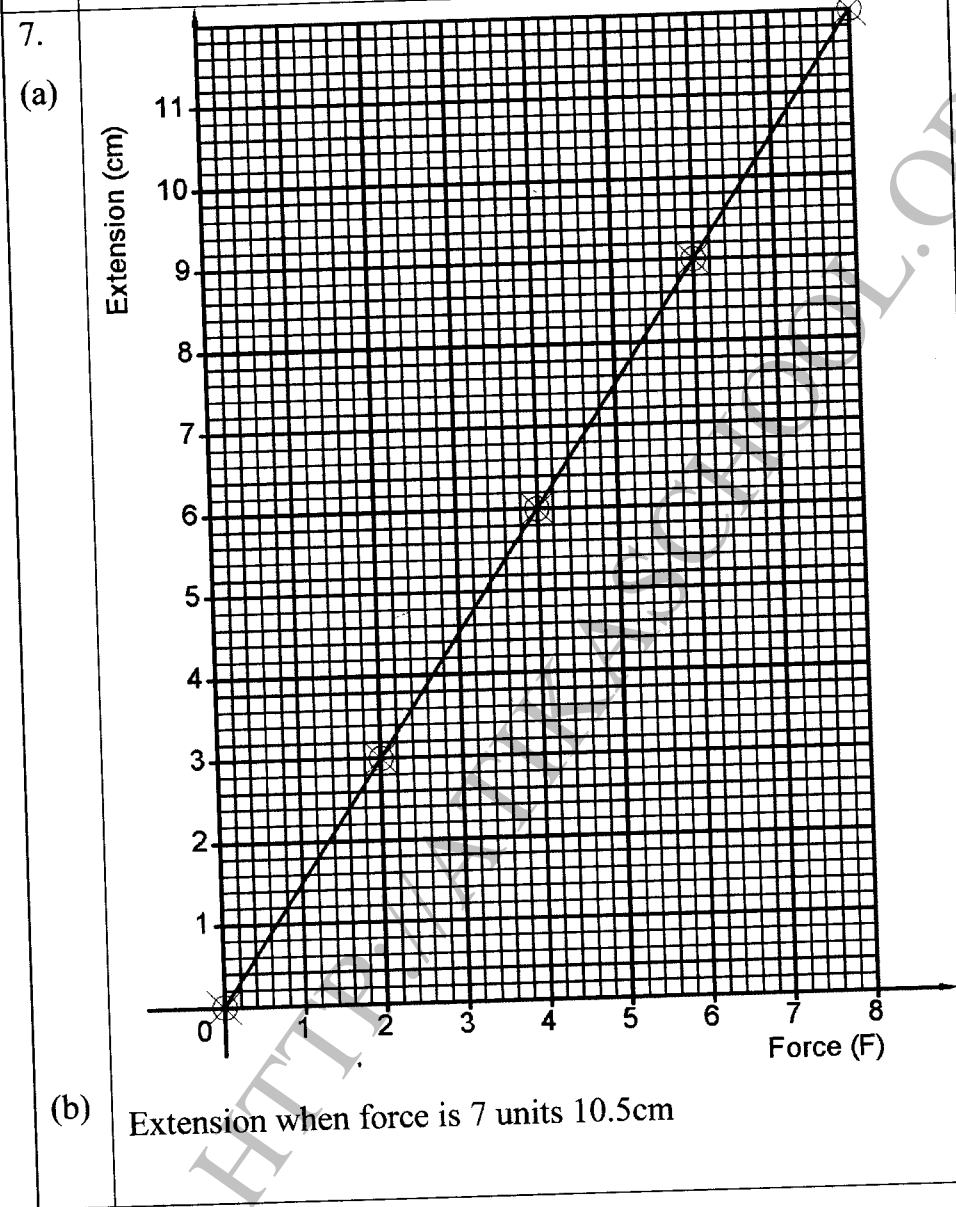


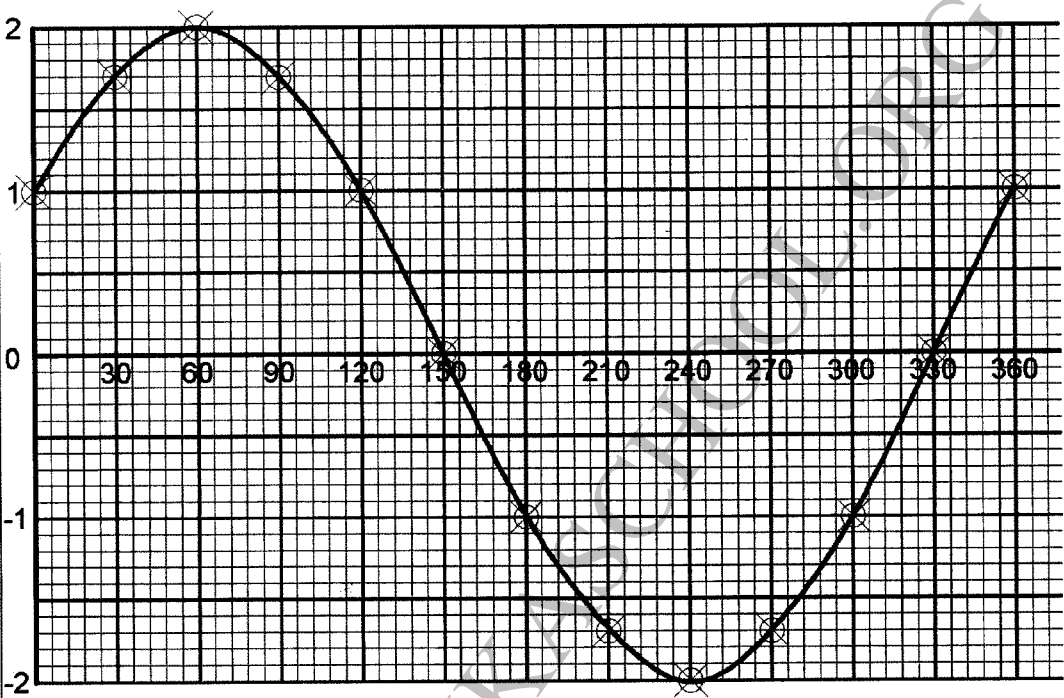
4.4.2 Mathematics Alternative B Paper 2 (122/2)

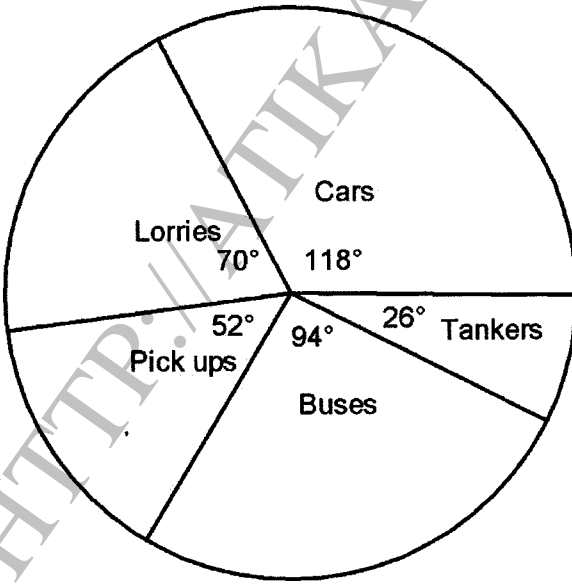
No	Marking scheme	marks	comments
1.	$190.1 \times 30 = 5703$ $= 5700$	M1 A1 2	
2.	Common Ratio: $\frac{6}{3} = 2$ $S_{10} = \frac{3(2^{10} - 1)}{2 - 1}$ $= \frac{3(1024 - 1)}{1} = 3069$	B1 M1 A1 3	Common ratio substitution into formula
3.	$\frac{5}{x} = \frac{35}{84}$ $x = \frac{5 \times 84}{35}$ $= 12$	M1 M1 A1 3	
4.	Let height be x cm $\frac{1}{2}(x+3)x = 35$ $x^2 + 3x - 70 = 0$ $(x+10)(x-7) = 0$ $x = 7$ or $x = -10$ \therefore height = 7, base = $7 + 3 = 10$	M1 M1 A1 B1 4	
5.	Full square = 11 Fractional square = 26 Area estimate: $11 + \frac{26}{2}$ $= 24\text{cm}^2$	B1 M1 A1 3	

