

**Education Bureau**  
**Territory-wide System Assessment 2021**  
**Secondary 3 Mathematics**  
**Marking Scheme**

**CANCELLED**

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.
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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.

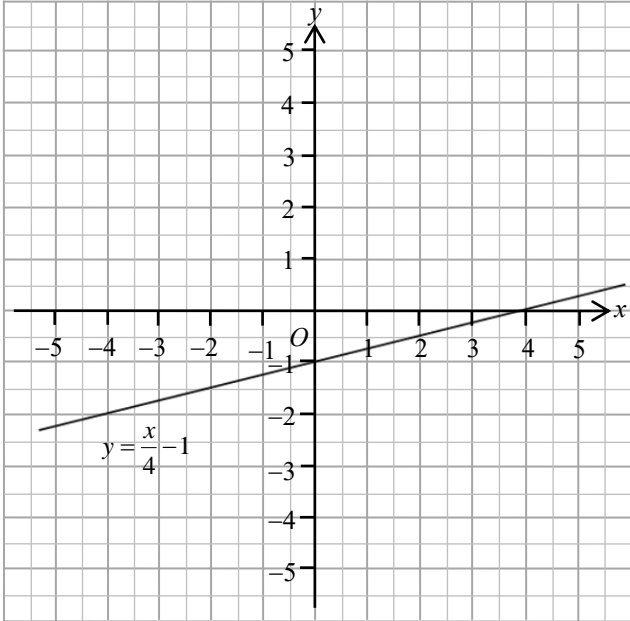
## Section A – Sub-paper 1 (9ME1) (1 mark each)

1. B (9ME4-1)
2. C
3. D (9ME4-3)
4. B
5. A (9ME4-5)
6. D (9ME2-7)
7. D
8. A (9ME4-8)
9. C
10. C
11. A
12. C (9ME2-11)
13. A
14. A (9ME4-13)
15. B (9ME2-15)
16. B
17. C
18. D (9ME2-18)
19. D (9ME2-19)
20. B (9ME4-20)

## Section B – Sub-paper 1 (9ME1)

Question Number	Suggested Answers	Marks	Notes
21.	$A = 3 / +3$ $B = -1$ $C = -5$	1	Must be all correct
22.	60 000	1	
23. (9ME4-23)	$r = \underline{2}$	1	
24. (9ME2-24)	The value of the 6 <sup>th</sup> term of the sequence is <u>84</u> .	1	
25.	$4 - x$	1	
26.	$(3 + x)(3 - x)$	1	
27. (9ME4-27)	$x = \underline{2}$	1	
28. (9ME2-28)	approximate solution	1	
29.	$m = 5a + 1$	1	
30.	$x \leq -4$	1	
31.	The order of rotational symmetry is <u>5</u> .	1	
32.	(a) $x = \underline{9}$ (b) $y = \underline{80}$	1	Must be all correct No need to consider unit
33.	$x = \underline{45^\circ}$	1	No need to consider unit
34.	$ED / DE$	1	
35. (9ME2-35)	$X$ and $Y$	1	Must be all correct
36.	The coordinates of point $S'$ are ( <u>4</u> , <u>2</u> ).	1	Must be all correct
37.	(i) Continuous data (ii) Discrete data	1	Must be all correct
38. (9ME2-38)	(a) The value of $x$ is <u>46</u> . (b) The total number of students of that level is <u>180</u> . (c) The percentage of Secondary 3 students going to school by bus or minibus is <u>75%</u> .	1 (38a) 1 (38b) 1 (38c)	No need to consider unit
39. (9ME4-39)	Mean = <u>26</u> Median = <u>27</u>	1 (39-1) 1 (39-2)	

