9ME1

Education Bureau Territory-wide System Assessment 2011 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.
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- (4) The Mark for Presentation may include overall work such as mathematical expressions, units, written explanations, usage of symbol, 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. A (9ME2-1)
- 2. D (9ME2-2)
- 3. A (9ME4-2)
- 4. C
- 5. A
- 6. C
- 7. B
- 8. D
- 9. D
- 10. C
- 11. C (9ME2-11)
- 12. **B** (9ME2-12)
- 13. B (9ME4-12)
- 14. D
- 15. A
- 16. B
- 17. A
- 18. D
- 19. B
- 20. C

| Question Number | Suggested Answers | Marks | Notes |
|--------------------|---|-------|---------------------------------|
| 21. (9ME2-21) | (i) $+200 \swarrow 200$ (ii) -50 | 1 | Must be all correct |
| 22. (9ME2-22) | (i) Estimated value(ii) Exact value | 1 | Must be all correct |
| 23. (9ME4-22) | 17.9 | 1 | |
| 24. | The sum of the number of red marbles and yellow marbles is <u>30</u> . | 1 | |
| 25. | $2y^2 - 5y + 3$ | 1 | Expansion |
| 26. | (k+2)(x-y) | 1 | Factorization |
| 27. | (x+4)(x-1) | 1 | Factorization |
| 28. | <i>x</i> = 3 | 1 | |
| 29. | $16 - x^2$ | 1 | Expansion |
| 30. (9ME2-30) | $\frac{3}{4a}$ | 1 | In simplest form |
| 31. (9ME2-31) | (i) $\sqrt{2}$ < $\sqrt{3}$ (ii) $\frac{1}{\sqrt{3}}$ < $\frac{1}{\sqrt{2}}$ | 1 | Must be all correct |
| 32. | CE / EC / DE / ED | 1 | |
| 33. | | 1 | Pyramid with triangular base |
| 34. (9ME4-36) | <i>x</i> = 80 | 1 | |
| 35. | $B \sim C$ | 1 | Must be all correct |
| 36. | <i>x</i> = 130 | 1 | |

Section B - Sub-paper 1 (9ME1)

| Question Number | Suggested Answers | Marks | Notes |
|--------------------|-------------------------------------|----------|---------------------|
| 37. | $\angle DBF / \angle FBD$ | 1 | |
| 38. | The coordinates of <i>A</i> ' are | 1 | M (1 11) |
| | (-3, -3). | 1 | Must be all correct |
| 39. (9ME2-39) | The coordinates of the mid-point of | 1 | |
| | line segment AB are $(0, 2)$. | 1 | |
| 40. | <i>x</i> = 7.51 | 1 | |
| 41. (9ME4-41) | Arithmetic mean of the inflation | | |
| | rates = <u>3.5</u> % | 1 (41-1) | |
| | Median of the inflation rates | | |
| | = <u>3</u> % | 1 (41-2) | |
| 42. (9ME3-41) | The weighted mean mark that David | 1 | |
| | got is <u>16.5</u> . | 1 | |
| 43. | The empirical probability that Paul | 1 | or 100% |
| | predicted correctly is 1 . | 1 | 01 10070 |

Section C - Sub-paper 1 (9ME1)

