FORM 3	MATHEMATICS	Marking Scheme

Aids for Marking of Scripts

Types of Marks
- **M**(ethod) marks are awarded for knowing a correct method of solution and attempting to apply it. Method marks cannot be lost for arithmetic mistakes. They can only be awarded if the method used would have led to the correct answer had not an arithmetic mistake been made. In general a correct method is implied by a correct answer and therefore **when a correct answer is given and no work is shown, no method marks are lost**.
- **A**(ccuracy) marks are given for correct answer only (c.a.o.) Incorrect answers, even though nearly correct, score no marks. Accuracy marks are also awarded for incorrect answers which are correctly followed through (f.t.) from an incorrect previous answer, **provided that f.t. is indicated in the mark scheme**. No method (M) or accuracy (A) marks are awarded when a wrong method leads to a correct answer.
- **B** marks are accuracy marks awarded for specific results or statements independent of the method used.

Misreading
M marks can still be earned (unless that part of the question is trivialized) but the final A marks are lost.

Crossed out working
An answer or working that is crossed out and not replaced is marked as if it were not crossed out. If the answer or working is replaced, then the crossed out answer or working is ignored and should not be considered for marking.

Units
In general, missing or inaccurate units are not penalised unless otherwise indicated in the mark scheme.

Other
- Incorrect working or statements following a correct answer are ignored.
- Marks are not sub-divisible; no half marks may be awarded.
- Other abbreviations used:
  - o.e. (or equivalent)
  - e.e.o.o. (each error or omission)
- Markers are advised to indicate the M, A or B marks awarded in the body of the script and then write their total in the margin. The total mark for each question should be written in the table included at the top of page 1 of the main paper. This measure facilitates the moderation of papers.
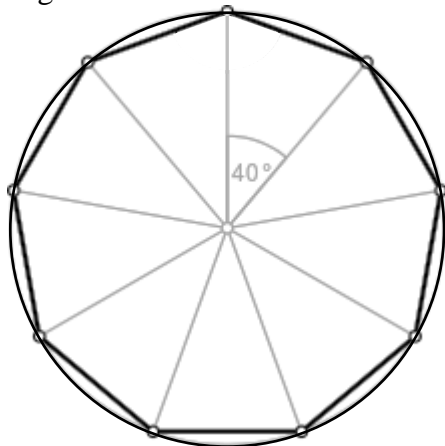
NON CALCULATOR PAPER (Total: 25 Marks)

Quest.		Requirements	Marks	Additional Guidance	Tot
1.	a)	3790	B1		**3**
	b)	42710	B1		
	c)	0.08	B1		
2.		$\frac{30+20}{5} = 10$	B1		**1**
3.	a)	79	B1		**3**
	b)	56	B1		
	c)	69	B1		
4.		$16a + 12b - 6a + 3b$ $10a + 15b$	M1 M1 A1	Opening 1st bracket correctly Opening 2nd bracket correctly	**3**
5.		$5(5a - c)$	B1		**1**
6.	a)	i) $\frac{8}{3}$	B1		**5**
		ii) $2\frac{1}{2}$ or $2\frac{2}{4}$	B1		
	b)	i) $\frac{12-10}{15}$ $= \frac{2}{15}$	M1 A1		
		ii) $\frac{1}{9}$	B1		
7.		$P - b = 2a$ $\frac{P-b}{2} = a$	M1 A1		**2**
8.	a)	$\hat{a} = 40°$ $\hat{b} = 140°$ $\hat{c} = 40°$	B1 B1 B1		**4**
	b)	40°, 140°, 40°, 360°.	B1	All correct, the first three inputs being in any order.	
9.		From 3.20 p.m. till 5.15 p.m. 1hr 55min From 8.45 p.m. till 10.30 p.m. 1hr 45min Total of 3hr 40min	M1 M1 A1		**3**

MAIN PAPER (Total: 75 Marks)