6.	Let length be x $\frac{x}{\sin 30^\circ} = \frac{5}{\sin 75^\circ}$ $x = \frac{5 \sin 30^\circ}{\sin 75^\circ}$ $x = 2.59$	M1 M1 A1	
		3	



P1 L1	
B1	
3	

8.	<p>Latitude difference: $51^\circ + 37^\circ = 88^\circ$</p> <p>Distance in kilometres;</p> $= \frac{88}{360} \times \frac{22}{7} \times 2 \times 6370$ $= 9787.6$	<p>B1</p> <p>M1</p> <p>A1</p>		
		3		
9.	<p>(a)</p>  <p>(b) When $\theta^\circ = 162^\circ$, $y = -0.4$</p>	<p>S1</p> <p>P1</p> <p>C1</p> <p>B1</p>		
		4		
10.	<p>Distance covered: 380m } Time taken 20s } $\therefore \text{speed} = \frac{380}{1000} \div \frac{20}{3600}$ $= \frac{380}{1000} \times \frac{3600}{20}$ $= 68.4 \text{ km/h}$</p>	<p>B1</p> <p>M1</p> <p>A1</p>	<p>or equivalent</p>	
		3		

11.	<p>Compound interest by end of 4th year</p> $= 50\,000 \times 1.1^4 - 50\,000$ $= 50\,000(1.1^4 - 1)$ $= 50\,000(1.4641 - 1)$ $= 50\,000(0.4641)$ $= \text{Ksh } 23\,205$	<p>M1 M1</p> <p>A1</p> <p>3</p>	
12.	<p>Angle representing different vehicles:</p> <p>Cars - $\frac{59}{180} \times 360 = 118^\circ$</p> <p>Lorries - $\frac{35}{180} \times 360 = 70^\circ$</p> <p>Pickups - $\frac{26}{180} \times 360 = 52^\circ$</p> <p>Buses - $\frac{47}{180} \times 360 = 94^\circ$</p> <p>Tankers - $\frac{13}{180} \times 360 = 26^\circ$</p>  <p>The pie chart is divided into five segments. Starting from the top and moving clockwise, the segments are: Cars (118°), Tankers (26°), Buses (94°), Pickups (52°), and Lorries (70°). The segments are labeled with their respective vehicle types and angles.</p>	<p>B2</p> <p>(B1 for 3 for correct)</p> <p>B1</p> <p>3</p>	

13.	$2p + 3r = 60 \dots\dots\dots(i)$ $1p + 2r = 35 \dots\dots\dots(ii)$ $2p + 4r = 70 \dots\dots\dots(iii)$ $(iii) - (i)$ $r = 10$ $1p + 2(10) = 35$ $p = 15$ rubber is sh10 and pencil is sh35	M1 M1 A1 3	Forming equation Attempt to solve For r and p
14.	(a) $\begin{pmatrix} 3 & 2 \\ 7 & 5 \end{pmatrix}^{-1} = \frac{1}{15-14} \begin{pmatrix} 5 & -2 \\ -7 & 3 \end{pmatrix}$ $= \begin{pmatrix} 5 & -2 \\ -7 & 3 \end{pmatrix}$ (b) $\begin{vmatrix} x & 2 \\ 6 & 4 \end{vmatrix} = 0$ $4x - 12 = 0$ $x = 3$	M1 A1 M1 A1 4	
15.	(a) Side of QRST = $\sqrt{(1-1)^2 + (3-1)^2}$ $= 2$ $\therefore \text{Area} = 2 \times 2 = 4$ (b) Area of Q'R'S'T' $= \det. \begin{pmatrix} 3 & 1 \\ 0 & 2 \end{pmatrix} \times 4$ $= 6 \times 4$ $= 24$	M1 A1 M1 A1 4	or equivalent

16.	$ 9 = \sqrt{6^2 + 2^2}$ $= \sqrt{40} = 6.32$	M1 A1	
		2	
17.	<p>(a) (i) $a + d = 80$ $a + 5d = 320$ $4d = 240$ $d = 60$ $a = 20$</p> <p>(ii) $ar^3 = 80 \dots\dots\dots(i)$ $ar^5 = 320 \dots\dots\dots(ii)$</p> $r^2 = \frac{320}{80} = 4$ $r = 2$ $a = \frac{80}{8} = 10$ <p>(b) A.P. $T_{20} = 20 + 19 \times 60$ $= 1160$</p> <p>(c) G.P. $S_{12} = \frac{12(2^{12} - 1)}{2 - 1}$ $= 49\,140$</p> $\text{A.P. } S_{12} = \frac{12}{2} \{2 \times 12 + (12 - 1)60\}$ $= 4104$ <p>Difference : $= 49140 - 4104$ $= 45\,036$</p>	M1 A1 M1 A1 M1 A1 M1 A1 M1 A1	
		10	