## Section C – Sub-paper 1 (9ME1)

Question Number	Suggested Answers	Marks	Notes								
40. (9ME4-40)	The amount = $\$20\,000 \times (1 + 3\%)^2$ = $\$21\,218$	1 (40-1) 1* (40-2) 1** (40-3)									
41.	<p>The number of customers in May = <math>6\,400 \times (1 - 25\%)^2</math> = <math>3\,600</math> <math>\therefore</math> The number of customers in May is <math>3\,600</math>.</p> <p>OR</p> <table border="1" data-bbox="264 846 539 936"> <tr><td><math>6\,400 \times 0.75 = 4\,800</math></td></tr> <tr><td><math>4\,800 \times 0.75 = 3\,600</math></td></tr> </table> <p>The number of customers in May is <math>3\,600</math>.</p>	$6\,400 \times 0.75 = 4\,800$	$4\,800 \times 0.75 = 3\,600$	<p>1 (41-1) 1* (41-2) 1** (41-3)</p> <p><math>\boxed{1}</math> <math>\boxed{1^*}</math> <math>\boxed{1^{**}}</math></p>	<p><math>\boxed{\text{Correct method (multiply 0.75 two times)}}</math></p>						
$6\,400 \times 0.75 = 4\,800$											
$4\,800 \times 0.75 = 3\,600$											
42. (9ME4-42)	<table border="1" data-bbox="347 1070 807 1169"> <tr><td><math>x</math></td><td><math>-4</math></td><td><math>0</math></td><td><math>4</math></td></tr> <tr><td><math>y</math></td><td><math>-2</math></td><td><math>-1</math></td><td><math>0</math></td></tr> </table> 	$x$	$-4$	$0$	$4$	$y$	$-2$	$-1$	$0$	<p>1* (42-1)</p> <p>1 (42-2)</p> <p>1* (42-3)</p>	<p>Must be all correct</p> <p>In case the data in the above table is incorrect, students can still use the ordered pairs to draw a straight line. The line must pass through <math>(0, -1)</math> and the range of <math>x</math> must include the values from <math>-4</math> to <math>4</math>.</p> <p>Correct graph (include: correct position, use ruler to draw the line, pass through the 3 correct points and extend two ends of the line)</p> <p>If the table is incomplete but no mistakes are found and the graph is correct, <math>(0, 1, 1)</math> can be given.</p>
$x$	$-4$	$0$	$4$								
$y$	$-2$	$-1$	$0$								

Question Number	Suggested Answers	Marks	Notes
43. (9ME2-43)	$\begin{cases} y = 7x + 10 & \dots(1) \\ y = 5x + 8 & \dots(2) \end{cases}$ <p>Substitute (2) into (1),</p> $7x + 10 = 5x + 8$ $7x - 5x = 8 - 10$ $x = -1$ <p>Substitute <math>x = -1</math> into (2),</p> $y = 5(-1) + 8$ $y = 3$	<p>1 (43-1)</p> <p>1* (43-2)</p> <p>1 (43-3)</p> <p>1* (43-4)</p>	<p>Correct method (eliminating one of the variables)</p> <p>Correct value of <math>y</math> (or <math>x</math>)</p> <p>Correct method</p> <p>Both values are correct</p>
44. (9ME2-44)	$\frac{AB}{AD} = \frac{2+4}{2} = 3$ $\frac{AC}{AE} = \frac{3+6}{3} = 3$ $\therefore \frac{AB}{AD} = \frac{AC}{AE}$ $\angle BAC = \angle DAE \quad (\text{common})$ $\therefore \triangle ABC \sim \triangle ADE \quad (\text{ratio of 2 sides, inc. } \angle)$		Or other correct proofs
<b>Conditions</b>			
	(1) Any correct proof with correct reasons	3	
	(2) Any correct proof with poor presentation, missing reasons or inappropriate reasons	2	
	(3) Incomplete proof with any one correct statement and one corresponding reason	1	
	(4) Incomplete proof	0	
45. (9ME3-46)	$x + 15^\circ = 35^\circ$ $x = 20^\circ$	<p>1 (45-1)</p> <p>1* (45-2)</p>	
46.	$x = 2\pi(5)\left(\frac{225^\circ}{360^\circ}\right)$ $\approx 19.634954$ $= 19.6 \text{ cm (corr. to 3 sig. fig.)}$	<p>1 (46-1)</p> <p>1* (46-2)</p> <p>1** (46-3)</p>	r.t. 19.6 cm

Question Number	Suggested Answers	Marks	Notes
47.	<p>Half of the number is 5. There are only 4 passengers with a check-in duration of 15 minutes or less. Therefore, it is not true that more than half of them can finish their check-in in 15 minutes.</p> <p style="text-align: center;">OR</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>Half of the number is 5. There are 6 passengers with a check-in duration of more than 15 minutes. Therefore, it is not true that more than half of them can finish their check-in in 15 minutes.</p> </div> <p>∴ I <b>disagree</b> with the airline's claim.</p>	0 0	<ul style="list-style-type: none"> <li>◆ Without any reasonable explanation</li> <li>◆ Conclusion is incorrect</li> </ul>
		1 0	<ul style="list-style-type: none"> <li>◆ Explanation is reasonable but incomplete</li> <li>◆ Explanation is reasonable but no conclusion is drawn</li> </ul>
		1 1	<ul style="list-style-type: none"> <li>◆ Explanation is reasonable and the conclusion is correct</li> </ul>

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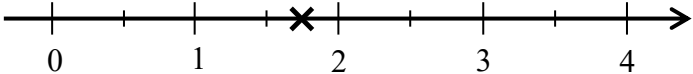
Alternative suggested answers are shown in boxes.