| Question Number | Suggested Answers | Marks | Notes |
|--------------------|--|------------|---|
| 44. | $Discount = 12000 \times 15\%$ | 1 (44-1) | |
| (9ME2-44) | = 1 800 | 1* (44-2) | |
| | \therefore The discount is \$ 1 800. | 1** (44-3) | |
| 45. | $45000 \times (1+10\%)^3$ | 1 (45-1) | |
| (9ME4-45) | = 59895 | 1* (45-2) | |
| | The annual car sales of WIND Motor in | 1** (45-3) | |
| | 2013 are 59895. | | |
| | OR | | |
| | 45000 ×1.1 = 49500 | 1 (45-1) | Correct method (multiply 1.1 three |
| | 49500 ×1.1 = 54450 | | times) |
| | 54450 ×1.1 = 59895 | 1* (45-2) | |
| | The annual car sales of WIND Motor in | 1** (45-3) | |
| | 2013 are 59895. | | |
| 46. | (a) $2r\pi = 28\pi$ | 1 (46a-1) | |
| | r = 14 | 1* (46a-2) | |
| | (b) Area of the circle | | |
| | $=14^2 \pi$ | 1 (46b-1) | Using correct method |
| | $= 196\pi \text{ cm}^2$ | 1* (46b-2) | |
| | \therefore The area of the circle is 196 π cm ² . | 1** (46-5) | |
| 47. | x -2 0 2 | 1 (47-1) | Must be all correct |
| (9ME4-48) | y 3 3 3 | | |
| | × × | 1 (47-2) | In case the data in the above table is |
| | 6 | | incorrect, student can still use the |
| | 5 | | ordered pairs to draw a straight line. |
| | 4 | | The line must pass through (0, 3) |
| | $\frac{3}{2} + y - 3 = 0$ | | and the range of value of x must |
| | | | include -2 to 2. |
| | -3-2-10 1 2 3 | 1* (47-3) | Correct straight line (include: |
| | | | correct position, use ruler to draw |
| | | | the line, pass through the 3 points |
| | | | and extend in 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 Answers | Marks | Notes |
|--------------------|---|-------------------------|--|
| 48. | Length of \widehat{AB} = $\left(\frac{85^{\circ}}{360^{\circ}}\right)(2)(22)\pi$ | 1 (48-1) | |
| | ≈ 32.637657 = 32.6 cm (corr. to 3 sig. fig.) | 1* (48-2) 1** (48-3) | r.t. 32.6 |
| 49. | $\tan 70^\circ = \frac{BC}{2.3}$ | 1 (49-1) | |
| | $\therefore BC = 6.3$ \therefore The height of wall is 6.3 m. | 1* (49-2) 1** (49-3) | r.t. 6.3 |
| 50. (9ME2-50) | (a) The test marks of 8 students in Mathematics and Science 20 15 15 10 5 10 5 10 5 10 5 10 10 5 10 15 20 Mathematics | 1 (50a) | For the correct indication of all marks Zero mark obtained if points are connected by line segments. |
| | (b) Positive relationship | 1 (50b) | Or other reasonable answers |
| 51. (9ME2-51) | (a) <u>10</u> players are shorter than 160.5 cm. (b) <u>6</u> players whose heights are between 150.5 cm and 155.5 cm. (c) James' height should belong to the class interval | 1 (51a) 1 (51b) | |
| | <u>166 cm — 170 cm.</u> | 1 (51c) | Must be all correct |

9ME1

| Question Number | Suggested Answers | Notes | Marks |
|--------------------|--|---|--|
| 52. | The maximum number of segments = $\frac{20}{5}$ = 4 OR | 0 0 No evidence of using estimation strategy and giving reasonable justification | Exact calculation only Give estimate only after exact calculation Wrong estimation: approximate 4.22 by rounding down |
| | 4.22 is rounded up to 5, ∴ the maximum number of segments = 4 | 1 0 Partial evidence of using estimation strategy, but the solution is incomplete or contains errors | Using correct method, but minor error occurred Estimate correctly, but the correct maximum number of segments cannot be found |
| | | 1 1 Estimate with reasonable justification | No need to consider unit/presentation For reference only: ²⁰/_{4.22} ≈ 4.739 |

Education Bureau Territory-wide System Assessment 2011 Secondary 3 Mathematics Marking Scheme

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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 2 (9ME2) (1 mark each)

