9ME1

Education Bureau Territory-wide System Assessment 2015 Secondary 3 Mathematics Marking Scheme

Note (for Section B and C of each sub-paper):

*Mark for Answer:

- (1) The Mark for Answer may be given when there is a correct answer without any work shown.
- (2) If the work shown is incorrect, the Mark for Answer will not be given.
- (3) If the work shown is poorly presented but there is a correct answer, the Mark for Answer may be given.

**Mark for Presentation:

- (1) If the work shown is correct but the answer is incorrect, the Mark for Presentation may be given.
- (2) If the work shown is incorrect, the Mark for Presentation will not be given.
- (3) If the numerical value of the answer is correct but not the approximate value as required by the question, the Mark for Presentation will not be given.
- (4) The Mark for Presentation may include overall work such as mathematical expressions, units, written explanations, use of symbols, etc.

r.t. xxx means "accept answers which can be rounded to xxx".

Steps that may be skipped are shown in shade.

Alternative suggested answers are shown in boxes.

1.	Α	(9ME2-1)
2.	В	(9ME4-2)
3.	D	
4.	С	
5.	В	
6.	А	
7.	D	
8.	А	(9ME3-8)
9.	С	
10.	D	(9ME2-10)
11.	D	
12.	В	
12. 13.	B A	(9ME4-13)
12. 13. 14.	B A D	(9ME4-13) (9ME3-14)
12. 13. 14. 15.	B A D C	(9ME4-13) (9ME3-14)
12. 13. 14. 15. 16.	B A D C C	(9ME4-13) (9ME3-14)
 12. 13. 14. 15. 16. 17. 	B A D C C B	(9ME4-13) (9ME3-14) (9ME4-17)
 12. 13. 14. 15. 16. 17. 18. 	B A D C C B C	(9ME4-13) (9ME3-14) (9ME4-17) (9ME3-18)
 12. 13. 14. 15. 16. 17. 18. 19. 	B A D C C B C A	(9ME4-13) (9ME3-14) (9ME4-17) (9ME3-18)

Section A - Sub-paper 1 (9ME1) (1 mark each)

Question Number	Suggested Answers	Marks	Notes
21.	(i) <u>+68</u> / <u>68</u>	1	
(9ME2-21)	(ii) <u>-95</u>	1	Must be all correct
22.			(Acceptable range:
		1	7 (2)
	-4 -2 0 2 4		$-4 < -\frac{1}{2} < -3$
23.	<i>S</i> = <u>1830</u>	1	
24.	n^2	1	
25.	$-3a^2 + a^4 \swarrow a^4 - 3a^2$	1	
26.	$(x+y)(k+1) \swarrow (k+1)(x+y)$	1	
(9ME4-26)		1	
27.	$(x-1)(x+6) \swarrow (x+6)(x-1)$	1	
(9ME3-27)		1	
28.	$x = \underline{7}$	1	
(9ME3-28)		1	
29.	2x	1	
(9ME2-29)	3 <i>y</i>	1	
30.	$-\frac{5}{-5}$ < $-\frac{5}{-5}$	1	
(9ME2-30)	3 4	-	
31.	The total surface area of the cuboid is 386 cm ² .	1	
32.		1	The figure has 5 axes of symmetry
33.	(a) $x = 55$	1	Unit may not be
(9ME4-33)	(b) $y = 6$	1	considered

Section B - Sub-paper 1 (9ME1)

Question Number	Suggested Answers					Marks	Notes		
34.	<i>x</i> = 108					1	Unit may not be considered		
35.	$\angle BED / \angle L$	DEB						1	
(9ME3-35)								1	
36.	<i>B</i> , <i>C</i>							1	Must be all correct
(9ME4-37)								1	What be all confect
37.	The polar coor	dinates	of point	D are	(<u>2</u> ,	<u>120°</u>).		1	Must be all correct
(9ME2-37)								1	and in order
38.	$\theta = 78.5^{\circ}$								r.t. 78.5°
								1	Unit may not be
									considered
39.	(i) Discrete d	lata						1	Must be all correct
	(ii) Continuou	ıs data						1	Must be all confect
40.	(a)								
	Group	А	В	С	D	Е	F		
	Time (s)	11 – 15	16 - 20	21 – 25	26 - 30	31 - 35	36-40		
	Frequency	3	12	23	21	15	6	1 (40a)	Must be all correct
						1			
	(b) <u>15</u> students took less than 20.5 s to solve the				olve the	1 (40b)			
	online pro	blem.							
	(c) The time	taken by	Jacky	should	belong (o group	• <u> </u>	1 (40c)	
41.	The required en	mpirical	probab	ility =	$\frac{41}{100}$			1	Or 0.41