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

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



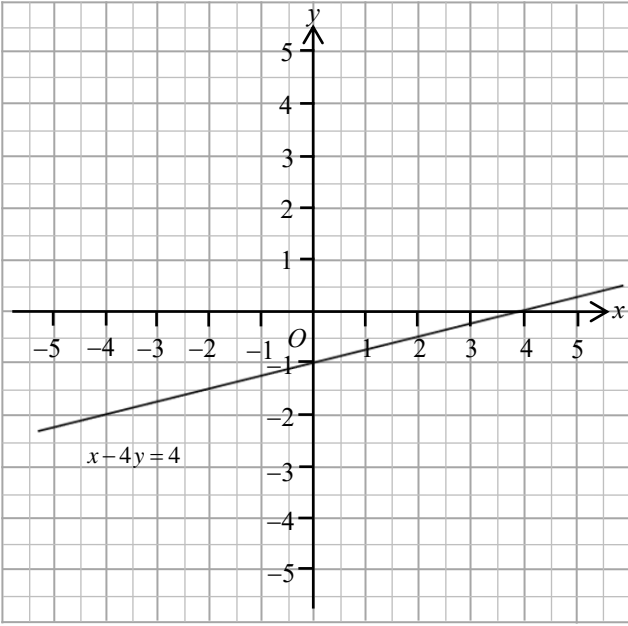
## Section B – Sub-paper 2 (9ME2)

Question Number	Suggested Answers	Marks	Notes
21. (9ME3-21)	(i) $+5\,500 / 5\,500$ dollar(s) represents that the profit of the tuckshop in May was 5 500 dollars. (ii) $-3\,200$ dollar(s) represents that the loss of the tuckshop in June was 3 200 dollars in June.	1	Must be all correct
22. (9ME3-23)		1	Acceptable range: Between 1.5 and 2
23.	The ratio of the number of students ordering lunch set $A$ to that of lunch set $B = \underline{11:12}$	1	
24. (9ME1-24)	The value of the 6 <sup>th</sup> term of the sequence is $\underline{84}$ .	1	
25.	The coefficient of $y^6$ is $\underline{3}$ .	1	
26.	$2x^2 - 3x + 1$	1	
27.	$(x + 4)^2 \not/ (x + 4)(x + 4)$	1	
28. (9ME1-28)	approximate solution	1	
29. (9ME3-28)	$D = \underline{16}$	1	
30. (9ME3-29)	$-\frac{1}{4} > -0.3$	1	
31.	The volume of the cone is $\underline{2560\pi}$ cm <sup>3</sup> .	1	
32.	R	1	
33.	(a) $m = \underline{40}$ (b) $n = \underline{12}$	1	Must be all correct No need to consider unit
34.	$x = \underline{36^\circ}$	1	No need to consider unit
35. (9ME1-35)	$X$ and $Y$	1	Must be all correct
36.	The vertical distance $AC$ is $\underline{8.4}$ m.	1	

Question Number	Suggested Answers	Marks	Notes																								
37. (9ME3-36)	<table border="1" style="margin-bottom: 10px; width: 100%;"> <thead> <tr> <th colspan="2" style="text-align: center;">Table 1</th> </tr> <tr> <th style="width: 50%;">Number of late arrivals</th> <th style="width: 50%;">Frequency</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0 – 9</td> <td style="text-align: center;">9</td> </tr> <tr> <td style="text-align: center;">10 – 19</td> <td style="text-align: center;">7</td> </tr> <tr> <td style="text-align: center;">20 – 29</td> <td style="text-align: center;">2</td> </tr> </tbody> </table> <table border="1" style="width: 100%;"> <thead> <tr> <th colspan="2" style="text-align: center;">Table 2</th> </tr> <tr> <th style="width: 50%;">Number of late arrivals</th> <th style="width: 50%;">Frequency</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0 – 5</td> <td style="text-align: center;">5</td> </tr> <tr> <td style="text-align: center;">6 – 11</td> <td style="text-align: center;">6</td> </tr> <tr> <td style="text-align: center;">12 – 17</td> <td style="text-align: center;">4</td> </tr> <tr> <td style="text-align: center;">18 – 23</td> <td style="text-align: center;">2</td> </tr> <tr> <td style="text-align: center;">24 – 29</td> <td style="text-align: center;">1</td> </tr> </tbody> </table>	Table 1		Number of late arrivals	Frequency	0 – 9	9	10 – 19	7	20 – 29	2	Table 2		Number of late arrivals	Frequency	0 – 5	5	6 – 11	6	12 – 17	4	18 – 23	2	24 – 29	1	1* (37-1)	Must be all correct
Table 1																											
Number of late arrivals	Frequency																										
0 – 9	9																										
10 – 19	7																										
20 – 29	2																										
Table 2																											
Number of late arrivals	Frequency																										
0 – 5	5																										
6 – 11	6																										
12 – 17	4																										
18 – 23	2																										
24 – 29	1																										
38. (9ME1-38)	(a) The value of $x$ is <u>46</u> . (b) The total number of students of that level is <u>180</u> . (c) The percentage of Secondary 3 students going to school by bus or minibus is <u>75%</u> .	1 (38a) 1 (38b) 1 (38c)	No need to consider unit																								
39.	The modal class of the number of stamps obtained is <u>0</u> – <u>9</u> .	1	Must be all correct																								