Quest.		Requirements	Mark	Additional Guidance	Tot
1.	a)	i) 17.5 ii) 36.20	B1 B1		**4**
	b)	C) because for example $2^2 = 4$ (greater) but $0.1^2 = 0.01$ (smaller)	B1 M1	Accept other valid explanations	
2.	a)	i) $374\,000 \times 1000$ $\quad = 374\,000\,000$	B1		**4**
		ii) 3.74×10^5	B1	f.t.	
	b)	Ryan Because $3 \times 10^6 = 3\,000\,000$ but $9 \times 10^5 = 90\,000$, which is smaller	B1 M1		
3.	a)	$\frac{8}{25}$, $\frac{2}{5}$, 0.5	B1 B1	for the largest number for the smallest number	**7**
	b)	$\frac{1}{5} + \frac{2}{3} = \frac{3}{15} + \frac{10}{15}$ $= \frac{13}{15}$	M1 A1		
	c)	i) $\frac{1}{5} + \frac{2}{3} + \frac{3}{5} = \frac{22}{15}$ $= \frac{22}{15} - 1 = \frac{7}{15}$	A1 A1		
		ii) B and C	B1	both correct	
4.	a)	$6.3 + 5.4 + 2.0 + 4.6 + 5.4$ $= \frac{23.7}{5}$ $= 4.74$	M1 A1		**8**
	b)	Mode = 5.4	B1		
	c)	$3.7 + 5.8 + 4.1 + 3.9 = 17.5$ $20 - 17.5 = 2.5$	M1 A1		
	d)	2.5 , 3.7 , 3.9 , 4.1 , 5.8 Median = 3.9	M1 A1	f.t. from part c)	
	e)	Range = $5.8 - 2.5 = 3.3$	B1	f.t. from part c)	

5.	a)	300 : 240 : 60 5 : 4 : 1	B2	–1 e.e.o.o.	**8**
	b)	$\frac{960}{5} \times 4$ $= 768$	M1 A1		
	c)	Milk $= \frac{5}{10} \times 5400 = 2700$ Ice cream $= \frac{4}{10} \times 5400 = 2160$ Chocolate sauce $= \frac{1}{10} \times 5400 = 540$	M1 M1 M1 A1	Do not subtract method marks if conversion is not done. Award the accuracy mark if all amounts are correct	
6.	a)	Irregular	B1		**7**
	b)	$y + 34 = 120$ $y = 96$	M1 A1		
	c)	i) $8x + 12$	B1		
		ii) $3x + 3x + 4(2x + 3) + 4(2x + 3) + 3x + 3x = 584$ $12x + 8x + 12 + 8x + 12 = 584$ $28x + 24 = 584$ $28x = 560$ $x = 20$	M1 M1 A1		
7.	a)	1 : 3	B1		**3**
	b)	16.35	B1		
	c)	721.80	B1		
8.	a)	i) 2400 ii) Speed $= \frac{\text{Distance}}{\text{Time}} = \frac{16800}{40 \times 60}$ $= 7$	B1 M1 A1	 f.t. from part i)	**8**
	b)	i) Time $= \frac{\text{Distance}}{\text{Speed}} = \frac{16800}{12.4}$ $= 1354.83871 \approx 1355$ ii) $1354.83871 \div 60$ $= 22.5806... \approx 23$	M1 A1 M1 A1	 f.t. from part b i)	
	c)	$40 - 23 = 17$ Greg arrives first by 17 minutes	B1	Both correct. f.t. from part b ii)	
9.	a)	$\frac{47.5}{100} \times 18\ 000$ $= 8550$	M1 A1		**7**
	b)	$\frac{5580}{18000} \times 100$ $= 31$	M1 A1		
	c)	$\frac{1}{100} \times 18,000 = 180$ $18,000 - 180 =$ $17,820$	M1 M1 A1		

10.	a)	6		B1		**10**
	b)	10 , 12 , 14		B1	All correct	
	c)	(see table below)		A5	–1 e.e.o.o.	
	d)	4		B1		
	e)	158 – 4 = 154		B1	Accept other valid methods	
	f)	C or $(n \times 2) + 4$		B1		

c)

n	Output A
9	**22**
17	38
62	**128**

n	Output B
9	**26**
17	42
62	**132**

11.	a)	$360 \div 9 = 40°$ Accurate drawing of nonagon sides and angles 		M1 A2	–1 e.e.o.o.	**9**
	b)	i) 360°		B1		
		ii) 360 ÷ 24 = 15		M1 A1		
		iii) 180° – 24° = 156°		A1		
		iv) Sum = 180(n – 2) = 180(15 – 2) = 2340 °		M1 A1	Accept other valid methods	