Section C -	Sub-paper 1 (9ME1)
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Question Number	Suggested Answers	Marks	Notes
42.	Cost price = $$330 \div 55\%$	1 (42-1)	
(9ME4-42)	= \$600	1* (42-2)	
		1** (42-3)	
43.	Interest = $7500 \times (1 + 6\%)^2 - 7500$	1 (43-1)	
	= \$927	1* (43-2)	
		1** (43-3)	
44.	$\int 5x + 2y = 31 \qquad \dots (1)$		
(9ME2-44)	$\begin{cases} 3x + 2y = 25 \qquad \dots (2) \end{cases}$		
	(1) - (2):		
	2x = 6	1 (44-1)	Correct method (eliminate one of the variables)
	<i>x</i> = 3	1* (44-2)	Correct value of x (or y)
	Substitute $x = 3$ into (2)		
	3(3) + 2y = 25	1 (44-3)	Correct method
	<i>y</i> = 8		
		1* (44-4)	Both values are correct
45.	$\angle BCF + 113^\circ = 180^\circ$ (adj. $\angle s$ on a st. line)		
(9ME3-45)	$\angle BCF = 67^{\circ}$		
	$\angle ABE = 67^{\circ}$ (given)		
	$\therefore \ \angle BCF = \angle ABE = 67^{\circ}$		
	$\therefore BE // CF \qquad (corr. \angle s equal)$		
	$\angle EBC + 67^\circ = 180^\circ$ (adj. \angle s on a st. line)		Or other correct proofs
	$\angle EBC = 113^{\circ}$		
	$\angle FCD = 113^{\circ}$ (given)		
	$\therefore \angle EBC = \angle FCD = 113^{\circ}$		
	$\therefore BE // CF \qquad (corr. \angle s equal)$		
	Marking Scheme:		
	(1) Any correct proof with correct reasons	3	
	(2) Any correct proof with poor presentation or without reasons	2	
	(3) Incomplete proof with any one correct statement and one corresponding reason	1	
	(4) Incomplete proof	0	

46. The area of the sector	
$ (9ME4-46) = \pi (6^2) \left(\frac{50^{\circ}}{360^{\circ}} \right) $ 1 (46-1)	
≈ 15.70796327	
$= 15.7 \text{ cm}^2(\text{corr. to the nearest } 0.1 \text{ cm}^2)$ 1* (46-2) r.t. 15.7 cm ²	
1** (46-3)	
47. The curved surface area of the cone	
$= \pi \times 20 \times 29 \qquad \qquad 1 (47-1)$	
$=580\pi\mathrm{cm}^2$ 1* (47-2)	
1** (47-3)	
48. (Students must find the approximation 0 0 No • Exact calculation	
(9ME3-48) for the weight of each machine) evidence of using + The estimate is gi	ven only
estimation after exact	
The maximum number of machines tostrategies nor• Use rounding d	own to
be carried giving reasonable estimate	
$=\frac{1800}{1000}$	
58.810Partial• Give an approxim	nation of
$\approx \frac{1800}{1000}$ evidence of using the weight of the	machine
60 estimation correctly	
$= 30$ strategies, but the \bullet Approximate the	weight
solution is correctly, but the	required
\therefore The lorry can carry at most 30 incomplete or maximum num	ber of
machines each time. contains errors machines is om	itted or
wrongly estimated	
• Correct method v	ised, but
minor errors occur	red
I I Estimate + No need to	consider
with reasonable unit/presentation	. 1
justification • The conclusion	must be
correct and aligne	u with a
For reference only	
$\frac{1800}{58.8} \approx 30.61$	