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

| Question Number | Suggested Answers | Marks | Notes |
|--------------------|--|-------|--|
| 21. (9ME1-21) | (i) $+200 \swarrow 200$ (ii) -50 | 1 | Must be all correct |
| 22. (9ME1-22) | (i) Estimated value(ii) Exact value | 1 | Must be all correct |
| 23. (9ME3-23) | The diameter of the cross section of an optical fibre is about 6.5×10^{-5} m. | 1 | |
| 24. (9ME4-24) | (i) Rate(ii) Ratio | 1 | Must be all correct |
| 25. | $y = \frac{x}{3} + 4$ | 1 | Or other equivalent equations E.g. $x = 3(y-4)$ |
| 26. | The number of terms of the polynomial is $\underline{4}$. | 1 | |
| 27. | $a^{3}b+ab^{2}-2ab$ | 1 | Expansion |
| 28. | (2-3x)(2+3x) | 1 | Factorization |
| 29. | (3x+1)(x+3) | 1 | Factorization |
| 30. (9ME1-30) | $\frac{3}{4a}$ | 1 | In simplest form |
| 31. (9МЕ1-31) | (i) $\sqrt{2}$ < $\sqrt{3}$ (ii) $\frac{1}{\sqrt{3}}$ < $\frac{1}{\sqrt{2}}$ | 1 | Must be all correct |
| 32. (9ME3-32) | $x \ge 0$ | 1 | |
| 33. (9ME3-33) | The radius of the circle is 6 cm. | 1 | |
| 34. (9ME4-33) | The volume of the sphere is 3054 cm ³ . | 1 | |

Section B – Sub-paper 2 (9ME2)

| Question Number | Suggested Answers | Marks | Notes |
|--------------------|--|--------------------|--|
| 35. | | 1 | ALL axes of symmetry are correct |
| 36. | (a) $\triangle PQR \sim \triangle XYZ$ (b) Ratios of 2 sides, included angles | 1 (37a) 1 (37b) | Must be all correct |
| 37. | (a) $x = 85$ (b) $AB = 9$ cm | 1 | |
| 38. | $\angle BDC = 31^{\circ}$ | 1 | |
| 39. (9ME1-39) | The coordinates of the mid-point of line segment <i>AB</i> are $(0, 2)$. | 1 | |
| 40. | x = 40 | 1 | |
| 41. | The polar coordinates of point <i>B</i> are $(3, 150^\circ)$. | 1 | Must be all correct and in order |
| 42. (9ME3-42) | $(4) \rightarrow (2) \rightarrow (3) \rightarrow (1)$ | 1 | |
| 43. (9ME3-43) | The mean training hours of the members for the last week is 8.9 . | | |

Section C - Sub-paper 2 (9ME2)

| Question Number | Suggested Answers | Marks | Notes |
|--------------------|---|------------|--|
| 44. | $Discount = 12000 \times 15\%$ | 1 (44-1) | |
| (9ME1-44) | = 1 800 | 1* (44-2) | |
| | ∴ The discount is \$ 1 800. | 1** (44-3) | |
| 45. | Method 1 | | |
| (9ME3-49) | The area of quadrilateral ABCD | | |
| | $= \frac{6\times4}{2} + \frac{6\times3}{2}$ | 1 (45-1) | For $\frac{6 \times 4}{2}$ or $\frac{6 \times 3}{2}$ |
| | = 21 | 1* (45-2) | |
| | \therefore The area of quadrilateral <i>ABCD</i> is 21 square units. | 1** (45-3) | |
| | Method 2 | | |
| | The area of quadrilateral ABCD | | |
| | $= 6 \times 7 - \frac{3 \times 4}{2} - \frac{3 \times 4}{2} - \frac{3 \times 4}{2} - \frac{3 \times 4}{2} - \frac{3 \times 2}{2}$ | 1 (45-1) | For any 2 correct areas of triangles |
| | = 21 | 1* (45-2) | |
| | \therefore The area of quadrilateral <i>ABCD</i> is 21 square units. | 1** (45-3) | |
| 46. | $\triangle OAB$ is a right-angled triangle. | | |
| (9ME4-51) | $OB^2 = OA^2 + AB^2$ | | |
| | $= 0.7^2 + 2.4^2$ | 1 (46-1) | |
| | = 6.25 | | |
| | $\therefore OB = 2.5 \text{ km}$ | 1* (46-2) | |
| | \therefore The distance between point <i>O</i> and point <i>B</i> is 2.5 | 1** (46-3) | |
| | km. | | |
| 47. | $x^{12}\left(\frac{y}{x}\right)^3$ | | |
| | $=x^{12}\cdot\frac{y^3}{x^3}$ | 1 (47-1) | Using $\left(\frac{y}{x}\right)^k = \frac{y^k}{x^k}$ |
| | $=x^{12-3}y^3$ | 1 (47-2) | Using $\frac{x^m}{x^n} = x^{m-n}$ |
| | $=x^9y^3$ | 1* (47-3) | Correct final answer (getting marks 1 1 1) |

