MARKS: 140

This memorandum consists of 10 pages.

Important Information
• This is a marking guideline. In instances where learners have used different but mathematically sound strategies to solve the problems, they (learners) should be credited.
• Unless otherwise stated, learners who give a correct answer only, should be awarded full marks.
• Underline errors committed by learners and apply Consistent Accuracy (CA) marking.

KEY

<table>
<thead>
<tr>
<th>M</th>
<th>Method mark</th>
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<tbody>
<tr>
<td>CA</td>
<td>Consistent Accuracy mark</td>
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<tr>
<td>A</td>
<td>Accuracy mark</td>
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</tbody>
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QUESTION 1

1. | 1.1 | B | 1.2 | A | 1.3 | B | 1.4 | B | 1.5 | C |
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<tbody>
<tr>
<td>1.6</td>
<td>C</td>
<td>1.7</td>
<td>D</td>
<td>1.8</td>
<td>D</td>
<td>1.9</td>
<td>A</td>
<td>1.10</td>
<td>D</td>
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</tbody>
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Give 1 mark for each correct answer.

QUESTION 2

2.1 \[
\frac{6x^5 - 15x^3}{3x^2} = 6x\checkmark - 5x\checkmark M \\
= 6x\checkmark \text{CA}
\]

or

\[
\frac{18x^5 - 15x^5}{3x^4} = \frac{3x^5}{3x^4} \checkmark M \\
= 3x^5 \checkmark \text{CA}
\]

\[6x: 1 \text{ mark} \]
\[-5x: 1 \text{ mark} \]
Answer: 1 mark

[3]

2.2 \[
x(x + 2) - (x - 1)(x - 3) \\
= x^2 + 2x\checkmark - (x^2 - 4x + 3) \checkmark M \\
= x^2 + 2x - x^2 + 4x - 3 \checkmark M \\
= 6x - 3 \checkmark \text{CA}
\]

\[x^2 + 2x: 1 \text{ mark} \]
\[x^2 - 4x + 3: 1 \text{ mark} \]
Simplification: 1 mark
Answer: 1 mark

[4]
2.3 \[ \sqrt{225x^4} - \sqrt[3]{125x^6} \]

\[ = 15x^2 \checkmark \checkmark \text{M} - 5x^2 \checkmark \checkmark \text{M} \]

\[ = 10x^2 \checkmark \text{CA} \]

15: 1 mark

\[ x^2: 1 \text{ mark} \]

\[ -5: 1 \text{ mark} \]

\[ x^2: 1 \text{ mark} \]

\[ 10x^2: 1 \text{ mark} \] (5)

2.4 \[ \frac{2x + 1}{4} - \frac{x + 2}{2} - \frac{1}{4} \]

\[ = \frac{2x + 1 - 2(x + 2) - 1}{4} \checkmark \text{M} \]

\[ = \frac{2x + 1 - 2x - 4 - 1}{4} \checkmark \text{M} \]

\[ = \frac{-4}{4} \checkmark \text{M} \]

\[ = -1 \checkmark \text{CA} \]

Same denominator: 1 mark

Note:
If learners treat the expression as an equation 0 out of 4.
If learners leave out denominator the maximum mark is 3 out of 4.

\[ -2x - 4: 1 \text{ mark} \]

Simplifying numerator: 1 mark

Answer: 1 mark

[16]

QUESTION 3

3.1 \[ 6a^3 - 12a^2 + 18a \]

\[ = 6a \checkmark (a^2 - 2a + 3) \checkmark \text{A} \]

Common factor \(6a\): 1 mark

\[ a^2 - 2a + 3: 1 \text{ mark} \] (2)

3.2 \[ 7x^2 - 28 \]

\[ = 7(x^2 - 4) \checkmark \text{A} \]

\[ = 7(x - 2)(x + 2) \checkmark \text{A} \]

Note: If learners give answer as 
\[ (\sqrt{7}x - \sqrt{28})(\sqrt{7}x + \sqrt{28}) \], then give 1 mark out of 2.

[4]

QUESTION 4

4.1 \[ 3x - 1 = 5 \]

\[ 3x = 6 \checkmark \text{M} \]

\[ x = 2 \checkmark \text{CA} \]

Add 1 on both sides: 1 mark

Answer: 1 mark (2)
4.2 \[2(x - 2)^2 = (2x - 1)(x - 3)\]  
Squaring a binomial: 1 mark  
Product of 2 binomials: 1 mark  
\[2(x^2 - 4x + 4) \checkmark = 2x^2 - 7x + 3 \checkmark M\]  
\[2x^2 - 8x + 8 = 2x^2 - 7x + 3 \checkmark M\]  
x = 5 \checkmark CA