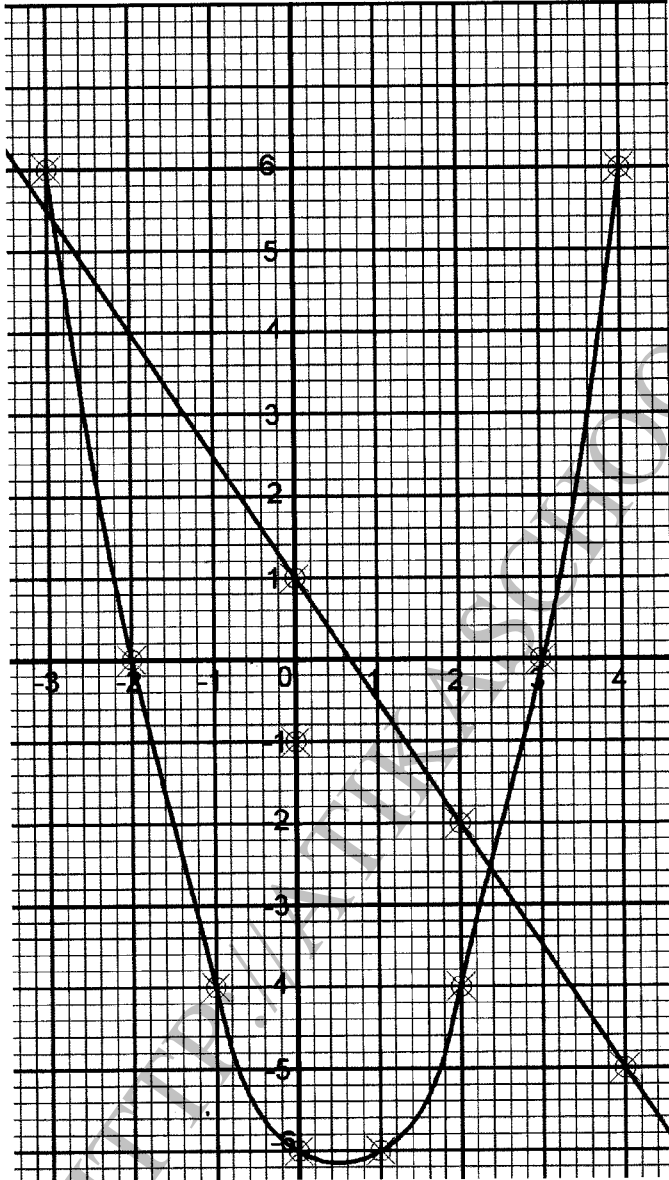
18. (i)

(a)

x	-3	-2	-1	0	1	2	3	4
$y = x^2 - x - 6$	6	0	-4	-6	-6	-4	0	6

(ii) $y = \left(\frac{1}{2}\right)^2 - \frac{1}{2} - 6 = -6.25$

(b)



(c)

Line $y = -\frac{3}{2}x + 1$

$x = 2.4$

$x = -2.8$

B2

All correct:

allow B1 for 5 correct

B1

S1

P1

C1

P1

L1

B1

B1

10

19.	a) $50\,000 \times 0.9$ = Ksh 45000	M1	
		A1	
	b) (i) $50\,000 \times 1.75$ = Ksh 87 500	M1	
		A1	
	(ii) Amount to pay in instalments; = 87500×0.8 = Ksh 70 000	M1	
	Monthly instalment $\frac{70000}{28}$	M1	
		A1	
	= Ksh 2 500		
	c) (i) $50\,000 \times 1.04^{15}$ = 90047.17528 = Ksh 90047	M1	
		A1	
(ii) $90\,047 - 50\,000 = \text{Ksh } 40\,047$	B1		
			10