| Question Number | Suggested Answers | Marks | Notes |
|--------------------|--|------------------|--|
| 48. | x -2 0 2 | 1 (48-1) | Must be all correct |
| (9ME3-48) | y -3 -1 1 | 1 (48-2) | In case the data in the above table |
| | $ \begin{array}{c} $ | 1* (48-3) | is incorrect, student can still use the ordered pairs to draw a straight line. $(2, 1)$ must lie on the line and the range of value of x must include -2 to 2. Correct straight line (include: correct position, use ruler to draw the line, pass through the 3 points and extend in 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 |
| 49. | (a) Weight of rice $= 20 - 8$ | 1 (49a-1) | Can be absorbed in the next step |
| (9ME3-51) | = 12 | | |
| | \therefore The weight of sand : The weight of rice | | |
| | = 8 : 12 | | |
| | = 2 : 3 | 1* (49a-2) | |
| | (b) Method 1: | | |
| | $5:6=5 \times 2:6 \times 2$ | | |
| | = 10 : 12 | 1 (49b-1) | For any correct methods |
| | \therefore Amount of sand required = $10 - 8$ | | |
| | = 2g | 1* (49b-2) | |
| | Method 2: | | |
| | Let x g be the amount of sand required. | | |
| | (8+x): 12 = 5:6 | 1 (49b-1) | |
| | $\frac{8+x}{12} = \frac{5}{6}$ | | |
| | 40 + 0x = 00 | 1* (401 - 2) | |
| | $\frac{\mu - 2}{1}$ | <u>1 (496-2)</u> | |
| | Amount of sand required is 2 g. | 1** (40 5) | |
| | | 1*** (49-5) | |

| Question Number | Suggested Answers | Marks | Notes |
|--------------------|--|----------|--|
| 50. (9MC1-50) | (a) The test marks of 8 students in Mathematics and Science 20 15 15 10 5 10 5 10 5 10 5 10 5 10 15 20 Mathematics | 1 (50a) | For the correct indication of all marks Zero mark obtained if points are connected by line segments. |
| | (b) Positive relationship | 1 (50b) | Or other reasonable answers |
| 51. | (a) <u>10</u> players are shorter than 160.5 cm. | 1 (51a) | |
| (9ME1-51) | (b) <u>6</u> players whose heights are between 150.5 cm | 1 (51b) | |
| | and 155.5 cm. | | |
| | (c) James' height should belong to the class interval | | |
| | <u>166</u> cm — <u>170</u> cm. | 1 (51c) | Must be all correct |
| 52. | Range : 1250 mL to 1750 mL | 1 (52-1) | Have some explanation |
| | The height of the tank is about 6 times the length of | 1 (52-2) | Reasonable explanation |
| | AB. | | |
| | \therefore Capacity \approx (250 × 6)mL = 1500 mL | | |

