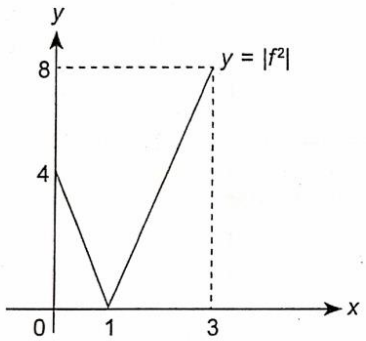
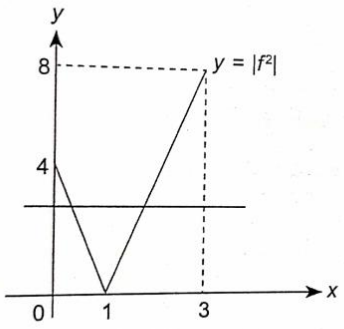
Soalan	Skema Pemarkahan	Sub Markah	Markah Penuh
1	(a) Hasil darab punca/*Product of roots* $\alpha(\alpha + 3) = 28$ atau/*or* Hasil tambah punca/*Sum of roots* $\alpha + \alpha + 3 = p$ $(\alpha - 4)(\alpha + 7) = 0$ $\alpha = 4$ dan/*and* $\alpha = -7$ $p = 11$ dan/*and* $p = -11$ (b) $5^2 - 11(5) + 28 = 5k$ $k = -\frac{2}{5}$	 P1 P1 K1 N1 K1 N1	6

2	(a) $f^2 = -4 + 4x$		P1
			
	Bentuk V/V *shape*		P1
	Pintasan-x = 1 dan pintasan-y = 4 *x-intercept* = 1 *and y-intercept* = 4		P1
	Mengikut domain/*Follow the domain* $0 \leqslant x \leqslant 3$		P1

		Markah	Penuh
2	(b) (i) $0 \leqslant y \leqslant 8$	N1	
	(ii) Hubungan banyak kepada satu *Many to one relation*	P1	
	(iii) 		
	Ujian garis mengufuk (melalui dua titik) *Horizontal line test (through two points)*	K1	
	Tidak mempunyai fungsi songsang *Does not have an inverse function*	N1	8

6 3	(a) Kecerunan tangen/*Gradient of tangent* Q, $m = -\frac{1}{2}$	P1	
	$m_{PQ}\left(-\frac{1}{2}\right) = -1$	K1	
	$\frac{y-8}{x-1} = 2$ atau/*or* $8 = 2(1) + c$	K1	
	$y = 2x + 6$	N1	
	(b) $\frac{x+1}{2} = -4$ atau/*or* $\frac{y+8}{2} = -2$	K1	
	$R(-9, -12)$	N1	
	(c) $\sqrt{[-9-(-4)]^2 + [-12-(-2)]^2}$ atau/*or* $\sqrt{(-4-1)^2 + (-2-8)^2}$	K1	
	$\sqrt{125}$ atau/*or* $11.1803 > 10$ Roda Ferris tidak boleh beroperasi *The Ferris wheel cannot be operated*	N1	8

4

a) $f^{-1}(x) =$

katakan $y = a - bx$ ✓1

$bx = a - y$

$x = \frac{a-y}{b}$

$f^{-1}(x) = \frac{a-x}{b}$ ✓1

b) $f^{-1}(14) = -4$, $f(5) = -13$

$\frac{a-14}{b} = -4$ ✓1 (a) ; $a - 5b = -13$ ✓

$a - 14 = -4b$;

$a = 14 - 4b$ ✓ (atau) ✓1 $a = 5b - 13$

$5b - 13 = 14 - 4b$ pers. serentak ✓1

$9b = 27$

$b = 3$ ✓1

$a = 14 - 4(3)$ dan

$a = 2$ ✓1

6m

$a = 2$ (dan) $b = 3$ ✓1

5	(a) $\frac{20.25}{x} = \frac{x}{36}$	1	
	$x = 27$		
	$r = \frac{3}{4}$	1	
	(b) $T_{10} = 36\left(\frac{3}{4}\right)^2$	1	
	$= 2.703 \text{ cm}^3$	1	
	(c) $36\left(\frac{1-0.75^n}{1-0.75}\right) > 140$	1	
	$n \log 0.75 < \log 0.0278$	1	
	$n = 13$	1	7

