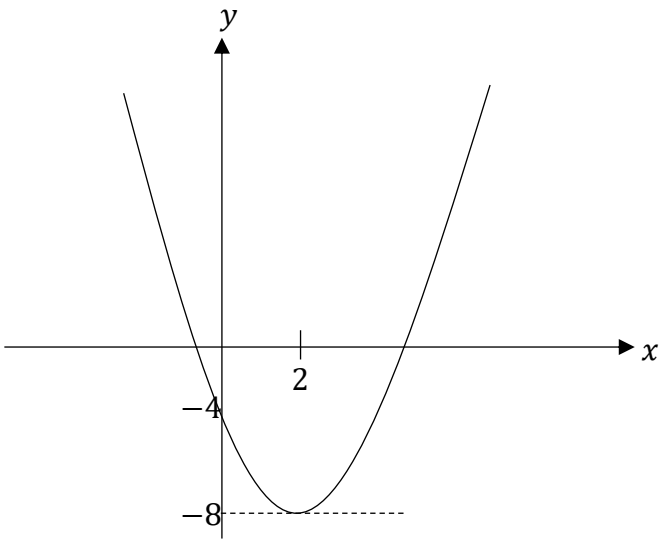
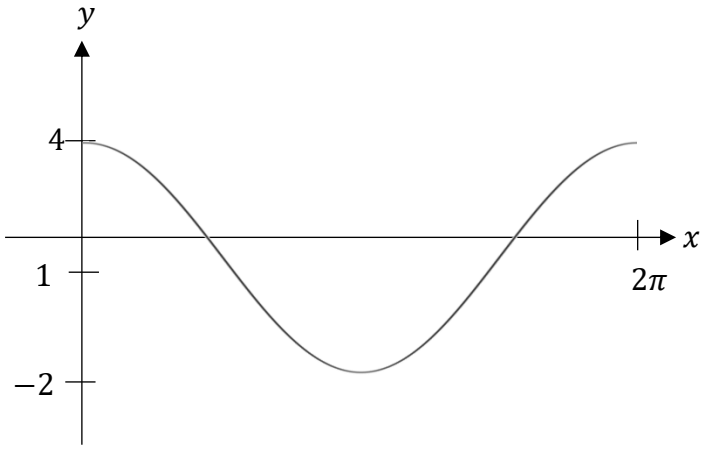
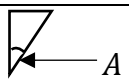
PERATURAN PEMARKAHAN KERTAS 1 PERC. SPM 2021

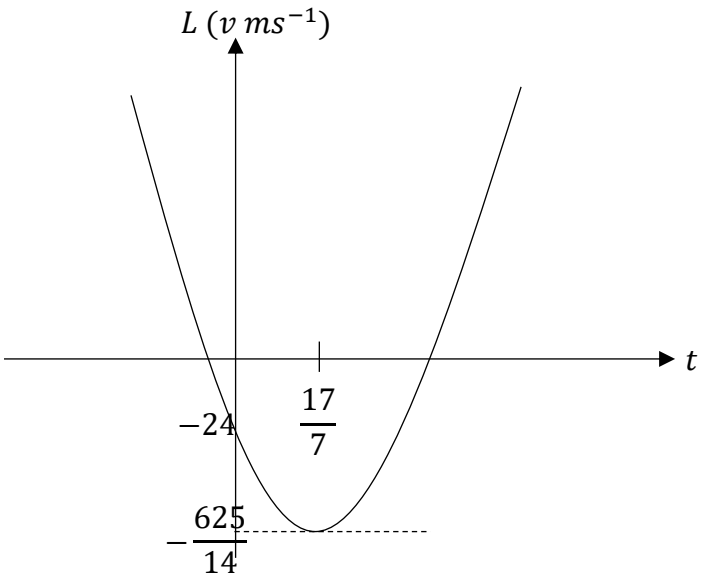
No		JAWAPAN	MARKAH
		Bahagian A	
1		$f^2(x) = f[f(x)]$ $f^2(x) = f\left[\frac{x-1}{x+1}\right]$ $\left[\frac{\left(\frac{x-1}{x+1}\right)-1}{\left(\frac{x-1}{x+1}\right)+1}\right]$ $f^2(x) = -\frac{1}{x}, x \neq 0$ $f^4(x) = f^2[f^2x]$ $f^4(x) = f^2\left[-\frac{1}{x}\right]$ $f^4(x) = -\frac{1}{\left(-\frac{1}{x}\right)}$ $f^4(x) = x$ $f^{25}(x) = f[f^{24}x]$ $f^{25}(x) = \frac{x-1}{x+1}, x \neq 1$	1 1 1 1 1
			5
2		 Lakar Graf Kuadratik Titik minimum $(2, -8)$ Pintasan $-y = -4$	1 1 1
	(a)	1. Bentuk Graf berubah 2. Paksi simetri sama, $x = 2$ 3. Titik maksimum $(2,8)$	1
	(b)	1. Bentuk graf sama 2. Paksi Simetri berubah, $x = -3$ 3. Graf bergerak 5 unit ke kiri 4. Titik minimum berubah $(-3, -8)$	1
	(c)	1. Bentuk graf sama 2. Paksi Simetri sama, $x = 2$ 3. Graf bergerak 12 unit ke atas 4. Titik minimum berubah $(2,4)$	1
			6

