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SHARP

June Exam Memorandum

Grade 8 Mathematics

Marks: 150

Time: 2 hours

Question 1 [16]

1.1. 25; 78; 23; -7; $\sqrt{-2}$; $\frac{0}{5}$; $\frac{8}{0}$; 36; -64; 51;

1.1.1. 25, 78, 23, -7, $\frac{0}{5}$, 36, -64, 51 (2) minus $\frac{1}{2}$ for every two values missing from the list

1.1.2. $\sqrt{-2}$, $\frac{8}{0}$ (2) 1 mark each

1.1.3. 25, 36 (1) $\frac{1}{2}$ mark each

1.1.4. -64 (1)

1.1.5. 23, 51 (2) 1 mark each

1.2. 1.2.1. 84: 1, 2, 3, 4, 6, 7, 12, 14, 21, 28, 42, 84 (2)

minus $\frac{1}{2}$ for every 2 values missing from the list

1.2.2. 54: 1, 2, 3, 6, 9, 18, 27, 54 (2)

Minus $\frac{1}{2}$ for every 2 values missing from the list

1.3.	1.3.1.	<table border="1"> <tr><td>98</td><td>2</td></tr> <tr><td>49</td><td>7</td></tr> <tr><td>7</td><td>7</td></tr> <tr><td>1</td><td></td></tr> </table>	98	2	49	7	7	7	1		<table border="1"> <tr><td>70</td><td>2</td></tr> <tr><td>35</td><td>7</td></tr> <tr><td>5</td><td>5</td></tr> <tr><td>1</td><td></td></tr> </table>	70	2	35	7	5	5	1	
98	2																		
49	7																		
7	7																		
1																			
70	2																		
35	7																		
5	5																		
1																			

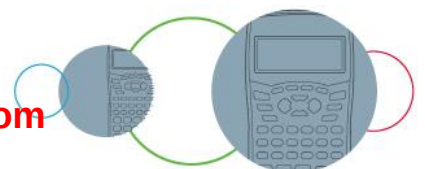
$\therefore$ Highest common factor: $2 \times 7 = 14$ $\checkmark$

$\therefore$ Lowest Common Multiple: $2 \times 7 \times 7 \times 5 = 490$ $\checkmark$ (2)

1.3.2.	<table border="1"> <tr><td>72</td><td>2</td></tr> <tr><td>36</td><td>2</td></tr> <tr><td>18</td><td>2</td></tr> <tr><td>9</td><td>3</td></tr> <tr><td>3</td><td>3</td></tr> <tr><td>1</td><td></td></tr> </table>	72	2	36	2	18	2	9	3	3	3	1		<table border="1"> <tr><td>120</td><td>2</td></tr> <tr><td>60</td><td>2</td></tr> <tr><td>30</td><td>2</td></tr> <tr><td>15</td><td>3</td></tr> <tr><td>5</td><td>5</td></tr> <tr><td>1</td><td></td></tr> </table>	120	2	60	2	30	2	15	3	5	5	1	
72	2																									
36	2																									
18	2																									
9	3																									
3	3																									
1																										
120	2																									
60	2																									
30	2																									
15	3																									
5	5																									
1																										

$\therefore$ HCF = $2 \times 2 \times 2 \times 3 = 24$

$\therefore$ LCM = $2 \times 2 \times 2 \times 3 \times 3 \times 5$
= 360



Question 2 [13]

$$\begin{aligned}
 2.1. \quad & \sqrt{0.36} & (2) \\
 & = \sqrt{\frac{36}{100}} & \checkmark \\
 & = \frac{6}{10} & \\
 & = 0.6 & \checkmark
 \end{aligned}$$

$$\begin{aligned}
 2.2. \quad & (-8)^2 \div -4 & (2) \\
 & = 64 \div -4 & \checkmark \\
 & = -16 & \checkmark
 \end{aligned}$$

$$\begin{aligned}
 2.3. \quad & (-4) + (-4) - (-8) & (2) \\
 & = -4 - 4 + 8 & \checkmark \\
 & = 0 & \checkmark
 \end{aligned}$$

$$\begin{aligned}
 2.4. \quad & 5 \times \frac{-42}{6} + (-12) & (3) \\
 & = 5 \times -7 - 12 & \checkmark \\
 & = -35 - 12 & \checkmark \\
 & = -47 & \checkmark
 \end{aligned}$$

$$\begin{aligned}
 2.5. \quad & \sqrt[3]{-3\frac{3}{8}} & (2) \\
 & = \sqrt[3]{\frac{-27}{8}} & \checkmark \\
 & = -\frac{3}{2} \text{ or } -1.5 & \checkmark
 \end{aligned}$$

$$\begin{aligned}
 2.6. \quad & 2 - 16 + 3 \times -2 & (2) \\
 & = -14 - 6 & \checkmark \\
 & = -20 & \checkmark
 \end{aligned}$$