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

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

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

| Question Number | Suggested Answers | Marks | Notes |
|--------------------|--|---------|---|
| 21. | A = -3 B = -1 C = 2 C = + 2 | 1 | Must be all correct |
| 22. | The amount is \$ <u>4 320</u> . | 1 | |
| 23. (9ME2-23) | The diameter of the cross section of an optical fibre is about 6.5×10^{-5} m. | 1 | |
| 24. | Figure <i>n</i> is formed by $\underline{n+2}$ dots. | 1 | |
| 25. (9ME4-25) | <i>n</i> = 18 | 1 | |
| 26. | $6x^2 - 12xy / -12xy + 6x^2$ | 1 | Expansion |
| 27. | (x-1)(2x-1)(3x+2) | 1 | Factorization |
| 28. | G and H | 1 | Accept $G(2, -\frac{2}{3})$ and $H(4, 0) /$ $(2, -\frac{2}{3})$ and $(4, 0)$ Must be all correct |
| 29. | $9x^2 + 30x + 25$ | 1 | |
| 30. | <i>a</i> = 3 | 1 | |
| 31. | The curved surface area of the cone is 260π cm ² . | 1 | |
| 32. (9ME2-32) | $x \ge 0$ | 1 | |
| 33. (9ME2-33) | The radius of the circle is 6 cm. | 1 | |
| 34. (9ME4-34) | A, F | 1 | Must be all correct |
| 35. | (a) $x = 30$ | 1 (35a) | |
| | (b) $y = 12$ | 1 (35b) | |

Section B - Sub-paper 3 (9ME3)

| Question Number | Suggested Answers | Marks | Notes |
|--------------------|---|-------|--|
| 36. | BE / EB | 1 | |
| 37. | The angle between the inclined plane <i>ABHE</i> and the horizontal plane <i>ABCD</i> is $\angle CBH$. | 1 | or $\angle HBC \neq$ $\angle DAE \neq \angle EAD$ |
| 38. | <i>x</i> = 65 | 1 | |
| 39. | <i>x</i> = 62 | 1 | |
| 40. | $\theta = 66.9^{\circ}$ | 1 | |
| 41. (9ME1-42) | The weighted mean mark that David got is 16.5 . | 1 | |
| 42. (9ME2-42) | $(4) \rightarrow (2) \rightarrow (3) \rightarrow (1)$ | 1 | |
| 43. (9ME2-43) | The mean training hours of the members last week is <u>8.9</u> . | 1 | |

| Question Number | Suggested Answers | | Marks | Notes |
|--------------------|---|-----------------------|--------------------------|-----------------------|
| 44. | $P(1+3\%)^2 = 42436$ | | 1 (44-1) | Other correct methods |
| | P = 40000 |) | 1* (44-2) | |
| | | | 1** (44-3) | |
| 45. | Tab | le 1 | | |
| | Working hours | Frequency | | |
| | 0-10 | 1 | | |
| | 11-20 | 1 | 1 (45-1) | Must be all correct |
| | 21-30 | 2 | | |
| | 31-40 | 8 | | |
| | 41-50 | 6 | | |
| | 51-60 | 2 | | |
| | | | | |
| | Tab | le 2 | | |
| | Working hours | Frequency | | |
| | 0-15 | 1 | 1 (45-2) | Must be all correct |
| | 16-30 | 3 | | |
| | 31-45 | 10 | | |
| | 46-60 | 6 | | |
| 46. | Area of the sector | | | |
| | $= \left(\frac{230^{\circ}}{360^{\circ}}\right) \pi \left(18^2\right)$ | | 1 (46-1) | |
| | ≈ 650.3096793 | | | |
| | $= 650.3 \mathrm{cm}^2$ (corr. | to the nearest 0.1 cm | ²) 1* (46-2) | r.t. 650.3 |
| | | | 1** (46-3) | |
| 47. | Total surface are | ea | | |
| | $= 5 \times 8 + 5 \times 6 + 5 \times 10 + \frac{8 \times 6}{2} \times 2$ | | 1 (47-1) | |
| | $= 168 \text{ cm}^2$ | | 1* (47-2) | |
| | | | 1** (47-3) | |