Question Number	Suggested Answers				Marks	Notes
49.	The area of the pentagon ABCDE					
	$=4\times 6+\frac{4\times 2}{2}$				1 (49-1)	
	= 28 sq.	units			1* (49-2)	
					1** (49-3)	
50.		Table 1				
		Waiting time (min)	Frequency			
		0-9	5			
		10 – 19	8		1* (50-1)	Must be all correct
		20 - 29	7			
		Table 2				
		Waiting time (min)	Frequency			
		0-5	5			
		6 – 11	3		1* (50-2)	Must be all correct
		12 – 17	4			
		18 - 23	5			
		24 - 29	3			

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- (4) The Mark for Presentation may include overall work such as mathematical expressions, units, written explanations, use of symbols, etc.

r.t. xxx means "accept answers which can be rounded to xxx".

Steps that may be skipped are shown in shade.

Alternative suggested answers are shown in boxes.

1.	А	(9ME1-1)
2.	С	(9ME3-2)
3.	А	
4.	В	(9ME4-4)
5.	С	
6.	С	(9ME4-6)
7.	D	
8.	D	
9.	D	
10.	D	(9ME1-10)
11.	С	
11. 12.	C B	(9ME3-12)
11. 12. 13.	C B B	(9ME3-12)
 11. 12. 13. 14. 	C B B A	(9ME3-12) (9ME3-13)
 11. 12. 13. 14. 15. 	C B B A D	(9ME3-12) (9ME3-13)
 11. 12. 13. 14. 15. 16. 	C B A D C	(9ME3-12) (9ME3-13)
 11. 12. 13. 14. 15. 16. 17. 	C B A D C B	(9ME3-12) (9ME3-13)
 11. 12. 13. 14. 15. 16. 17. 18. 	C B A D C B A	(9ME3-12) (9ME3-13)
 11. 12. 13. 14. 15. 16. 17. 18. 19. 	C B A D C B A A	(9ME3-12) (9ME3-13)

Section A - Sub-paper 2 (9ME2) (1 mark each)

Question Number	Suggested Answers	Marks	Notes
21. (9ME1-21)	(i) $\pm 68 \ / \ 68$ (ii) -95	1	Must be all correct
22.	$x^3 - 6x^2 + 11x - 6$	1	
23.	The print speed of the printer is <u>24</u> pages / min.	1	
24.	The value of the 4^{th} term of the sequence is <u>17</u> .	1	
25. (9ME3-25)	$4x^2 + x^2y - xy$	1	
26.	$(x+3)^2 \swarrow (x+3)(x+3)$	1	
27. (9ME4-27)	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	1	Correct straight line (include: correct position and the range of x includes the values from – 2 to 2)
28. (9ME3-30)	P = 4(N-1) / P = 4N-4	1	
29. (9ME1-29)	$\frac{2x}{3y}$	1	
30. (9ME1-30)	$-\frac{5}{3}$ < $-\frac{5}{4}$	1	
31. (9ME3-31)	x > -3	1	
32.	The order of rotational symmetry is <u>3</u> .	1	
33.	$x = \underline{75}$	1	Unit may not be considered

Section B – Sub-paper 2 (9ME2)

Question Number	Suggested Answers		Notes
34. (9ME4-34)	$x = \underline{22.5^{\circ}}$		Unit may not be considered
35.	GHIJ or its correct permutation	1	
36.	x = 6	1	
37. (9ME1-37)	The polar coordinates of point D are $(2, 120^{\circ})$.	1	Must be all correct and in order
38.	The slope of $L = \frac{2}{5}$	1	
39. (9ME3-39)	$(1) \rightarrow (4) \rightarrow (3) \rightarrow (2)$	1	
40.	Median = 80 marks	1 (40-1)	
	Mean = $\underline{78}$ marks	1 (40-2)	
41. (9ME3-41)	The modal class of the travelling distances is $381 \text{ km} - 400 \text{ km}$.	1	Must be all correct