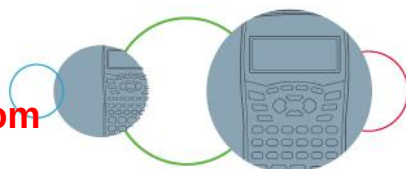
Question 3 [18]

$$\begin{aligned}
 3.1. \quad & 3.1.1. \quad 3 \times 3 \times 3 \times 2 \times 2 \times 2 \times 2 = 3^3 \times 2^4 & \checkmark\checkmark & (2) \\
 & 3.1.2. \quad a \times a \times b \times b \times b \times b = a^2 \times b^4 & \checkmark\checkmark & (2)
 \end{aligned}$$

$$\begin{aligned}
 3.2. \quad & 3.2.1. \quad 464\,000 = 4,64 \times 10^5 \quad \checkmark & (1) & 3.2.2. \quad 0.332 = 3,32 \times 10^{-1} & (1)
 \end{aligned}$$

$$\begin{aligned}
 3.3. \quad & 3.3.1. \quad 4.92 \times 10^3 = 4\,920 & \checkmark & (1) & 3.3.2. \quad 7.22 \times 10^8 = 722\,000\,000 \quad \checkmark & (1)
 \end{aligned}$$

$$\begin{aligned}
 3.4. \quad & 3.4.1. \quad \frac{(a^4b)^0}{ab^8} \times \frac{cb^2}{a^5c^2} & (3) & 3.4.2. \quad \frac{(x^2y)^{-1}}{(xy^2z)^3} \div \frac{2x^3y^{-7}}{4x^4y^8} \times \frac{6xy}{z^3} & (4) \\
 & = \frac{1}{ab^8} \times \frac{b^2}{a^5c} & \checkmark\checkmark & = \frac{x^{-2}y^{-1}}{x^3y^6z^3} \times \frac{4x^4y^8}{2x^3y^{-7}} \times \frac{6xy}{z^3} & \checkmark\checkmark \\
 & = \frac{b^2}{a^6b^8c} & & = \frac{24x^3y^8}{2x^6y^{-1}z^6} & \checkmark \\
 & = \frac{1}{a^6b^6c} & \checkmark & = \frac{12y^9}{x^3z^6} & \checkmark
 \end{aligned}$$



3.5. $3^x + 1 = 10$

(3)

$3^x = 9$ ✓

$3^x = 3^2$ ✓

$x = 2$ ✓

Question 4 [9]

4.1. 20, 26, 32, 38...

(3)

i) 44, 50, 56 ✓

ii) Add 6 to the previous term ✓

iii) $20 + (6)(20) - 6 = 134$ ✓

4.2. 3, 6, 12, 24...

(3)

i) 48, 96, 192 ✓

ii) multiply the previous term by 2 ✓

iii) $3 \times 2(20 \text{ times}) \therefore 3 \times 2^{20} = 3\,145\,728$ ✓

4.3. 8, 10, 13, 17, 23...

(3)

i) 8, +2 10, +3 13, +4 17, +5 23, +6 29, +7 36, +8 44 ✓

ii) add an extra one to each previous number that has been added. ✓

iii) $44 + 9 = 53$, $53 + 10 = 63$, $63 + 11 = 74$, $74 + 12 = 86$, $86 + 13 = 99$, $99 + 14 = 113$, $113 + 15 = 128$, $128 + 16 = 144$, $144 + 17 = 161$, $161 + 18 = 179$, $179 + 19 = 198$, $198 + 20 = 218$ ✓

Question 5 [6]

5.1.