Section C - Sub-paper 3 (9ME3)

| Question Number | Suggested Answers | Marks | Notes |
|--------------------|--|--------------------------------|--|
| 48. | x -2 0 2 | 1 (48-1) | Must be all correct |
| (9ME2-48) | y -3 -1 1 | 1 (48-2) | In case the data in the above |
| | | | table is incorrect, student can |
| | | | still use the ordered pairs to |
| | 4- | | draw a straight line. (2, 1) must |
| | 3- | | lie on the line and the range of |
| | | | value of x must include -2 to |
| | | | 2. |
| | $\rightarrow x$ | 1* (48-3) | Correct straight line (include: |
| | | | correct position, use ruler to |
| | x - y = 1 | | draw the line, pass through the |
| | | | 3 points and extend in two ends |
| | | | of the line) |
| | | | If the data in the table is correct |
| | | | but not complete and the graph is correct $(0, 1, 1)$ con be given |
| 40 | Mathod 1 | | is correct, (0, 1, 1) can be given |
| 49. | The area of quadrilateral ABCD | | |
| ()WIL2-43) | | | 6 4 6 4 2 |
| | $=\frac{6\times4}{2}+\frac{6\times5}{2}$ | 1 (49-1) | For $\frac{0\times4}{2}$ or $\frac{0\times3}{2}$ |
| | - 21 | 1* (49.2) | |
| | • The area of quadrilateral ABCD is 21 square units | $1^{(+)-2)}$ $1^{**}(49-3)$ | |
| | Method 2 | 1 (17.5) | |
| | The area of quadrilateral <i>ABCD</i> | | |
| | $\overbrace{\leftarrow}$ 3×4 3×4 3×4 3×2 | | For any 2 correct areas of |
| | $=$ $0 \times 7 - \frac{2}{2} - \frac{2}{2} - \frac{2}{2} - \frac{2}{2}$ | [1] (49-1) | triangles |
| | = 21 | 1* (49-2) | |
| | \therefore The area of quadrilateral <i>ABCD</i> is 21 square units. | 1** (49-3) | |
| 50. (9ME4-50) | (a) $k = \frac{A}{\pi r} - r$ / $k = \frac{A - \pi r^2}{\pi r}$ | 1* (50a) | |
| | (b) $k = \frac{90\pi}{5\pi} - 5$ | 1 (50b-1) | Correct methods |
| | <i>k</i> = 13 | 1* (50b-2) | |

| Question Number | Suggested Answers | Marks | Notes |
|--------------------|--|------------|----------------------------------|
| 51. | (a) Weight of rice $= 20 - 8$ | 1 (51a-1) | Can be absorbed in the next step |
| (9ME2-49) | = 12 | | |
| | \therefore The weight of sand : The weight of rice | | |
| | = 8 : 12 | | |
| | = 2 : 3 | 1* (51a-2) | |
| | (b) Method 1: | | |
| | $5:6=5{\times}2:6{\times}2$ | | |
| | = 10 : 12 | 1 (51b-1) | For any correct methods |
| | \therefore Amount of sand required = $10 - 8$ | | |
| | = 2g | 1* (51b-2) | |
| | Method 2: | | |
| | Let x g be the amount of sand required. | | |
| | (8+x): 12=5:6 | 1 (51b-1) | |
| | $\frac{8+x}{12} = \frac{5}{6}$ | | |
| | 48 + 6x = 60 | | |
| | x = 2 | 1* (51b-2) | |
| | \therefore Amount of sand required is 2 g. | | |
| | | 1** (51-5) | |
| 52. | The total amount of the gifts should not be | 1 (52-1) | Reasonable explanation |
| | estimated by rounding up since whether the | | |
| | actual amount is \$300 or above cannot be | | |
| | guaranteed. | | |
| | \therefore Jack's estimation is not reasonable. | 1 (52-2) | Have some explanation |
| | OR | | |
| | | | |
| | $74.3 \times 4 < 75 \times 4$ | 1 (52-1) | Reasonable explanation |
| | = \$300 | | |
| | The total amount is less than \$300. | _ | |
| | \therefore Jack's estimation is not reasonable. | 1 (52-2) | Have some explanation |