6	$\frac{8}{2}[2(3) + (8-1)d] = 136$	1	
	$d = 4$	1	
	$\frac{n}{2}[2(3) + (n-1)(4)] = 820$	1	
	$2n^2 + n - 820 = 0$		
	$(2n + 41)(n - 20) = 0$		
	$n = 20 \ (n > 0)$	1	
	$T_n = 3 + (20-1)(4)$ atau/*or* $S_{20} = \frac{20}{2}(3 + l)$		
	$= 79$ $l = 79$	1	5

7) $f^{-1}(x) = \frac{1}{p-x}$; $x \neq p$

$g(x) = 3 + x$

a) Let $y = \frac{1}{p-x}$

$p - x = \frac{1}{y}$ ✓1

$x = p - \frac{1}{y}$

$f(x) = \frac{px-1}{x}$; $x \neq 0$ ✓1

b) i) $ff^{-1}(p^2-1) = g[(2-p)^2]$

$f\left[\frac{1}{p-(p^2-1)}\right] = g\left[(2-p)^2\right]$

$$\frac{p\left[\frac{1}{p-p^2+1}\right]-1}{\frac{1}{p-p^2+1}} = g\left[(2-p)^2\right]$$

$p^2 - 1 = 3 + (2-p)^2$ ✓1

$p^2 - 1 = 3 + 4 - 4p + p^2$

$4p = 8$

$p = 2$ ✓1

7(ii) $fg^{-1}(x) = x$; $b^2 - 4ac < 0$

$g^{-1}(x) = x - 3$ ✓1

$f(x) = \frac{px-1}{x}$

$f[x-3] = x$

$\frac{p(x-3)-1}{x-3} = x$

$px - 3p - 1 = x^2 - 3x$

~~$x^2 - x + 7 = 0$~~

$x^2 - 3x - px + 3p + 1 = 0$

$x^2 - (3+p)x + 3p + 1 = 0$ ✓1

$[-(3+p)]^2 - 4(1)(3p+1) < 0$

$9 + 6p + p^2 - 12p - 4 < 0$

$p^2 - 6p + 5 < 0$

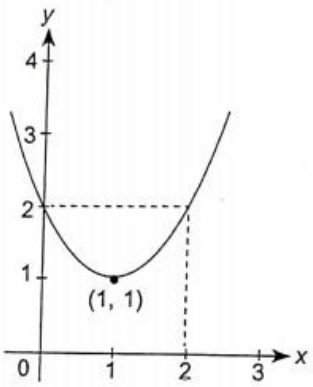
$(p-1)(p-5) < 0$

$p = 1, \; p = 5$ ✓

@ ✓1

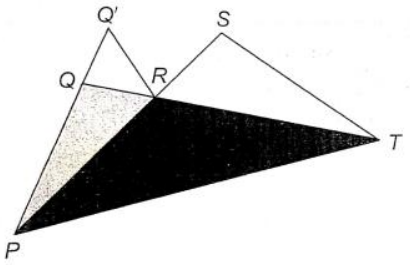
$1 < p < 5$ ✓1

8	(a) $\frac{1}{2}\begin{vmatrix} 5 & 3 & -1 & -4 & -3 & 2 & 5 \\ 2 & -2 & -3 & 0 & 2 & 6 & 2 \end{vmatrix}$ atau setara/*or equivalent*	P1	
	$\frac{1}{2}\lvert(-10-9-8-18+4)-(6+2+12+4+30)\rvert$	K1	
	$\frac{1}{2}\lvert-41-54\rvert$	K1	
	47.5 atau/*or* $47\frac{1}{2}$	N1	
	(b) (i) $\frac{1}{2}\lvert(-8+18)-(12-2)\rvert$	K1	
	0 unit^2	N1	
	ABC adalah segaris/*ABC are colliner*		
	(ii) $AM = 2MB$	P1	
	$\sqrt{(x+1)^2+(y+3)^2} = 2\sqrt{(x+4)^2+y^2}$	K1	
	$x^2+2x+1+y^2+6y+9 = 4x^2+32x+64+4y^2$	K1	
	$x^2+y^2+10x-2y+18=0$	N1	10