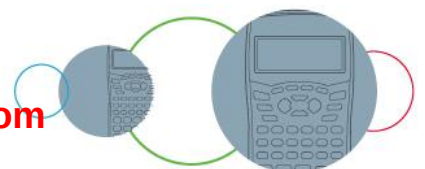
Number of Hours Worked	1	2	3	7	10	14	20
Amount Earned	35	70	105	245	350	490	700

1 mark each

(5)

5.2. $M = 35x n$

(1)



Question 6 [25]

6.1. $7x^6 - 8x^4 + 2x^3 - 3x + 10$

6.1.1. 6th degree $\checkmark$ (1)

6.1.2. -8 $\checkmark$ (minus sign must be there to get the mark) (1)

6.1.3. 5 terms $\checkmark$ (1)

6.1.4. 10 $\checkmark$ (1)

6.2. 6.2.1. $3x(4x + y)$ (2) 6.2.2. $-y(8y - 2)$ (2)

$= 12x^2 + 3xy$ $\checkmark\checkmark$ $= -8y^2 + 2y$ $\checkmark\checkmark$

6.2.3. $-4xy(4x^2 + 7y - 8xy)$ (3) 6.2.4. $12a(4a + b) - 6b(7a - 3)$ (4)

$= -16x^3y - 28xy^2 + 32x^2y^2$ $\checkmark\checkmark\checkmark$ $= 48a^2 + 12ab - 42ab + 18b$ $\checkmark\checkmark$

$= 48a^2 - 30ab + 18b$ $\checkmark\checkmark$

6.2.5. $(3x^3 - 27x^2 + 6xy) \div 3x$ (3) 6.2.6. $\frac{1}{2}c(4c^2 + 16c - 10) - 8c^2$ (3)

$= x^2 - 9x + 2y$ $\checkmark\checkmark\checkmark$ $= 2c^3 + 8c^2 - 5c - 8c^2$ $\checkmark\checkmark$

$= 2c^3 - 5c$ $\checkmark$

6.3. 6.3.1. $8a + 8b + 7a + 11b$ $\checkmark\checkmark$
 $= 15a + 19b$ $\checkmark$ (3)

6.3.2. $12 \times e$ $\checkmark$ (1)

Question 7 [13]

7.1. 7.1.1. $3(x - 4) = 6$ (3) 7.1.2. $\frac{x}{9} - 5 = -1$ (3)

$3x - 12 = 6$ $\checkmark$ $\frac{x}{9} = 4$ $\checkmark$

$3x = 18$ $\checkmark$ $x = 36$ $\checkmark\checkmark$

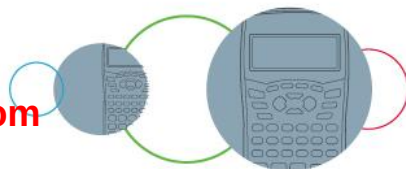
$x = 6$ $\checkmark$

7.1.3. $\frac{2x}{3} + 20 = 10$ (4)

$\frac{2x}{3} = -10$ $\checkmark$

$2x = -30$ $\checkmark$

$x = -15$ $\checkmark\checkmark$



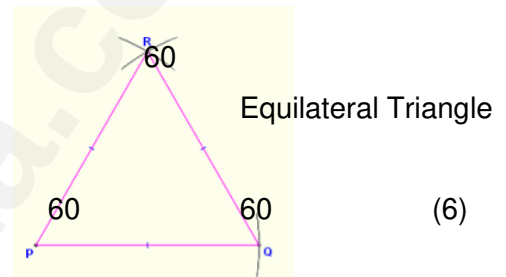
7.2.

	Now	In 10 years-time
Mom	$3x$	$2(x + 10)$
Sindiswa	x	$x + 10$

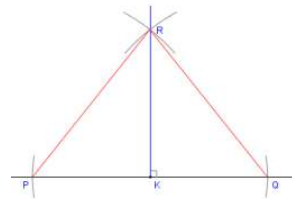
$$\therefore 3x + 10 = 2(x + 10) \quad \checkmark\checkmark$$

$$\therefore 3x + 10 = 2x + 20$$

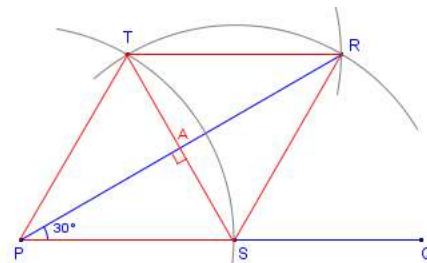
$$\therefore x = 10 \quad \checkmark \quad (3)$$

Question 8 [16]8.1. All sides are equal to 4.5cm (± 3 mm). $\checkmark\checkmark$ All three angles are labelled 60° $\checkmark\checkmark$ Angles measure 60° $\checkmark$ Triangle is labelled $\checkmark$ 

(6)

8.2. 1st line with point marked $\checkmark$ 4 arcs points marked $\checkmark$ Straight line from point to crossing arcs $\checkmark$ Angle measures 90° $\checkmark$ 

(4)

8.3. 3 arcs $\checkmark\checkmark$ Line from end point of line to third arc $\checkmark$ Angle measures 30° and is labelled 30° $\checkmark$ 

(4)

Question 9 [14]

9.1. 9.1.1. All parallelograms are squares.