Education Bureau Territory-wide System Assessment 2011 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, usage of symbol, 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. | В | |
|-----|---|-----------|
| 2. | Α | (9ME1-3) |
| 3. | Α | |
| 4. | Α | (9ME2-5) |
| 5. | D | (9ME3-5) |
| 6. | D | |
| 7. | В | |
| 8. | С | |
| 9. | С | |
| 10. | В | |
| 11. | D | |
| 12. | В | (9ME1-13) |
| 13. | С | |
| 14. | С | (9ME2-15) |
| 15. | А | (9ME3-15) |
| 16. | С | |
| 17. | D | |
| 18. | D | |
| 19. | В | (9ME2-19) |
| | | |

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

| Question Number | Suggested Answers | Marks | Notes |
|--------------------|---|-------|----------------|
| 21. | 4 | 1 | |
| 22. | 17.9 | 1 | |
| (9ME1-23) | | 1 | |
| 23. | | | |
| - | | | |
| | -3 -2 -1 0 1 2 3 | 1 | |
| | $-\sqrt{5} \approx -2.24$ | | |
| | (Acceptable range: $-2.5 < -\sqrt{5} < -2$) | | |
| 24. | (i) Rate | 1 | Must be all |
| (9ME2-24) | (ii) Ratio | 1 | correct |
| 25. | n = 18 | 1 | |
| (9ME3-25) | | 1 | |
| 26. | x = -29, $y = -38$ | 1 | Must be all |
| | | 1 | correct |
| 27. | The value of the 5 th term of the sequence is $-\frac{1}{2}$ <u>-0.5</u> . | 1 | |
| 28. | $-3x^2 + 5x$ / $5x - 3x^2$ | 1 | Simplification |
| 29. | $(3x+2)^2 \swarrow (3x+2)(3x+2)$ | 1 | Factorization |
| 30. | <i>x</i> = 2 | 1 | |
| 31. | <i>x</i> < 4 | 1 | |
| 32. | The total surface area of the cuboid is 216 cm ² . | 1 | |
| 33. | The volume of the sphere is 3054 cm ³ . | 1 | |
| (9ME2-34) | | 1 | |
| 34. | A, F | 1 | Must be all |
| (9ME3-34) | | 1 | correct |
| 35. | 6 | 1 | |
| 36. | x = 80 | 1 | |
| (9ME1-34) | | | |
| 37. | <i>x</i> = 65 | 1 | |
| 38. | x = 25 | 1 | |

Section B – Sub-paper 4 (9ME4)

| Question Number | Suggested Answers | Marks | Notes |
|--------------------|--|----------|-------------|
| 39. | Slope of <i>L</i> is $-\frac{7}{10} \swarrow -0.7$. | 1 | |
| 40. | (1) angle of elevation | 1 | Must be all |
| | (2) 20° | 1 | correct |
| 41. (9ME1-41) | Arithmetic mean of the inflation rates | | |
| | = <u>3.5</u> % | 1 (41-1) | |
| | Median of the inflation rates | | |
| | = <u>3</u> % | 1 (41-2) | |
| 42. | The modal class of the weights of | | |
| | these 50 newborn babies is | 1 | |
| | <u>3.5</u> kg — <u>4.4</u> kg. | | |
| 43. | $\frac{1}{4} / 0.25$ | 1 | |

Section C - Sub-paper 4 (9ME4)