## Section C – Sub-paper 2 (9ME2)

Question Number	Suggested Answers	Marks	Notes
40.	The marked price = $\$480 \div (1 - 25\%)$ = \$640	1 (40-1) 1* (40-2) 1** (40-3)	
41.	The length of the set of railing is approximately 5 times the length of the banner. $\therefore$ The length of the set of railing $\approx 1.5 \times 5$ $= 7.5 \text{ m}$	0 0 No evidence of using estimation strategies nor giving reasonable justification	<ul style="list-style-type: none"> <li>♦ Answer only, without any working steps or written explanation</li> <li>♦ The explanation is irrelevant or unreasonable</li> </ul>
		1 0 Partial evidence of using estimation strategies, but the solution is incomplete or contains mistakes	<ul style="list-style-type: none"> <li>♦ Using reasonable estimation strategies, but the solution is incomplete. For instance, only the length of the set of railing is estimated as about 5 times the length of the banner</li> <li>♦ The explanation is reasonable, but the answer is out of the acceptable range</li> <li>♦ The explanation is reasonable, but calculation mistakes occurred</li> </ul>
		1 1 Estimate with reasonable justification	<ul style="list-style-type: none"> <li>♦ The answer must be supported by a reasonable explanation and within the acceptable range</li> <li>♦ Accept the length of the set of railing is 5 times to 6 times the length of the banner</li> <li>♦ Acceptable range of the length of the set of railing :7.5 m to 9.0 m</li> </ul>

Question Number	Suggested Answers	Marks	Notes								
42. (9ME3-42)	<table border="1" data-bbox="363 342 823 443"> <tr> <td><math>x</math></td> <td><math>-4</math></td> <td><math>0</math></td> <td><math>4</math></td> </tr> <tr> <td><math>y</math></td> <td><math>-2</math></td> <td><math>-1</math></td> <td><math>0</math></td> </tr> </table> 	$x$	$-4$	$0$	$4$	$y$	$-2$	$-1$	$0$	1* (42-1)  1 (42-2)  1* (42-3)	Must be all correct  In case the data in the above table is incorrect, students can still use the ordered pairs to draw a straight line. The line must pass through $(0, -1)$ and the range of $x$ must include the values from $-4$ to $4$ .  Correct graph (include: correct position, use ruler to draw the line, pass through the 3 correct points and extend two ends of the line)  If the table is incomplete but no mistakes are found and the graph is correct, $(0, 1, 1)$ can be given.
$x$	$-4$	$0$	$4$								
$y$	$-2$	$-1$	$0$								
43. (9ME1-43)	$\begin{cases} y = 7x + 10 & \dots(1) \\ y = 5x + 8 & \dots(2) \end{cases}$ <p>Substitute (2) into (1),</p> $7x + 10 = 5x + 8$ $7x - 5x = 8 - 10$ $x = -1$ <p>Substitute <math>x = -1</math> into (2),</p> $y = 5(-1) + 8$ $y = 3$	1 (43-1)  1* (43-2)  1 (43-3)  1* (43-4)	Correct method (eliminating one of the variables)  Correct value of $y$ (or $x$ )  Correct method  Both values are correct								