Section C - Sub-paper 2 (9ME2)

Question Number	Suggested Answers	Marks	Notes
42.	Let the amount of money borrowed by Vivian be \$ <i>P</i> .		
	$P \times 5\% \times 3 = 789$	1 (42-1)	
	P = 5260	1* (42-2)	
	∴ The amount of money Vivian borrows is \$5 260.	1** (42-3)	
43.	$\frac{12}{x} = \frac{1}{63+1}$	1 (43-1)	Accept $\frac{12}{x} = \frac{1}{64} / \frac{12}{x-12} = \frac{1}{63} / \frac{12}{63}$
	<i>x</i> = 768	1* (43-2) 1** (43-3)	$\frac{x-12}{x} = \frac{63}{64}$ /
			$x = 12 \times 64 / x = 12 \times 63 + 12$
44. (9ME1-44)	$\begin{cases} 5x + 2y = 31 & \dots(1) \\ 3x + 2y = 25 & \dots(2) \end{cases}$		
	(1) - (2):		
	2x = 6	1 (44-1)	Correct method (eliminate one of the variables)
	x = 3	1* (44-2)	Correct value of x (or y)
	Substitute $x = 3$ into (2)	1	
	3(3) + 2y = 25	1 (44-3)	Correct method
	y = 0	1* (44-4)	Both values are correct
45.	AD = CD (given)		Or other correct proofs
(9ME4-45)	$\angle ADB = \angle CDB$ (given)		
	BD = BD (common side)		
	$\therefore \triangle ABD \cong \triangle CBD \qquad (SAS)$		
	Marking Scheme:		
	(1) Any correct proof with correct reasons	3	
	(2) Any correct proof with poor presentation or without reasons	2	
	(3) Incomplete proof with any one correct statement and one corresponding reason	1	
	(4) Incomplete proof	0	

Question Number	Suggested Answers	Marks	Notes
46.	The length of \widehat{AB} = $2\pi(5)\left(\frac{140^{\circ}}{360^{\circ}}\right)$ ≈ 12.21730476	1 (46-1)	
	= 12.2 cm (corr. to 3 sig. fig.)	1* (46-2) 1** (46-3)	r.t. 12.2 cm
47.	The volume of the sphere		
	$= \frac{4}{3}\pi(3^3)$	1 (47-1)	
	$=36\pi\mathrm{cm}^3$	1* (47-2) 1** (47-3)	
48. (9ME4-48)	The length of 2 computer rooms is approximately equal to the length of 3 classrooms. The length of each classroom $\approx 12 \times 2 \div 3$	0 0 No evidence of using estimation strategies nor giving reasonable	 Answer only, without any working steps or written explanation The explanation is irrelevant or unreasonable
	= 8 m The length of the corridor $\approx (8 \times 7)$ m = 56 m (Acceptable range: 54 m to 63 m)	1 0 Partial evidence of using estimation strategies, but the solution is incomplete or contains errors	 Using reasonable estimation strategies, but the solution is incomplete, for instance: estimate the length of a classroom only state the length of the corridor is approximately equal to the length of 4.5 computer rooms only The explanation is reasonable, but the answer is outside the acceptable range The explanation is reasonable, but minor errors occurred
		11Estimatewithreasonablejustification	The answer must be supported by reasonable explanation and within the acceptable range

Question Number	Sugg	ested Answers	Marks	Notes
49.				
(9ME3-49)	The marks of 15 students in a dictation		1 (49-1)	Correct data on the stem
	Stem (10 marks)	Leaf (1 mark)		and leaf in any one of the
	1	1 2 5 8		rows (no need to consider
	2	4 4 9		ordering)
	3	7 8		
	4	2 5 8 8	1 (49-2)	Correct data on the stem
	5	0 0		and leaf in all rows (no
				need to consider ordering)
			1* (49-3)	Correct stem-and-leaf diagram (include: the
				correct ordering of the data
				on the stem and leaf, the
				length of the leaf is
				proportional to the
				trequency of the
				corresponding row of data,
				between the data)
				between the data)
50.	Mean weight			
(9ME4-50)	$18 \times 8 + 23 \times 32 + 32$	$28 \times 14 + 33 \times 6$	1 (50-1)	
	60			
	144 + 736 + 392 +	198		
	=60			
	= 24.5 kg		1* (50-2)	
			1** (50-3)	

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**Mark for Presentation:

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r.t. xxx means "accept answers which can be rounded to xxx".