11 9	(a) $f(x) = (x-2k)^2-(-2k)^2+h$	K1	
	$-(-2k)^2+h = 4k-4k^2$ atau/*or* $2k = h-1$	K1	
	$h = 4k$		
	$k = \frac{1}{2}$	N1	
	$h = 2$	N1	
	(b) (1, 1)	N1	
	(c) 		
	Bentuk graf yang betul *Correct shape of graph*	P1	
	Nilai minimum yang betul *Correct minimum value*	P1	
	Pintasan-*y* yang betul *Correct y-intercept*	P1	
	(d) Nilai minimum baharu/*New minimum value* = 1	N1	
	Persamaan paksi simetri/*Equation of symmetrical axis*, $x = 7$	N1	10

11	(a) $T=\left(\frac{2(2)+3(5)}{2+3}, \frac{2(-2)+3(4)}{2+3}\right)$	1	
	$=\left(\frac{19}{5}, \frac{8}{5}\right)$	1	
	(b) Luas/*Area of QOR* $=\frac{1}{2}\begin{vmatrix}0 & 2 & 5 & 0\\ 0 & -2 & 4 & 0\end{vmatrix}$		
	$=\frac{1}{2}\lvert(0+8+0)-(0-10+0)\rvert$	1	
	$=9$ unit^2	1	
	(c) $m_{QR}=2, m_{\perp QR}=-\frac{1}{2}$	1	
	$y-\frac{8}{5}=-\frac{1}{2}\left(x-\frac{19}{5}\right)$	1	
	$y=-\frac{1}{2}x+\frac{7}{2}$		
	(d) $\sqrt{\left(x-\frac{19}{5}\right)^2+\left(y-\frac{8}{5}\right)^2}=5$	1	
	$x^2-\frac{38}{5}x+\frac{361}{25}+y^2-\frac{16}{5}y+\frac{64}{25}=25$	1	
	$5x^2+5y^2-38x-16y-40=0$	1	10

	Penerangan	Markah	Penuh
12	(a) $\frac{3}{2}\times 100=150$	P1	
	(b) *A*: $\frac{30}{20}\times 100$ atau/*or* *C*: $\frac{40}{50}\times 100$ atau/*or* *D*: $\frac{20}{40}\times 100$	K1	
	$\overline{I}_{2020/2019}=\frac{\left(\frac{30}{20}\times 100\right)(2)+(150)(4)+\left(\frac{40}{50}\times 100\right)(6)+\left(\frac{20}{40}\times 100\right)(3)}{2+4+6+3}$ atau setara/*or equivalent*	K1	
	$\overline{I}_{2020/2019}=102$		
	(c) (i) *A*: $\left(\frac{30}{20}\times 100\right)\left(\frac{x+100}{100}\right)$ atau/*or*	N1	
	B: $150\left(\frac{x+100}{100}\right)$	K1	
	$103.2=\frac{\left(\frac{30}{20}\times 100\right)\left(\frac{x+100}{100}\right)(2)+(150)\left(\frac{x+100}{100}\right)(4)+\left(\frac{40}{50}\times 100\right)(6)+\left(\frac{20}{40}\times 100\right)(3)}{2+4+6+3}$	K1	
	$x=2$	N1	
	(ii) $150\times\frac{102}{100}=153$	N1	
	(iii) $103.2=\frac{\text{kos}_{2021}}{250}\times 100$	K1	
	$\text{kos}_{2021}=$ RM258	N1	10

~~14~~ 12	(a) $\frac{\sin S}{7} = \frac{\sin 50.05°}{6.5}$	K1	
	(i) $S = 55.65°$	N1	
	$\angle RST = 124.35°$	N1	
	(ii) $PQ^2 = 5^2 + 9^2 - 2(5)(9)$ kos $50.05°$	K1	
	$PQ = 6.943$ cm	N1	
	(iii) $\angle RTS = 180° - 50.05° - 124.35° = 5.6°$ atau/*or* $\angle PRT = 180° - 50.05° = 129.95°$	P1	
	Luas *RST*/*Area of RST* atau/*or* Luas *PRT*/*Area of PRT* $= \frac{1}{2}(9)(7) \sin 129.95°$ $= \frac{1}{2}(7)(6.5) \sin (5.6°)$	K1	
	Luas *PST*/*Area of PST* = Luas *RST*/*Area of RST* + Luas *PRT*/*Area of PRT* $= \frac{1}{2}(7)(6.5) \sin 5.6° + \frac{1}{2}(9)(7) \sin 129.95°$	K1	
	$= 26.37$ cm^2	N1	
12	(b) 	N1	10