3				
	(a)	$y+\delta y = 8(x+\delta x) - 3(a+\delta x)^2$ $\underset{had\ \delta x\to 0}{\frac{\delta y}{\delta x}} = \frac{8\delta x}{\delta x} - \frac{6x\delta x}{\delta x} - \frac{3(\delta x)^2}{\delta x}$ $\frac{dy}{dx} = 8 - 6x$	1 1 1	
				3
	(b)	$\frac{dV}{dx} = \frac{40}{3}\pi x - x^2\pi$ $\frac{dV}{dt} = \left(\frac{40}{3}\pi(3) - (3)^2\pi\right) \times 4$ $\frac{dV}{dt} = 124\pi$	1 1,1 1	
				4
			7	
4		$t = \sqrt{(4.672)^2 - \left(1+\sqrt{2}\right)^2}$ $t = 4$	1 1	
			2	
5		$x = 6 - y - z$ $2(6 - y - z) + y - z = 10$ Atau $(6 - y - z) + 2y + 3z = 9$ $y = 2 - 3z$ Atau $y = 3 - 2z$ $(2 - 3z) + 2z = 3$ Atau $2 - 3z = 3 - 2z$ $x = 4$ $y = 1$ $z = 1$	1 1 1 1 1 1 1	
			6	
6		Rajah 1 $m = -\frac{8}{4}$ $m = -2$ $xy = -2x^2 + 8$ Rajah 2 $m = \frac{12 - (-4)}{4 - 0}$ $m = 4$ $\log_{10} p = 4\left(\frac{1}{q}\right) - 4$	 1 1 1 1	
			4	
7	(a)	$m = \frac{180 - 8}{300 - 50}$ $m = \frac{2}{5}$ $y - 60 = \frac{2}{5}(x - 0)$ $y = \frac{2}{5}x + 60$	 1 1 1	
				3

	(b)	$\frac{1}{2}\|[(3)(4)+(7)(3\beta)+(\beta)(2)]-[(7)(2)+(4)(\beta)+(3)(3\beta)]\|$ $\beta=\frac{9}{5}$, $\beta=-\frac{7}{5}$	2 1	
				3
				6
8	(a)	<table><tr><th>Bil Bulan Month Number</th><th>Simpanan Bulanan Monthly savings</th><th>Jumlah Simpanan Total Savings</th></tr><tr><td>1</td><td>RM30</td><td>RM30</td></tr><tr><td>2</td><td>RM45</td><td>RM75</td></tr><tr><td>3</td><td>RM60</td><td>RM135</td></tr><tr><td>4</td><td>RM75</td><td>RM240</td></tr><tr><td>5</td><td>RM90</td><td>RM330</td></tr><tr><td>6</td><td>RM105</td><td>RM435</td></tr></table>		
				2
	(b)	Janjang Aritmetik $d=60-45$ atau $d=45-30$ $d=15$		
				1
	(c)	$\frac{n}{2}[2(30)+(n-1)(15)]\geq 1000$ $n\approx 11$	1 1	
				2
				5
9		$({}^{7}C_{7}\times{}^{5}C_{3})\ atau\ ({}^{7}C_{6}\times{}^{5}C_{4})\ atau\ ({}^{7}C_{5}\times{}^{5}C_{5})$ $({}^{7}C_{7}\times{}^{5}C_{3})+({}^{7}C_{6}\times{}^{5}C_{4})$ atau $({}^{7}C_{6}\times{}^{5}C_{4})+({}^{7}C_{5}\times{}^{5}C_{5})$ atau $({}^{7}C_{7}\times{}^{5}C_{3})+({}^{7}C_{5}\times{}^{5}C_{5})$ $({}^{7}C_{7}\times{}^{5}C_{3})+({}^{7}C_{6}\times{}^{5}C_{4})+({}^{7}C_{5}\times{}^{5}C_{5})$ 66	1 1 1 1	
				4
10	(a)	$a=3$ $b=1$ $c=1$	1 1 1	
				3