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1.	С	(9ME4-1)
2.	С	(9ME2-2)
3.	В	
4.	В	
5.	D	(9ME4-5)
6.	А	
7.	С	
8.	А	(9ME1-8)
9.	С	
10.	А	
11.	А	(9ME4-11)
12.	В	(9ME2-12)
13.	А	(9ME2-14)
14.	D	(9ME1-14)
15.	D	
16.	D	(9ME4-16)
17.	В	
18.	С	(9ME1-18)
19.	В	
20.	D	

Section A - Sub-paper 3 (9ME3) (1 mark each)

Section B - Sub-paper 3 (9ME3)

Question Number	Suggested Answers	Marks	Notes
21.	A = -2		
	B = -8	1	Must be all correct
	C = 6/+6		
22.	The number of students is <u>105</u> .	1	
23. (9ME4-23)	x = 10 y = 25	1	Must be all correct
24. (9ME4-24)	$-2x^{2}+9x / 9x-2x^{2} / x(-2x+9) / x(9-2x)$	1	
25. (9ME2-25)	$4x^2 + x^2y - xy$	1	
26.	4.09	1	
27. (9ME1-27)	(x-1)(x+6) / (x+6)(x-1)	1	
28. (9ME1-28)	$x = \underline{7}$	1	
29. (9ME4-28)	$4 - 4x + x^2 \swarrow x^2 - 4x + 4$	1	
30. (9ME2-28)	$P = 4(N-1) \checkmark P = 4N-4$	1	
31. (9ME2-31)	x > -3	1	
32.	P, S	1	Must be all correct
33.	(a) $x = 70$		Must be all correct
	(b) $y = 80$	1	Unit may not be considered
34.	<i>a</i> = 46	1 (34-1)	Unit may not be
	b = 40	1 (34-2)	considered
35. (9ME1-35)	$\angle BED / \angle DEB$	1	
36.	OA = 3.6 km	1	
37.	The coordinates of point P are $(-1, 3)$.	1	Must be all correct
38.	x = <u>23.6</u>	1	r.t. 23.6
39. (9ME2-39)	$(1) \rightarrow (4) \rightarrow (3) \rightarrow (2)$	1	
40. (9ME4-40)	6 students have a body temperature of 37.5°C or above.	1	
41. (9ME2-41)	The modal class of the travelling distances is $381 \text{ km} - 400 \text{ km}$.	1	Must be all correct

Section C - Sub-paper 3 (9ME3)

Question Number	Suggested Answers	Marks	Notes
42.	Selling price = $840 \times 80\%$	1 (42-1)	
	= \$672	1* (42-2)	
		1** (42-3)	
13	The present value of the smartphone		
ч.Э. (9МЕ4-43)	$-4400 \times (1 - 35\%)^2$	1 (42 1)	
()ML++5)	$= 4400 \times (1 - 55\%)$	1 (43-1) 1 * (42.2)	
	- \$1839	$1^{+}(43-2)$	
		1*** (43-3)	
	OR		
	4400 - 0 65 - 2860	1 (12.1)	
	$4400 \times 0.65 = 2800$	1 (43-1)	Correct method (multiply
	$2800 \times 0.05 = 1839$	1* (43-2)	0.65 two times)
4.4	The present value of the smartphone is \$1859.	1* (43-3)	
44.	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	1* (44-1)	Must be all correct
	y 4 1 0	1	T (1 1 (1 1
		1 (44-2)	In case the data in the above
			table is incorrect, students can
			still use the ordered pairs to
			draw a straight line. The line
	$\begin{array}{c c} x+y+z \neq 0 \\ \hline 3 \end{array}$		must pass through (1, 1) and
			the range of x must include
			the values from -2 to 2.
		1* (44-3)	Correct straight line (include:
			correct position, use ruler to
			draw the line, pass through
	3		the 3 points and extend two
			ends of the line)
			If the data in the table is
			correct but not complete and
			the graph is correct, $(0, 1, 1)$
			can be given.