4.3 \[\frac{2x - 3}{2} + \frac{x + 1}{3} = \frac{3x - 1}{2}\]  
\times 6 \[3(2x - 3) + 2(x + 1) = 3(3x - 1) \checkmark M\]  
Multiply LHS and RHS by 6: 1 mark  
\[6x - 9 + 2x + 2 = 9x - 3 \checkmark M\]  
Multiplying out: 1 mark  
\[8x - 7 = 9x - 3 \checkmark M\]  
Simplification: 1 mark  
x = -4 \checkmark CA

4.4 \[x^3 = 64\] or \[x^3 = 4^3 \checkmark M\]  
\[x = 4 \checkmark A\]  
Calculation: 1 mark  
\[x = \sqrt[3]{64} \checkmark M\]  
\[x = 4 \checkmark A\]  
Answer: 1 mark

QUESTION 5

5.1 \[19 \checkmark \text{and } 23 \checkmark A\]  
19: 1 mark  
23: 1 mark

5.2 \[T_n = 4n + 3 \checkmark \checkmark A\]  
4n: 1 mark  
+3: 1 mark  
or \[T_n = 7 + 4(n - 1) \checkmark \checkmark A\]  
7: 1 mark  
4(n - 1): 1 mark

5.3 \[T_n = 4(50) + 3 \checkmark M\]  
Substituting 50 for \(n\): 1 mark  
\[= 203 \checkmark CA\]  
Answer: 1 mark

Note: Give full marks if learner has correctly substituted in his/her “incorrect” general term from 5.2.
QUESTION 6

6.1

\[
\text{Time} = \frac{432}{96} h \checkmark M
\]

\[
= \frac{36}{8} h
\]

\[
= 4\frac{1}{2} h \text{ or } 4 \text{ } 30 \text{ min} \checkmark CA
\]

or

Speed x time = distance

\[
96 \text{ km/h } \times \text{ time } = 432 \text{ km} \checkmark M
\]

\[
\text{Time} = \frac{432 \text{ km}}{96 \text{ km/h}} = 4.5 \text{ h} \checkmark A
\]

Answer: 1 mark (2)

6.2

\[
A = P(1 + ni) \checkmark M
\]

\[
A = R3 500(1 + 3(0,06)) \checkmark M
\]

\[
= R3 500(1,18)
\]

\[
= R4 130,00 \checkmark CA
\]

\[
S.I = R4 130 - R3 500 \checkmark M
\]

\[
= R630 \checkmark CA
\]

or

\[
S.I = \frac{P.nr}{100} \checkmark M
\]

\[
S.I = \frac{R3 500(3)(6)}{100} \checkmark \checkmark \checkmark M
\]

\[
= R630 \checkmark CA
\]

6.3

\[
A = P(1 + i)^n \checkmark M
\]

\[
= R7 500(1 + 0,13)^3 \checkmark \checkmark \checkmark M
\]

\[
= R7 500(1,13)^3
\]

\[
= R10 821,73 \checkmark CA
\]

or

Year 1: \[
R7 500 \times 13\% = R975,00
\]

Year 2: \[
R8 475,00 \times 13\% = R1 101,75
\]

Year 3: \[
R9 576,75 \times 13\% = R1 244,98 \checkmark \checkmark \checkmark M
\]

The amount will be \[
R10 821,73 \checkmark CA
\]
QUESTION 7

7.1.1

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>x co-ordinate</strong></td>
<td>0</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td><strong>y co-ordinate</strong></td>
<td>−2</td>
<td>0</td>
<td>2</td>
</tr>
</tbody>
</table>

1 mark per pair of coordinates of each point (3)

7.1.2 \(y = x - 2 \checkmark \checkmark \text{A}

7.2.1

\[ x = 1 \]
\[ y = -2x + 4 \]

\(y\) - intercept: 1 mark \(\checkmark\)
\(x\) - intercept: 1 mark per graph \(\checkmark + \checkmark\)
Labelling graph: 1 mark per graph \(\checkmark + \checkmark\) (5)

7.2.2 \((1; 2) \checkmark \checkmark \text{CA} \)

Note: Give full marks if learner has correctly identified the point of intersection of his/her graphs.

1 mark for \(x\)-value
1 mark for \(y\)-value (2)

[12]
QUESTION 8

Note: Penalty for leaving out reasons: only deduct 1 mark for this entire question.