Question Number	Suggested Answers	Marks	Notes	
44. (9ME1-44)	$\frac{AB}{AD} = \frac{2+4}{2} = 3$ $\frac{AC}{AE} = \frac{3+6}{3} = 3$ $\therefore \frac{AB}{AD} = \frac{AC}{AE}$ $\angle BAC = \angle DAE \quad (\text{common})$ $\therefore \triangle ABC \sim \triangle ADE \quad (\text{ratio of 2 sides, inc. } \angle)$		Or other correct proofs	
	<b>Conditions</b>			
	(1) Any correct proof with correct reasons	3		
	(2) Any correct proof with poor presentation, missing reasons or inappropriate reasons	2		
	(3) Incomplete proof with any one correct statement and one corresponding reason	1		
	(4) Incomplete proof	0		
45.	$\sin \theta = \frac{BC}{AB}$ $\sin \theta = \frac{2400}{4950}$ $\theta \approx 29.002546^\circ$ $\theta = 29^\circ \quad (\text{Correct to the nearest degree})$ $\therefore \text{The angle of elevation of point } B \text{ from point } A \text{ is } 29^\circ.$	1(45-1)	r.t. 29°	
		1*(45-2)		
		1**(45-3)		
46.	<p>The area of the sector</p> $= \pi \times 16^2 \times \frac{70^\circ}{360^\circ}$ $\approx 156.381501$ $= 156 \text{ cm}^2 \text{ (corr. to 3 sig. fig.)}$	1 (46-1)	r.t. 156 cm <sup>2</sup>	
		1* (46-2)		
		1** (46-3)		

Question Number	Suggested Answers	Marks	Notes	
47.	<b>Marks of 15 students in a Mathematics test</b>		<p>Correct data of the leave in each row (no need to consider the order)</p> <p>All correct (including the distances between data, the order of the data and no commas between the data)</p>	
	Stem (10 marks)	Leaf (1 mark)		1* (47-1)
	0	5		
	1	2 2 5 6 9		
	2	2 6 6		
	3	0 0 1 7		
	4	3 8		1* (47-2)

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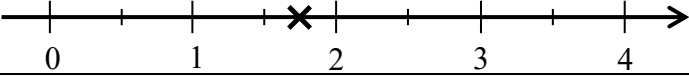
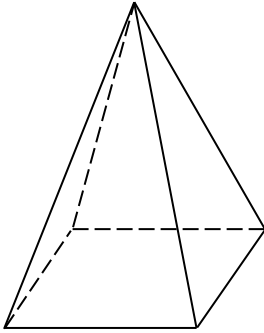
Alternative suggested answers are shown in boxes.

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

1. A (9ME2-1)
2. C
3. B
4. D
5. A (9ME2-5)
6. A
7. C (9ME4-7)
8. B
9. B (9ME2-9)
10. C (9ME4-10)
11. B (9ME2-12)
12. D
13. D (9ME2-14)
14. C
15. D
16. A (9ME4-16)
17. D (9ME2-17)
18. A
19. B (9ME2-20)
20. C



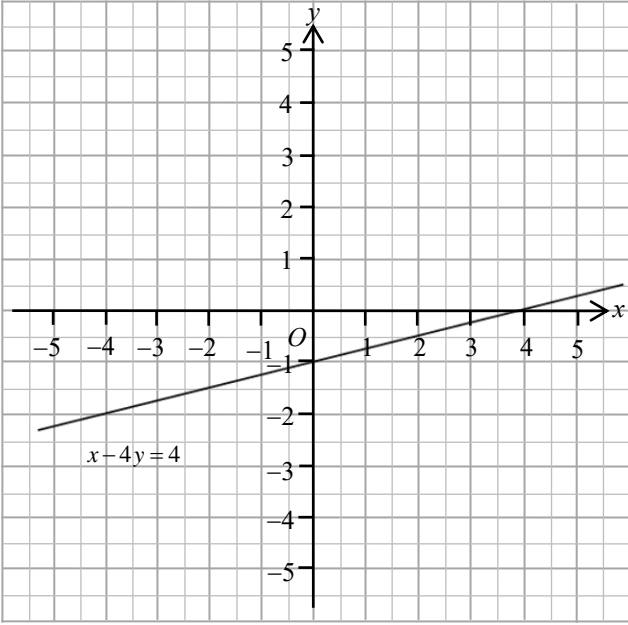
## Section B – Sub-paper 3 (9ME3)

Question Number	Suggested Answers	Marks	Notes
21. (9ME2-21)	(i) $\underline{+5\ 500 / 5\ 500}$ dollar(s) represents that the profit of the tuckshop in May was 5 500 dollars. (ii) $\underline{-3\ 200}$ dollar(s) represents that the loss of the tuckshop in June was 3 200 dollars in June.	1	Must be all correct
22.	Speed = $\underline{2.99 \times 10^8}$ m/s	1	
23. (9ME2-22)		1	Acceptable range: Between 1.5 and 2
24.	$x = \underline{19}$ $y = \underline{22}$	1	Must be all correct
25.	$8x - 2x^4$	1	
26.	$(x + 5)(x - 4)$	1	
27. (9ME4-28)	$25x^2 + 10x + 1$	1	
28. (9ME2-29)	$D = \underline{16}$	1	
29. (9ME2-30)	$-\frac{1}{4} > -0.3$	1	
30.		1	
31.	(a) $\triangle ABC \sim \triangle CDE$ (b) AAA	1	Must be all correct
32.	$x = \underline{140^\circ}$	1	No need to consider unit
33.	The coordinates of point <b>R</b> are ( $\underline{0}$ , $\underline{3}$ ).	1	Must be all correct
34.	$JK = \underline{17}$ units	1	
35.	$x = \underline{17.6}$	1	r.t. 17.6 No need to consider unit