20.	<p>Length of CD</p> <p>(a) $CD^2 = 8^2 + 4.2^2 - 2 \times 8 \times 4.2 \cos 45^\circ$ $= 64 + 17.64 - 16 \times 4.2 \times 0.7071$ $= 81.64 - 47.52 = 34.12$ $CD = \sqrt{34.12} = 5.8$</p> <p>Angle ABD:</p> <p>(b) $5.3^2 = 6^2 + 4.2^2 - 2 \times 6 \times 4.2 \cos \theta$ $\cos \theta = \frac{36 + 17.64 - 5.3^2}{50.4}$ $\theta = \cos^{-1} 0.5069$ $\theta = 59.5^\circ$</p> <p>Angle BCD:</p> <p>(c) $\frac{\sin BCD}{4.2} = \frac{\sin 45}{5.8}$ $\sin BCD = \frac{4.2 \times \sin 45}{5.8}$ $\text{Angle BCD} = \sin^{-1} 0.5120$ $= 30.8^\circ$</p> <p>(d) Area of $\triangle ABD$: $= \frac{1}{2} \times 6 \times 4.2 \sin 59.5$ $= 10.9 \text{ cm}$</p>	<p>M1</p> <p>M1</p> <p>A1</p> <p>M1</p> <p>M1</p> <p>A1</p> <p>M1</p> <p>A1</p> <p>M1</p> <p>A1</p> <p>M1</p> <p>A1</p> <p>10</p>	<p>or equivalent</p> <p>or equivalent</p>
-----	--	--	---

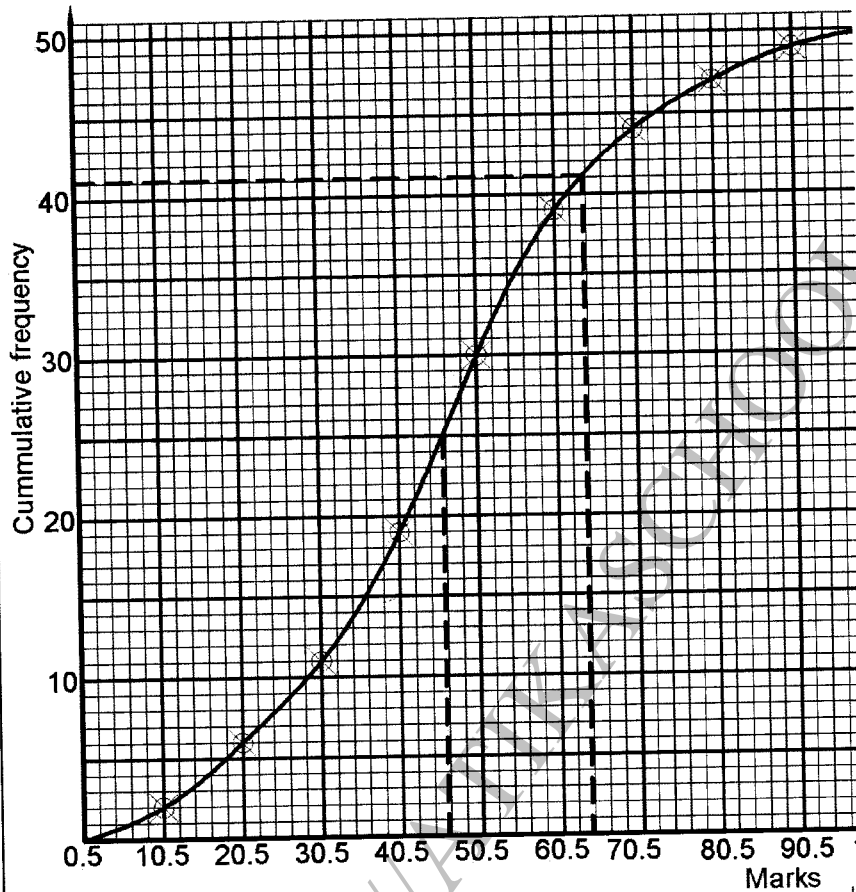
21.