False – all squares are parallelograms $\checkmark\checkmark$

9.1.2. All squares are rhombi.

True $\checkmark$

9.1.3. A scalene triangle has two sides that are equal.

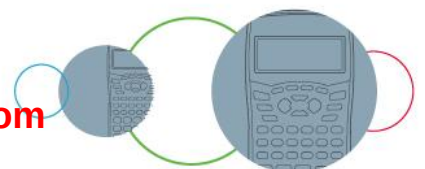
False – a scalene triangle has no equal sides. $\checkmark\checkmark$

9.1.4. Two intersecting lines with equal angles opposite each other are called corresponding angles. **False – two intersecting lines with equal angles opposite each other are called vertically opposite angles.** $\checkmark\checkmark$

9.1.5. All parallelograms are trapeziums.

True. $\checkmark$

(8)



- 9.2. 9.2.1 Neither – the shapes are not the same $\checkmark\checkmark$ (2)
 9.2.2. Similar $\checkmark$ All three angles are equal $\checkmark$ (2)
 9.2.3. Congruent $\checkmark$ SAS $\checkmark$ (2)

Question 10 [20]

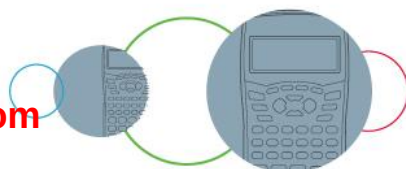
- 10.1. 10.1.1. $\widehat{GCE} = 90^\circ$ $EC \perp GB$
 $\widehat{GCE} + \widehat{DEC} = 180^\circ$ Corresponding $\angle$ s equal $DE \parallel GB$ $\checkmark$
 $\therefore \widehat{DEC} = 90^\circ$
 $\therefore EC \perp DE$ $\checkmark$ (2)

- 10.1.2. In $\triangle DEH$ and $\triangle BGH$
 1. $\widehat{EDH} = \widehat{HBG}$ Alt angles $\checkmark$
 2. $\widehat{DHE} = \widehat{GHB}$ Angles Vert. Opp. $\checkmark$
 3. $\widehat{DEH} = \widehat{HGB}$ Alt Angles $\checkmark$
 $\therefore \triangle DHE \equiv \triangle BHG$ (3)

- 10.1.3. In $\triangle DEF$ and $\triangle BCF$. (3)
 1. $\widehat{DEF} = \widehat{FCB}$ Both equal to 90° $\checkmark$
 2. $EF = FC$ Given $\checkmark$
 3. $\widehat{EFD} = \widehat{CFB}$ Vert. opp. $\checkmark$
 $\therefore \triangle DEF \equiv \triangle BCF$ (A,S,A)

- 10.2 10.2.1. In $\triangle ACD$ and $\triangle CEF$
 1. $\widehat{C}$ is common $\checkmark$
 2. $\widehat{ADC} = \widehat{EFC}$ Corr. Angles $\checkmark$
 3. $\widehat{DAC} = \widehat{FEC}$ Corr. Angles $\checkmark$
 $\therefore \triangle ACD \equiv \triangle CEF$ (All three angles equal) $\checkmark$ (4)

- 10.2.2. Any two of the following: (2)
 $\widehat{GAB} = \widehat{ADF}$ Corr. Angles $\checkmark$
 $\widehat{ADF} = \widehat{BFC} = \widehat{GAB}$ Corr. Angles $\checkmark$
 $\widehat{GAB} = \widehat{IAD}$ Vert. Opp. $\checkmark$
 $\widehat{IAD} = \widehat{ABF} = \widehat{GAB}$ Corr. Angles $\checkmark$
 $\widehat{ADF} = \widehat{DFH} = \widehat{GAB}$ Alt angles $\checkmark$



10.2.3.	10.2.3.1.	$E\hat{C}F = B\hat{A}E$	Alt angles	✓	
		$B\hat{A}E = J\hat{A}I = 40^\circ$	Vert. Opp.	✓	(2)
	10.2.3.2.	$I\hat{A}D = A\hat{D}F = 65^\circ$	Alt angles	✓✓	(2)
	10.2.3.3.	$\therefore J\hat{A}D = I\hat{A}D + J\hat{A}I$		✓	
		$\therefore J\hat{A}D = 65^\circ + 40 = 105^\circ$		✓	(2)

Grand Total [150]