## Section C – Sub-paper 3 (9ME3)

Question Number	Suggested Answers	Marks	Notes
40.	<p>The total number of seats</p> $= 31 \times 58$ $\geq 30 \times 50$ $= 1500$ <p><math>\therefore</math> The concert hall <b>has</b> enough seats for 1 500 people.</p>	<p>0 0</p> <p>No evidence of using estimation strategies nor giving reasonable justification</p>	<ul style="list-style-type: none"> <li>◆ Exact calculation only</li> <li>◆ The estimate is given only after exact calculation</li> <li>◆ Used wrong methods to get the approximation for each of the underlined values</li> </ul>
		<p>1 0</p> <p>Partial evidence of using estimation strategies, but the solution is incomplete or contains errors</p>	<ul style="list-style-type: none"> <li>◆ Approximate each of the underlined values correctly, but the total number of seats is omitted or wrongly estimated</li> <li>◆ Estimate the total number of seats correctly, but the conclusion is omitted or wrong</li> <li>◆ Correct method used, but errors occurred</li> </ul>
		<p>1 1</p> <p>Estimate with reasonable justification</p>	<ul style="list-style-type: none"> <li>◆ No need to consider unit/presentation</li> <li>◆ The conclusion must be correct and aligned with a reasonable explanation</li> </ul>
41.	<p>Let <math>P</math> be the principal of Catherine's deposit.</p> $P \times 4\% \times 2 = 520$ $P = 6\,500$ <p><math>\therefore</math> The principal of her deposit is \$6 500.</p>	<p>1 (41-1)</p> <p>1* (41-2)</p> <p>1** (41-3)</p>	

Question Number	Suggested Answers	Marks	Notes								
42. (9ME2-42)	<table border="1" data-bbox="363 353 823 454"> <tr> <td><math>x</math></td> <td><math>-4</math></td> <td><math>0</math></td> <td><math>4</math></td> </tr> <tr> <td><math>y</math></td> <td><math>-2</math></td> <td><math>-1</math></td> <td><math>0</math></td> </tr> </table> 	$x$	$-4$	$0$	$4$	$y$	$-2$	$-1$	$0$	1* (42-1)  1 (42-2)  1* (42-3)	Must be all correct  In case the data in the above table is incorrect, students can still use the ordered pairs to draw a straight line. The line must pass through $(0, -1)$ and the range of $x$ must include the values from $-4$ to $4$ .  Correct graph (include: correct position, use ruler to draw the line, pass through the 3 correct points and extend two ends of the line)  If the table is incomplete but no mistakes are found and the graph is correct, $(0, 1, 1)$ can be given.
$x$	$-4$	$0$	$4$								
$y$	$-2$	$-1$	$0$								
43.	(a) $(3y)^2$ $= 9y^2$ (b) $\frac{1}{y^5}(3y)^2$ $= \frac{1}{y^5} \cdot 9y^2$ $= \frac{9}{y^{5-2}}$ $= \frac{9}{y^3}$	1* (43a)  1 (43b1)  1* (43b2)	Using $\frac{y^m}{y^n} = \frac{1}{y^{n-m}}$  Correct answer (getting marks 1 1)								