Dr				Cr			
Date 2017	Particulars	Folio	Amount Ksh.	Date 2017	Particulars	Folio	Amount Ksh.
February 1	Balance b/f		10 000	February 3	Feeds		2 500
13	Broilers		12 000	7	Water		750
17	Eggs		4 000	11	Materials		1 900
24	Chicks		5 000	21	Wages		3 500
26	Layers		15 000	25	Electricity		1 300
				28	Incubator		12 500
				28	Balance c/d		23 550
			46 000				46 000
March 1	Balance b/f		23 550				
Egg sales				B1			
Layers sales				B1			
Feeds				B1			
Wages				B1			
Dr entries				B1			
Cr entries				B1			
Entries positively added				M1			
				A1			
Balance b/f: 46000 – 22450				M1			
= Ksh 23 550				A1			
				10			

22.

(a)

Marks	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
Frequency	2	4	5	8	11	9	5	3	2	1
Cumulative frequency	2	6	11	19	30	39	44	47	49	50



B1 ✓ Cumulative frequencies

S1 Correct scale

P2 Correct plotting: using upper class boundaries; allow P1 for 6 – 9 points

C1 Correct Curve

B1 Identifying median point

B1 Reading off

(b) (i) median = 46

M1

(ii) $50 - 41 = 9$

M1

$\% = \frac{9}{50} \times 100$

A1

$= 18\%$

10

23. (a)	$P(VV) = \frac{5}{8} \times \frac{3}{7}$ $= \frac{15}{56}$	M1	
	$P(GG) = \frac{3}{8} \times \frac{4}{7}$ $= \frac{12}{56}$	M1	
	$P(\text{same colour}) = \frac{15}{56} + \frac{12}{56}$ $= \frac{27}{56}$	M1 A1	
(b)(i)	$P(V_B V_B) = \frac{5}{8} \times \frac{4}{7}$ $= \frac{5}{14}$	M1	
	$P(V_C V_C) = \frac{3}{7} \times \frac{2}{6}$ $= \frac{1}{7}$	M1	
	$\therefore P(V_B V_B) + P(V_C V_C)$ $= \frac{5}{14} + \frac{1}{7} = \frac{1}{2}$	M1 A1	
	(ii) P (all violet)	M1	
	$= \frac{5}{14} \times \frac{1}{7}$ $= \frac{5}{98}$	A1	
		10	

24.	a) $\begin{pmatrix} 0 & 2 \\ 2 & 0 \end{pmatrix} \begin{pmatrix} 2 & 5 & 3 \\ 2 & 3 & 5 \end{pmatrix} = \begin{pmatrix} 4 & 6 & 10 \\ 4 & 10 & 6 \end{pmatrix}$	M1	
	Vertices: $A'(4,4), B'(6,10), C'(10,6)$	A1	
	b) $\begin{pmatrix} a & b \\ c & d \end{pmatrix} \begin{pmatrix} 2 & 5 & 3 \\ 2 & 3 & 5 \end{pmatrix} = \begin{pmatrix} -2 & -5 & -3 \\ 2 & 3 & 5 \end{pmatrix}$	M1	
	$2a + 2b = -2$		
	$5a + 3b = -5$		
	$6a + 6b = -6$		
	$10a + 6b = -10$	M1	
	$4a = -4$		
	$a = -1$		
	$2(-1) + 2b = -2 \Rightarrow b = 0$		
$2c + 2d = 2$			
$5c + 3d = 3$			
$6c + 6d = 6$			
$10c + 6d = 6$	M1		
$4c = 0$			
$c = 0$			
$\therefore 0 + 2d = 2 \Rightarrow d = 1$			
Matrix $\begin{pmatrix} a & b \\ c & d \end{pmatrix} = \begin{pmatrix} -1 & 0 \\ 0 & 1 \end{pmatrix}$	A1	For correct matrix	
c) $\begin{pmatrix} 1 & 0 \\ 2 & 1 \end{pmatrix} \begin{pmatrix} -1 & 0 \\ 0 & 1 \end{pmatrix} = \begin{pmatrix} -1 & 0 \\ -2 & 1 \end{pmatrix}$	B1		
$\begin{pmatrix} -1 & 0 \\ -2 & 1 \end{pmatrix} \begin{pmatrix} 2 & 5 & 3 \\ 2 & 3 & 5 \end{pmatrix} = \begin{pmatrix} -2 & -5 & -3 \\ -2 & -7 & -1 \end{pmatrix}$	M1 A1		
Vertices: $A'''(-2, -2), B'''(-5, -7), C'''(-3, -1)$	B1		
			10