	(b)	 Lihat 1. Lakar Graf Kos 2. Amplitud $maks = 1, min = -5$ 3. Sudut $= \frac{3}{2}\pi$	 1 1 1	
				3
				6
11	(a)	$\overrightarrow{PO} = \frac{1}{2}\overrightarrow{AO}$ atau $\overrightarrow{PB} = \overrightarrow{PO} + \overrightarrow{OB}$	1	
		$\overrightarrow{OA} = \overrightarrow{OB} + \overrightarrow{BA}$ $\overrightarrow{OA} = \underline{y} + \underline{x}$ $\overrightarrow{PO} = \frac{1}{2}\overrightarrow{AO}$ $\overrightarrow{PO} = \frac{1}{2}\left(-\underline{x} - \underline{y}\right)$		
	(i)	$\overrightarrow{PO} = -\frac{1}{2}\underline{x} - \frac{1}{2}\underline{y}$	1	
	(ii)	$\overrightarrow{PB} = -\frac{1}{2}\underline{x} - \frac{1}{2}\underline{y} + \underline{y}$		
		$\overrightarrow{PB} = -\frac{1}{2}\underline{x} + 3\underline{y}$	1	
				3
	(b)	$\overrightarrow{PQ} = \overrightarrow{PO} + \overrightarrow{OQ}$ $\overrightarrow{PQ} = -\frac{1}{2}\underline{x}$	1	
		$\lambda = \frac{-\frac{1}{2}}{1}$		
		$\lambda = -\frac{1}{2}$	1	
		$\overrightarrow{BA} = -2\overrightarrow{PQ}$. $\overrightarrow{BA}$ selari dengan $\overrightarrow{PQ}$	1	
				3
				6

12	(a)	$\frac{dy}{dx} = -\frac{2}{3}x + \frac{8}{3}$ $-\frac{2}{3}x + \frac{8}{3} = 0$ $x = 4$ $y = \frac{8}{3}(4) - 4 - \frac{(4)^2}{3}$ $y = \frac{4}{3}$ Koordinat titik pusingan $\left(4, \frac{4}{3}\right)$	1 1 1	
				3
	(b)	Lihat $A(2,0)$ atau $B(6,0)$ $\left[-\frac{x^3}{9} + \frac{4x^2}{3} - 4x\right]_2^6$ $\left(-\frac{(6)^3}{9} + \frac{4(6)^2}{3} - 4(6)\right) - \left(-\frac{(2)^3}{9} + \frac{4(2)^2}{3} - 4(2)\right)$ $\frac{32}{9} unit^2$	1 1 1 1	
				4
			7	
Bahagian B				
13	(a)	$\tan A = \frac{37}{26}$  $\theta = \frac{70.19^\circ}{180} \times 3.142$ $\theta = 1.225\ rad$	1 1 1	
				3
	(b)	$s = (63)(1.225)$ $s = 77.18\ cm$	1 2	
				2
	(c)	$\frac{1}{2}(57)^2(1.225)\ atau\ 2\left(\frac{1}{2}(26)(37)\right)$ $\frac{1}{2}(57)^2(1.225) + 2\left(\frac{1}{2}(26)(37)\right)$ $2952.0125\ cm^2$	1 1 1	
				3
			8	
14	(a)	$P(X > 30)$ $P\left(Z > \frac{30-20}{5}\right)$ $P(Z > 2)$ 0.02275	1 1	
				2
	(b)	$P(X < 30)$ $P\left(Z < \frac{10-20}{5}\right)$ $P(Z < -2)$ 0.02275×60 13.65 $n = 13$ orang	 1 1 1	
				3

	(c)	$P(X < y) = 0.25$ $\frac{y-20}{5} = -0.6745$ $y = 16.63$ minit	1 1 1	
				3
				8
15	(a)	Lihat $Laju = \frac{Jarak}{Masa}; Laju = \frac{12}{x}$ $\frac{12}{x} + \frac{12}{x+2} = 3.5$ $12x + 24 + 12x = 3.5(x^2 + 2x)$ $x = \frac{-(-17) \pm \sqrt{(-17)^2 - 4(3.5)(-24)}}{2(3.5)}$ $x = 6 \quad , \quad x = -\frac{8}{7}\ (tidak\ diterima)$	1 1 1 1 1	
				5
	(b)	 Lakar Graf Kuadratik Titik minimum $\left(\frac{17}{7}, -\frac{625}{14}\right)$ Pintasan $-y = -24$	1 1 1	
				3
				8