Question Number	Suggested Answers	Marks	Notes																
44. (9ME4-44)	$\angle CBD = 57^\circ$ (vert. opp. $\angle$ s) $\therefore \angle EDB + \angle CBD = 57^\circ + 123^\circ$ $= 180^\circ$ $\therefore AC \parallel DE$ (int. $\angle$ s supp.)		Or other correct proofs																
	<b>Conditions</b>																		
	(1) Any correct proof with correct reasons	3																	
	(2) Any correct proof with poor presentation, missing reasons or inappropriate reasons	2																	
	(3) Incomplete proof with any one correct statement and one corresponding reason	1																	
	(4) Incomplete proof	0																	
45.	The volume of the prism $= \frac{(3+6) \times 8}{2} \times 10$ $= 360 \text{ cm}^3$	1(45-1) 1*(45-2) 1**(45-3)																	
46. (9ME1-45)	$x + 15^\circ = 35^\circ$ $x = 20^\circ$	1 (46-1) 1* (46-2)																	
47.	(a)		1* (47a)  1 (47b1) 1* (47b2) 1** (47b3)	Must be all correct  Correct method															
	<table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th>Time (minute)</th> <th>0 – 4</th> <th>5 – 9</th> <th>10 – 14</th> <th>15 – 19</th> </tr> </thead> <tbody> <tr> <td>Class mark (minute)</td> <td>2</td> <td>7</td> <td>12</td> <td>17</td> </tr> <tr> <td>Frequency</td> <td>5</td> <td>16</td> <td>13</td> <td>6</td> </tr> </tbody> </table>	Time (minute)			0 – 4	5 – 9	10 – 14	15 – 19	Class mark (minute)	2	7	12	17	Frequency	5	16	13	6	
	Time (minute)	0 – 4			5 – 9	10 – 14	15 – 19												
	Class mark (minute)	2			7	12	17												
Frequency	5	16	13	6															
(b) The mean = $\frac{2 \times 5 + 7 \times 16 + 12 \times 13 + 17 \times 6}{40}$																			
$= 9.5 \text{ mins}$																			

**Education Bureau**  
**Territory-wide System Assessment 2021**  
**Secondary 3 Mathematics**  
**Marking Scheme**

**CANCELLED**

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.

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

1. B (9ME1-1)
2. B
3. D (9ME1-3)
4. D
5. A (9ME1-5)
6. B
7. C (9ME3-7)
8. A (9ME1-8)
9. C
10. C (9ME3-10)
11. A
12. D
13. A (9ME1-14)
14. B
15. D
16. A (9ME3-16)
17. C
18. C
19. D
20. B (9ME1-20)

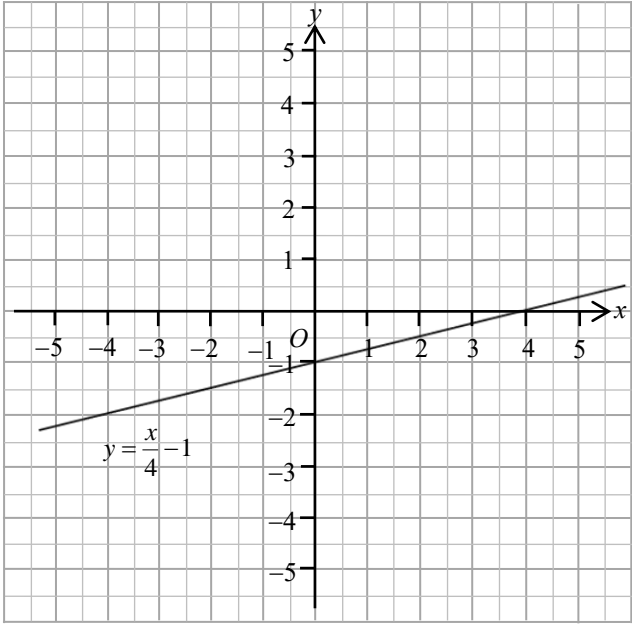
## Section B – Sub-paper 4 (9ME4)

Question Number	Suggested Answers	Marks	Notes
21.	$-3$	1	
22.	51.07	1	
23. (9MC1-23)	$r = \underline{2}$	1	
24.	$n$	1	
25.	$x^2 + xy + x$	1	
26.	$(y - 3)(x + 1)$	1	
27. (9MC1-27)	$x = \underline{2}$	1	
28. (9MC3-27)	$25x^2 + 10x + 1$	1	
29.	$\frac{1}{20y}$	1	
30.	$x < 2$	1	
31.	The radius of the circle is <u>19</u> cm.	1	
32.	The number of axes of symmetry of Figure A = <u>3</u> The number of axes of symmetry of Figure B = <u>1</u>	1	Must be all correct
33.	$k = \underline{100^\circ}$	1	No need to consider unit
34.	$\angle VDE / \angle EDV / \angle VDB / \angle BDV$	1	
35.	$x = \underline{3}$	1	No need to consider unit
36.	$\theta = \underline{71.3^\circ}$	1	r.t. $71.3^\circ$ No need to consider unit
37.	$(1) \rightarrow (4) \rightarrow (3) \rightarrow (2)$	1	Must be all correct