8.1.1 \( T_1 = T_1 = 25^\circ \) \( (\angle s \ \text{opp. equal sides of} \ \Delta) \checkmark \text{A} \)
Correct statement with reason: 1 mark (1)

8.1.2 \( M_2 = 50^\circ \) \( (\text{ext } \angle \ \text{of} \ \Delta MPT) \checkmark \text{A} \text{ or} \)
\( (\text{suppl. } \angle s \ \text{on a str line}) \checkmark \text{A} \)
Correct statement with reason: 1 mark (1)

8.1.3 \( \hat{R} + \hat{T_2} = 130^\circ \) \( (\text{sum of} \ \angle s \ \text{of} \ \Delta = 180^\circ) \checkmark \text{A} \)
But \( \hat{R} = \hat{T_2} \) \( (\angle s \ \text{opp. equal sides of} \ \Delta) \checkmark \text{A} \)
Correct statement with reason: 1 mark
Correct statement with reason: 1 mark
Answer: 1 mark (3)

8.2.1 \( BD + DE = CE + DE \ \checkmark \text{A} \)
Answer: 1 mark (1)

8.2.2 \( \Delta ACD \equiv \Delta ABE \) \( (s\angle s) \checkmark \text{A} \)
Correct statement and reason: 1 mark
NOTE: Order of the vertices should be correct (1)

8.3 \( \text{in } \Delta KNQ \text{ and } \Delta MPQ \)
\( \hat{Q} = \hat{Q} \) \( (\text{common}) \checkmark \text{A} \)
\( NQ = PQ \) \( (\text{given}) \checkmark \text{A} \)
\( KQ = MQ \) \( (\text{given}) \checkmark \text{A} \)
\( \therefore \Delta KNQ \equiv \Delta MPQ \) \( (s\angle s) \checkmark \text{A} \)
Correct statement with reason: 1 mark
Correct statement with reason: 1 mark
Correct statement with reason: 1 mark
Correct deduction with reason: 1 mark (4)

8.4.1 \( \text{in } \Delta QPN \text{ and } \Delta LMN \)
\( \hat{N} = \hat{N} \) \( (\text{common } \angle) \checkmark \text{A} \)
\( \hat{P} = \hat{P} \) \( (\text{corr} \angle s, \text{QP || LM}) \checkmark \text{A} \)
\( \hat{Q} = \hat{L} \) \( (\text{corr} \angle s, \text{QP || LM}) \checkmark \text{A} \)
\( \therefore \Delta QPN \parallel \Delta LMN \) \( (\angle \angle \angle) \checkmark \text{A} \)
Correct statement with reason: 1 mark
Correct statement with reason: 1 mark
Correct statement with reason: 1 mark
Correct deduction and reason: 1 mark
Note: Do not penalize learners if they leave out the third condition \( \hat{N} = \hat{N} \). (4)

8.4.2 \( \frac{QP}{LM} = \frac{PN}{MN} = \frac{QN}{LN} \) \( (\text{prop sides of similar } \Delta s) \checkmark \text{A} \)
Correct statement with reason: 1 mark
Substitution: 1 mark

\( \frac{3}{8} = \frac{PN}{16} \checkmark \text{A} \)

\( PN = 6 \text{ cm} \checkmark \text{A} \)
Answer: 1 mark
Note: Answer only give 3 marks (3)

[18]
QUESTION 9

9.1 and 9.3

9.2 \( B' (4; -2) \) ✔️CA

NOTE: Give full marks if learner has written the coordinates of \( B' \) from his/her triangle. Answer: 1 mark (1)

9.4 \( A'A'' = 4 \text{ units} \) ✔️CA

NOTE: Give full marks if learner has given the correct length of his/her \( A'A'' \). Answer: 1 mark (1)

Correct drawing of \( \triangle A'O'B' \): 2 marks ✔️✔️A

Correct drawing of \( \triangle A''O'B'' \): 2 marks ✔️✔️A (4)
QUESTION 10

10.1.1 Area of ring = \(\pi R^2 - \pi r^2\) \(\checkmark M/A\) 
= \(\pi (R^2 - r^2)\) 
Formula: 1 mark 
Subtraction: 1 mark 
(2)

10.1.2 Area of ring = \(\pi (14^2) - \pi (8^2)\) \(\text{cm}^2\) \(\checkmark M\) 
= 132\(\pi\) \(\text{cm}^2\) \(\checkmark CA\) 
= \(\pi (22)(6)\) \(\text{cm}^2\) 
= 132\(\pi\) \(\text{cm}^2\) \(\checkmark CA\) 
Answer: 1 mark 
(2)

10.2.1 \(QT = TR = 24\) \(\text{cm}\) \(\checkmark\) \((\Delta PQT \equiv \Delta PRT)\) \(\checkmark A\) 
Correct statement with reason: 2 marks 
(2)

10.2.2 In \(\Delta PQT:\) 
\(PT^2 = (25^2 - 24^2)\) \(\text{cm}^2\) \((\text{Pythagoras})\) \(\checkmark M\) 
\(= (625 - 576)\) \(\text{cm}^2\) \(\checkmark M\) or \((25+24)(25-24)\) \(\text{cm}^2\) \(\checkmark M\) 
\(= 49\) \(\text{cm}^2\) 
\(PT = 7\) \(\text{cm}\) \(\checkmark M\) 
Correct statement with reason: 2 marks 
Calculations: 1 mark 
Answer: 1 mark 
(4)