| Question Number | Suggested Answers | Marks | Notes |
|--------------------|---|------------|---|
| 44. | The selling price of the model car | | |
| | = \$80 (1 + 60%) | 1 (44-1) | |
| | = \$128 | 1* (44-2) | |
| | | 1** (44-3) | |
| 45. | $45000 \times (1+10\%)^3$ | 1 (45-1) | |
| (9ME1-45) | = 59895 | 1* (45-2) | |
| | The annual car sales of WIND Motor in | 1** (45-3) | |
| | 2013 are 59895. | | |
| | | | |
| | OR | | |
| | | _ | |
| | $45000 \times 1.1 = 49500$ | 1 (45-1) | Correct method (multiply 1.1 three |
| | $49500 \times 1.1 = 54450$ | | times) |
| | 54450 × 1.1 = 59895 | 1* (45-2) | |
| | The annual car sales of WIND Motor in | 1** (45-3) | |
| | 2013 are 59895. | | |
| 46. | $\begin{cases} 2x + 5y = 18 &(1) \end{cases}$ | | |
| | $\left[2x - 3y = 2 \qquad \dots (2)\right]$ | | |
| | (1) - (2): | | |
| | 8 <i>y</i> = 16 | 1 (46-1) | Method (eliminating one of the |
| | | | variables) |
| | y = 2 | 1* (46-2) | First correct root (either <i>x</i> or <i>y</i>) |
| | | | |
| | Substitute $y = 2$ into (2) | | |
| | 2x-3(2) = 2 | 1 (46-3) | Method (using the value of the first |
| | | | root to get the second root) |
| | <i>x</i> = 4 | 1* (46-4) | Both roots are the correct answers |
| 47. | $\pi \times r^2 \times 15 = 240\pi$ | 1 (47-1) | Using correct method |
| | r = 4 | 1* (47-2) | |

| Question Number | Suggested Answers | Marks | Notes |
|--------------------|---|------------|-------------------------------------|
| 48. | x -2 0 2 | 1 (48-1) | Must be all correct |
| (9ME1-47) | y 3 3 3 | | |
| | \mathbf{X} | 1 (48-2) | In case the data in the above |
| | 6 | | table is incorrect, student can |
| | 5 | | still use the ordered pairs to |
| | 4 | | draw a straight line. The line |
| | y - 3 = 0 | | must pass through (0, 3) and the |
| | | | -2 to 2 |
| | -3 - 2 - 1 0 + 2 3 | 1* (48-3) | Correct straight line (include: |
| | | | correct position, use ruler to |
| | | | draw the line, pass through the 3 |
| | | | points and extend in two ends of |
| | | | the line) |
| | -6- | | If the data in the table is correct |
| | | | but not complete and the graph |
| | | | is correct, (0, 1, 1) can be given |
| 49. | The total surface area of the pyramid | | |
| | $=\frac{(10)(12)}{2} \times 4 + (10)(10)$ | 1 (49-1) | Other correct methods |
| | 2 | | |
| | $= 340 \text{ cm}^2$ | 1* (49-2) | |
| | | 1** (49-3) | |
| 50. (9ME3-50) | (a) $k = \frac{A}{\pi r} - r$ / $k = \frac{A - \pi r^2}{\pi r}$ | 1* (50a) | |
| | (b) $k = \frac{90\pi}{5\pi} - 5$ | 1 (50b-1) | Correct methods |
| | <i>k</i> =13 | 1* (50b-2) | |

| Question Number | Suggested Answers | Marks | Notes |
|--------------------|---|------------|------------------------|
| 51. | $\triangle OAB$ is a right-angled triangle. | | |
| (9ME2-46) | $OB^2 = OA^2 + AB^2$ | | |
| | $= 0.7^2 + 2.4^2$ | 1 (51-1) | |
| | = 6.25 | | |
| | $\therefore OB = 2.5 \text{ km}$ | 1* (51-2) | |
| | \therefore The distance between point <i>O</i> and point <i>B</i> | 1** (51-3) | |
| | is 2.5 km. | | |
| 52. | The arithmetic mean is easily affected by | 1 (52-1) | Reasonable explanation |
| | the 2 extreme values. | | |
| | OR | | |
| | There are 13 donors whose donations are | 1 (52-1) | Reasonable explanation |
| | less than \$200. | | |
| | OR | | |
| | There are only 2 donors whose donations | 1 (52-1) | Reasonable explanation |
| | are more than \$200. | | |
| | | | |
| | ∴ I disagree with Mary's claim. | 1 (52-2) | Have some explanation |