Question Number	Suggested Ar	nswers	Marks	Notes
45.	$\angle BCF + 113^\circ = 180^\circ$	(adj. ∠s on a st. line)		
(9ME1-45)	$\angle BCF = 67^{\circ}$			
	$\angle ABE = 67^{\circ}$	(given)		
	$\therefore \ \angle BCF = \angle ABE = 67^{\circ}$			
	:. BE // CF	(corr. ∠s equal)		
	$\angle EBC + 67^\circ = 180^\circ$	(adj. \angle s on a st. line)		Or other correct proofs
	$\angle EBC = 113^{\circ}$			
	$\angle FCD = 113^{\circ}$	(given)		
	$\therefore \ \angle EBC = \angle FCD = 113^{\circ}$			
	$\therefore BE // CF$	(corr. ∠s equal)		
	Marl	ting Scheme:		
	(1) Any correct proof with co	rrect reasons	3	
	(2) Any correct proof with poor presentation or without reasons		2	
	(3) Incomplete proof with an and one corresponding re-	y one correct statement ason	1	-
	(4) Incomplete proof		0	
46.	(a) $2\pi r = 34\pi$		1 (46-1)	
	<i>r</i> = 17		1* (46-2)	
	(b) The area of the circle			
	$=\pi(17)^2$		1 (46-3)	Correct method
	$=289\pi\mathrm{cm}^2$		1* (46-4)	
			1** (46-5)	
47.	$\therefore \triangle BCD$ is an equilateral tri	angle,		
	$\angle BCD = 60^{\circ}$			
	$74^{\circ} + 60^{\circ} + x = 180^{\circ}$		1 (47-1)	
	$x = 180^{\circ} - 74^{\circ} - 60^{\circ}$			
	$x = 46^{\circ}$		1* (47-2)	
			1** (47-3)	

Question Number	Suggested	Answers	Marks	Notes
48.	(Students must	t find the	0 0 No	Exact calculation
(9ME1-48)	approximation for t machine) The maximum num	the weight of each	evidence of using estimation strategies nor giving reasonable	 The estimate is given only after exact Use rounding down to estimate
	$=\frac{1800}{58.8}$ $\approx\frac{1800}{60}$ = 30 ∴ The lorry can can machines each time	rry at most 30 5.	1 0 Partial evidence of using estimation strategies, but the solution is incomplete or or contains errors 0 1 1 Estimate with reasonable justification 1	 Give an approximation of the weight of the machine correctly Approximate the weight correctly, but the required maximum number of machines is omitted or wrongly estimated Correct method used, but minor errors occurred No need to consider unit/presentation The conclusion must be correct and aligned with a reasonable explanation For reference only: <u>1800</u> ≈ 30.61
40			1 (40.1)	Jo.o
49. (9ME2-49)	The marks of in a dia	f 15 students ctation	1 (49-1)	correct data on the stem and leaf in any one of the rows (no need to consider ordering)
	Stem (10 marks) 1 2 3 4 5	Leaf (1 mark) 1 2 5 8 4 4 9 7 8 2 5 8 8 0 0	1 (49-2) 1* (49-3)	Correct data on the stem and leaf in all rows (no need to consider ordering) Correct stem-and-leaf diagram (include: the correct ordering of the data on the stem and leaf, the
		L		length of the leaf is proportional to the frequency of the corresponding row of data, and without commas between the data)

9ME3

Question Number	Suggested Answers	Marks	Notes
50.	(a) $B \longrightarrow B = G$ $G \oplus G$ $B \oplus G \oplus G$ $B \oplus G \oplus G$ $B \oplus G \oplus G$ $G \oplus G$ $G \oplus G \oplus G$ $G \oplus G$	1* (50a)	Must be all correct
	(b) The required probability = $\frac{3}{8}$	1* (50b)	Or 0.375

Education Bureau Territory-wide System Assessment 2015 Secondary 3 Mathematics Marking Scheme

Note (for Section B and C of each sub-paper):

*Mark for Answer:

- (1) The Mark for Answer may be given when there is a correct answer without any work shown.
- (2) If the work shown is incorrect, the Mark for Answer will not be given.
- (3) If the work shown is poorly presented but there is a correct answer, the Mark for Answer may be given.