Question Number	Suggested Answers	Marks	Notes
38. (9ME3-37)	(a) There were <u>4</u> day(s) that the concentration of nitrogen dioxide was higher than $40\mu\text{g}/\text{m}^3$ last week. (b) The concentration of nitrogen dioxide from <u>Sunday</u> to <u>Monday</u> increased most last week. (c) The difference in the concentration of nitrogen dioxide recorded between Friday and Saturday was <u>2.3</u> $\mu\text{g}/\text{m}^3$ .	1 (38a) 1 (38b) 1 (38c)	Must be all correct
39. (9ME1-39)	Mean = <u>26</u> Median = <u>27</u>	1 (39-1) 1 (39-2)	

## Section C – Sub-paper 4 (9ME4)

Question Number	Suggested Answers	Marks	Notes								
40. (9ME1-40)	The amount = $\$20\,000 \times (1 + 3\%)^2$ = $\$21\,218$	1 (40-1) 1* (40-2) 1** (40-3)									
41.	The number of hour he worked this week = $\frac{2340}{130}$ = 18 hrs	1 (41-1)  1* (41-2) 1** (41-3)									
42. (9ME1-42)	<table border="1" data-bbox="422 790 879 891"> <tr> <td><math>x</math></td> <td>-4</td> <td>0</td> <td>4</td> </tr> <tr> <td><math>y</math></td> <td>-2</td> <td>-1</td> <td>0</td> </tr> </table> 	$x$	-4	0	4	$y$	-2	-1	0	1* (42-1)  1 (42-2)  1* (42-3)	<p>Must be all correct</p> <p>In case the data in the above table is incorrect, students can still use the ordered pairs to draw a straight line. The line must pass through (0, -1) and the range of <math>x</math> must include the values from -4 to 4.</p> <p>Correct graph (include: correct position, use ruler to draw the line, pass through the 3 correct points and extend two ends of the line)</p> <p>If the table is incomplete but no mistakes are found and the graph is correct, (0, 1, 1) can be given.</p>
$x$	-4	0	4								
$y$	-2	-1	0								

Question Number	Suggested Answers	Marks	Notes
43.	<p>The total surface area of Pyramid <math>B</math></p> $= 128 \times \left(\frac{6}{12}\right)^2$ $= 32 \text{ cm}^2$	<p>1 (43-1)</p> <p>1* (43-2)</p> <p>1** (43-3)</p>	
44. (9ME3-44)	<p><math>\angle CBD = 57^\circ</math> (vert. opp. <math>\angle</math>s)</p> <p><math>\therefore \angle EDB + \angle CBD = 57^\circ + 123^\circ</math> <math>= 180^\circ</math></p> <p><math>\therefore AC \parallel DE</math> (int. <math>\angle</math>s supp.)</p>		Or other correct proofs
	<b>Conditions</b>		
	(1) Any correct proof with correct reasons	3	
	(2) Any correct proof with poor presentation, missing reasons or inappropriate reasons	2	
	(3) Incomplete proof with any one correct statement and one corresponding reason	1	
	(4) Incomplete proof	0	
45.	$AB^2 = AE^2 + BE^2$ $= 8.4^2 + 3.5^2$ $= 82.81$ $AB = 9.1 \text{ cm}$	<p>1 (45-1)</p> <p>1* (45-2)</p> <p>1** (45-3)</p>	
46.	<p>The area of the rectangle</p> $= (6 - 1) \times [1 - (-3)]$ $= 20 \text{ sq. units}$	<p>1 (46-1)</p> <p>1* (46-2)</p> <p>1** (46-3)</p>	Or other correct methods

Question Number	Suggested Answers	Marks	Notes																			
47.	<p>(a)</p> <table border="1" data-bbox="408 376 1179 719"> <thead> <tr> <th colspan="2"></th> <th colspan="3">Music Activity</th> </tr> <tr> <th colspan="2"></th> <th>Choir (C)</th> <th>Violin Class (V)</th> <th>Recorder Class (R)</th> </tr> </thead> <tbody> <tr> <th rowspan="2">Sport Activity</th> <th>Long-distance running (L)</th> <td>LC</td> <td>LV</td> <td>LR</td> </tr> <tr> <th>Basketball (B)</th> <td>BC</td> <td>BV</td> <td>BR</td> </tr> </tbody> </table> <p>(b) The probability that Alice chooses basketball and violin class = <math>\frac{1}{6}</math></p>			Music Activity					Choir (C)	Violin Class (V)	Recorder Class (R)	Sport Activity	Long-distance running (L)	LC	LV	LR	Basketball (B)	BC	BV	BR	<p>1* (47a)</p> <p>1* (47b)</p>	<p>Must be all correct</p> <p>Or 0.167</p>
		Music Activity																				
		Choir (C)	Violin Class (V)	Recorder Class (R)																		
Sport Activity	Long-distance running (L)	LC	LV	LR																		
	Basketball (B)	BC	BV	BR																		