10.2.3 Area \(\Delta PQR = \frac{\text{base} \times \text{height}}{2}\) \(\checkmark M\) \(\ or = \frac{1}{2}(\text{base} \times \text{height})\) 
\(= \frac{(48)(7)}{2}\) \(\text{cm}^2\) \(\checkmark M\) 
\(= (24)(7)\) \(\text{cm}^2\) 
\(= 168\) \(\text{cm}^2\) \(\checkmark CA\) 
Formula: 1 mark 
Substitution: 1 mark 
Answer: 1 mark 
(3)

10.2.4 Volume = Area of base \(\times\) height \(\checkmark M\) 
\(= 168\) \(\text{cm}^2\) \(\times\) 80 \(\text{cm}\) 
\(= 13\ 440\) \(\text{cm}^3\) \(\checkmark CA\) 
Formula/substitution: 1 mark 
Answer: 1 mark 
(2)

10.2.5 Surface area = \(2(\text{Area }\Delta PQR) + 2(\text{Area }\text{PRSW}) + \text{Area }\text{QRSU}\) \(\checkmark M\) 
\(= 2(168)\) \(\text{cm}^2\) \(+ 2(80 \times 25)\) \(\text{cm}^2\) \(+ 80(48)\) \(\text{cm}^2\) \(\checkmark \checkmark M\) 
\(= 336\) \(\text{cm}^2\) \(+ 4\ 000\) \(\text{cm}^2\) \(+ 3\ 840\) \(\text{cm}^2\) 
\(= 8\ 176\) \(\text{cm}^2\) \(\checkmark CA\) 
Formula: 1 mark 
Substitution: 3 marks 
Answer: 1 mark 
(5)
QUESTION 11

11.1 Mark $x$ | $f$ | $fx$
---|---|---
1 | 2 | 2
2 | 3 | 6
3 | 4 | 12
4 | 6 | 24
5 | 7 | 35
6 | 9 | 54
7 | 4 | 28
8 | 3 | 24
9 | 2 | 18

\[ f \cdot x \text{ values: } 4 \text{ marks} \]

11.2 Number of learners $= \Sigma f = 40 \checkmark A$

Answer: 1 mark (1)

11.3 The mean mark $= \frac{\Sigma fx}{\Sigma f}$

\[ \frac{203}{40} \checkmark M \]

\[ = 5,075 \checkmark CA \]

Formula: 1 mark

Substitution: 1 mark

Answer: 1 mark (3)

Note: If answer is given as 5 then give full marks.

11.4 $\%$ of learners $= \frac{9}{40} \times 100 \checkmark M$

\[ = 22,5 \checkmark CA \]

Correct fraction: 1 mark

Answer: 1 mark (2)

NOTE: If answer is given as 22,5 then give full marks.

QUESTION 12

12.1 Stem | Leaves
---|---
13 | 7
14 | 5 6 7 9
15 | 0 3 3 6 6 7 8 8
16 | 3 5 5
17 | 0 3 7

Ordered table: 5 marks (5)

12.2.1 Range $= (177 - 137) \text{ cm} = 40 \text{ cm} \checkmark A$

Answer: 1 mark (1)

12.2.2 Mode $= 153 \text{ cm} \checkmark A$

Answer: 1 mark (1)

12.2.3 Median $= 156 \text{ cm} \checkmark A$

Answer: 1 mark (1)

12.2.4 $14 \checkmark A$

Answer: 1 mark (1)

[10]
QUESTION 13

13.1 \( P(G) = \frac{5}{12} \) Answer: 1 mark (1)

13.2 \( P(W) = \frac{4}{12} = \frac{1}{3} \) Answer: 1 mark (1)

13.3 \( P(W) = \frac{3}{11} \) Answer: 1 mark (1)

QUESTION 14

Let \( x \) boys play soccer and hockey

\[
150 + (130 - x) = 200 \quad \text{Correct statement: } 1 \text{ mark}
\]

\[
280 - x = 200 \quad \text{Correct statement: } 1 \text{ mark}
\]

\[
x = 80 \quad \text{Correct statement: } 1 \text{ mark}
\]

or

\[
130 + (150 - x) = 200 \quad \text{Correct statement: } 1 \text{ mark}
\]

\[
280 - x = 200 \quad \text{Correct statement: } 1 \text{ mark}
\]

\[
x = 80 \quad \text{Correct statement: } 1 \text{ mark}
\]

Total number of boys who play hockey and soccer

\[
= 150 + 130 = 280 \quad \text{Correct statement: } 1 \text{ mark}
\]

But this is 80 more than the number of boys in grade 9 which means 80 boys must play both soccer and hockey \( \checkmark \checkmark \) Answer: 1 mark (3)

TOTAL: 140