**Mark for Presentation:

- (1) If the work shown is correct but the answer is incorrect, the Mark for Presentation may be given.
- (2) If the work shown is incorrect, the Mark for Presentation will not be given.
- (3) If the numerical value of the answer is correct but not the approximate value as required by the question, the Mark for Presentation will not be given.
- (4) The Mark for Presentation may include overall work such as mathematical expressions, units, written explanations, use of symbols, etc.

r.t. xxx means "accept answers which can be rounded to xxx".

Steps that may be skipped are shown in shade.

Alternative suggested answers are shown in boxes.

1.	С	(9ME3-1)
2.	В	(9ME1-2)
3.	D	
4.	В	(9ME2-4)
5.	D	(9ME3-5)
6.	С	(9ME2-6)
7.	D	
8.	С	
9.	А	
10.	С	
11.	А	(9ME3-11)
12.	А	
13.	А	(9ME1-13)
14.	А	
15.	В	
16.	D	(9ME3-16)
17.	В	(9ME1-17)
18.	С	
19.	В	
20.	D	

Section A – Sub-paper 4 (9ME4) (1 mark each)

Section B – Sub-paper 4 (9ME4)

Question Number	Suggested Answers	Marks	Notes
21.	(a) -15 (b) 2	1	Must be all correct
22.	No. of red balls : no. of yellow balls : no. of green balls = $\underline{10}$: $\underline{13}$: $\underline{17}$	1	
23. (9ME3-23)	$\begin{array}{c} x = \underline{10} \\ y = \underline{25} \end{array}$	1	Must be all correct
24. (9ME3-24)	$-2x^{2}+9x / 9x-2x^{2} / x(-2x+9) / x(9-2x)$	1	
25.	$3x^2 + 2x - 1$	1	
26. (9ME1-26)	$(x+y)(k+1) \swarrow (k+1)(x+y)$	1	
27. (9ME2-27)	$ \begin{array}{c} $	1	Correct straight line (include: correct position and the range of x includes the values from -2 to 2)
28. (9ME3-29)	$4 - 4x + x^2 \swarrow x^2 - 4x + 4$	1	
29.	8	1	
30.	$P = 4(N-1) \swarrow P = 4N-4$	1	
31.	x > -4	1	

Question Number	Suggested Answers	Marks	Notes
32.		1	
33. (9ME1-33)	(a) $x = 55$ (b) $y = 6$	1	Must be all correct Unit may not be considered
34. (9ME2-34)	$x = \underline{22.5^{\circ}}$	1	Unit may not be considered
35.	I, III $\nearrow RU, FG$	1	Must be all correct
36.	$\angle VBC / \angle CBV$	1	
37. (9ME1-36)	<i>B</i> , <i>C</i>	1	Must be all correct
38.	The coordinates of P' are $(-4, 4)$.	1	Must be all correct
39.	 (a) At <u>18:00</u>, the relative humidity was equal to 65%. (b) The difference of the relative humidity between 	1 (39a)	
	19:00 and 22:00 was <u>16</u> %.	1 (39b)	
	(c) At <u>20:00</u> , the relative humidity increased	1 (39c)	
	most as compared to the relative humidity one hour before.		
40.	<u>6</u> students have a body temperature of 37.5°C or	1	
(9ME3-40)	above.	-	
41.	The weighted mean mark of Cindy is <u>78.9</u> .	1	

Question Number	Suggested Answers	Marks	Notes
42.	Cost price = \$330 ÷ 55%	1 (42-1)	
(9ME1-42)	= \$600	1* (42-2)	
		1** (42-3)	
43.	The present value of the smartphone		
(9ME3-43)	$=4400 \times (1 - 35\%)^2$	1 (43-1)	
	= \$1859	1* (43-2)	
		1** (43-3)	
	OR		
	$4400 \times 0.65 = 2860$	1 (43-1)	Correct method (multiply 0.65
	$2860 \times 0.65 = 1859$	1* (43-2)	two times)
	The present value of the smartphone is \$1859.	1** (43-3)	
44.	$(a) (x^{-4})^{-2}$		
	$=x^{8}$	1* (44-1)	
	$(x^{-4})^{-2} y^{3}$		
	(b) $\frac{y^6}{y^6}$		
	$=\frac{(x^{-4})^{-2}}{y^3}$	1 (44-2)	Using $\frac{y^{n}}{y^{m}} = \frac{1}{y^{m-n}}$ or $\frac{y^{n}}{y^{m}} = y^{n-m}$
	x ⁸		Correct answer
	$=\frac{x}{y^3}$	1* (44-3)	(getting marks 1 1)
45	AD - ED (given)		Or other correct proofs
+3.	AD = LD (given) ADB = /FDB (given)		of other contect proofs
()11112 (3)	$BD = BD \qquad (common side)$		
	$\frac{BD}{ABD} \simeq \triangle FBD \qquad (\text{common side})$		
	Marking Scheme:		
	(1) Any correct proof with correct reasons	3	
	(2) Any correct proof with poor presentation or	2	
	(3) Incomplete proof with any one correct		
	statement and one corresponding reason	1	
	(4) Incomplete proof	0	

Section C – Sub-paper 4 (9ME4)

Question Number	Suggested Answers	Marks	Notes
46.	The area of the sector		
(9ME1-46)	$=\pi(6^2)\left(\frac{50^\circ}{360^\circ}\right)$	1 (46-1)	
	≈ 15.70796327		
	= 15.7 cm^2 (corr. to the nearest 0.1 cm^2)	1* (46-2)	r.t. 15.7 cm^2
		1** (46-3)	
47.	The volume of the cylinder		
	$=\left(\frac{8}{2}\right)^2\pi\times9$	1 (47-1)	
	$= 144 \pi \mathrm{cm}^3$	1* (47-2)	
		1** (47-3)	
48.	The length of 2 computer rooms is	0 0 No	• Answer only, without any
(9ME2-48)	approximately equal to the length of 3	evidence of using	working steps or written
	classrooms.	estimation	explanation
		strategies nor	• The explanation is irrelevant or
	The length of each classroom	giving reasonable	unreasonable
	$\approx 12 \times 2 \div 3$	justification	
	= 8 m	1 0 Partial	• Using reasonable estimation
	The length of the corridor	evidence of using	strategies, but the solution is
	$\approx (8 \times 7) \text{ m}$	estimation	incomplete, for instance:
	= 56 m	strategies, but the	- estimate the length of a
	(Acceptable range: 54 m to 63 m)	solution is	classroom only
		incomplete or	- state the length of the
		contains errors	corridor is approximately
			equal to the length of 4.5
			computer rooms only
			• The explanation is reasonable,
			but the answer is outside the
			acceptable range
			• The explanation is reasonable,
		1 1 5.4	but minor errors occurred
		I I Estimate	The answer must be supported by
		with reasonable	the acceptable range
		justification	the acceptable range

Question Number	Suggested Answers	Marks	Notes
49.	$\cos\theta = \frac{BC}{AC}$		
	$\cos\theta = \frac{12}{22}$	1 (49-1)	
	$\theta \approx 56.94426885^{\circ}$		
	θ = 56.9° (Cor. to 3 sig. fig.)	1* (49-2)	r.t. 56.9°
		1** (49-3)	
50. (9ME2-50)	Mean weight = $\frac{18 \times 8 + 23 \times 32 + 28 \times 14 + 33 \times 6}{60}$	1 (50-1)	
	$= \frac{144 + 736 + 392 + 198}{60}$		
	= 24.5 kg	1* (50-2)	
		1** (50-3)	