



education

Department:
Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE**

GRADE 10

MATHEMATICS P2

NOVEMBER 2006

This memorandum consists of 9 pages.

MARKING MEMO - FET MATHEMATICS GRADE 10

<p>1.1.1 (a) $AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \checkmark$ $= \sqrt{(1 + 2)^2 + (3 + 2)^2} \checkmark$ $= \sqrt{34} \checkmark$</p>	<p>\checkmark Formula \checkmark substitution \checkmark answer (3)</p>
<p>(b) $BC = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ $= \sqrt{(6 - 1)^2 + (0 - 3)^2} \checkmark$ $= \sqrt{34} \checkmark$</p>	<p>\checkmark substitution \checkmark answer (2)</p>
<p>(c) $AC = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ $= \sqrt{(6 + 2)^2 + (0 + 2)^2} \checkmark$ $= \sqrt{68} \checkmark$</p>	<p>\checkmark substitution \checkmark answer (2)</p>
<p>1.1.2 $AB^2 = 34 \checkmark$ $BC^2 = 34$ $AC^2 = 68 \checkmark$ $AB^2 + BC^2 = AC^2 \checkmark$ $\Rightarrow \hat{B} = 90^\circ$ $\Rightarrow \Delta ABC$ is a right angled triangle</p> <p>OR</p> <p>$m_{AB} = \frac{3+2}{1+2} = \frac{5}{3} \checkmark$ $m_{BC} = \frac{3-0}{1-6} = -\frac{3}{5} \checkmark$ $m_{AB} \cdot m_{BC} = \frac{5}{3} \times \frac{-3}{5} = -1 \checkmark$ $\therefore AB \perp BC$</p>	<p>$\checkmark AB^2 = 34$ $\checkmark 68$ $\checkmark AB^2 + BC^2 = AC^2$ (3)</p> <p>$\checkmark m_{AB}$ $\checkmark m_{BC}$ $\checkmark m_{AB} \cdot m_{BC} = -1$ (3)</p>

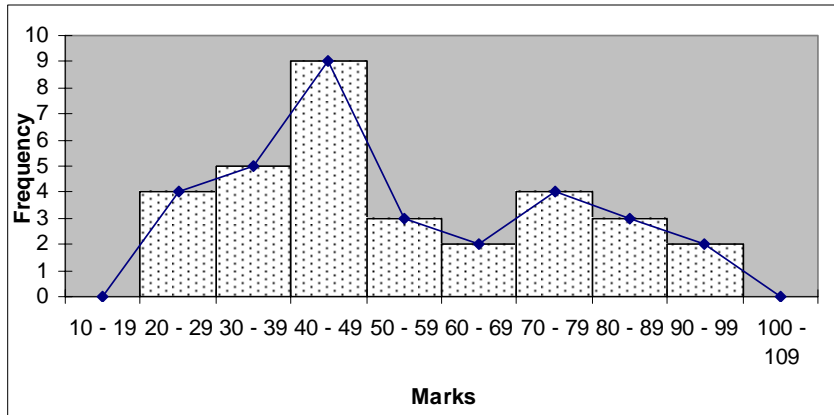
<p>1.1.3 $E = \left(\frac{x_A + x_B}{2}; \frac{y_A + y_B}{2} \right) \checkmark$</p> <p>$E = \left(\frac{-2+1}{2}; \frac{-2+3}{2} \right)$</p> <p>$E = \left(-\frac{1}{2}; \frac{1}{2} \right) \checkmark$</p> <p>$D = \left(\frac{x_A + x_C}{2}; \frac{y_A + y_C}{2} \right)$</p> <p>$D = \left(\frac{-2+6}{2}; \frac{-2+0}{2} \right)$</p> <p>$D = (2; -1) \checkmark$</p> <p>$m_{DE} = \frac{y_2 - y_1}{x_2 - x_1} \checkmark$</p> <p>$= \frac{-1 - \frac{1}{2}}{2 + \frac{1}{2}} \checkmark$</p> <p>$= \frac{-\frac{3}{2}}{\frac{5}{2}} \checkmark$</p> <p>$= -\frac{3}{5} \checkmark$</p> <p>$m_{BC} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{0 - 3}{6 - 1}$</p> <p>$= -\frac{3}{5} \checkmark$</p> <p>$\Rightarrow m_{DE} = m_{BC} \checkmark$</p> <p>Therefore DE is parallel to BC.</p>	<p>\checkmark formula</p> <p>\checkmark coordinate E</p> <p>\checkmark coordinate D</p> <p>\checkmark formula</p> <p>\checkmark substitution</p> <p>\checkmark answer of m_{DE}.</p> <p>\checkmark answer to m_{BC}</p> <p>\checkmark conclusion</p> <p>(8)</p>
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<p>1.2 $m_{CD} = \frac{3}{4}$</p> <p>$\therefore m_{AB} = -\frac{4}{3}$</p> $\frac{y - (-5)}{x - 3} = -\frac{4}{3}$ $3y + 15 = -4x + 12$ $4x = -3y - 3$ $x = \frac{-3y - 3}{4}$	<p>√ inversion and change sign of gradient</p> <p>√ substitution</p> <p>√ equating the gradient and the inverse negative.</p> <p>√ cross multiplication</p> <p>√ answer</p> <p>(5) [23]</p>
<p>2.1 $A' (-1 ; -4)$ √√</p> <p>$C' (1 ; -2)$ √√</p> <p>$F' (3 ; -4)$ √√</p> <p>2.2 $A' (6 ; 2)$ √</p> <p>$C' (4 ; 4)$ √</p> <p>$F' (2 ; 2)$ √</p> <p>2.3 $A' (2 ; -6)$ √√</p> <p>$C' (4 ; -4)$ √√</p> <p>$F' (2 ; -2)$ √√</p>	<p>√√ coordinate A'</p> <p>√√ coordinate C'</p> <p>√√ coordinate F'</p> <p>(6)</p> <p>√ x coordinate A'</p> <p>√ x coordinate C'</p> <p>√ x coordinate F'</p> <p>(3)</p> <p>√√ coordinate A'</p> <p>√√ coordinate C'</p> <p>√√ coordinate F'</p> <p>(6) [15]</p>
<p>3.1.1 $\frac{90^0}{360^0} = \frac{1}{4}$ √</p> <p>3.1.2 $\frac{2}{5} \times 360^0$ √</p> <p>$= 144^0$ √</p>	<p>√ answer</p> <p>(1)</p> <p>√ calculation</p> <p>√ answer</p> <p>(2)</p>

<p>3.1.3 percentage burnt = $\frac{144}{360} \times 100\%$ ✓ = 40 % ✓ percentage re-cycled = 25 % ✓ Therefore percentage used for landfill = $100 - (40 + 25) = 35\%$ ✓</p>	<p>✓ calculation ✓ answer ✓ answer ✓ final answer (4)</p>																		
<p>OR $360^\circ - (90^\circ + 144^\circ)$ ✓ = $360^\circ - 234^\circ$ = 126° ✓ Therefore percentage used for landfill = $\frac{126}{360} \times 100\%$ ✓ = 35 % ✓</p>	<p>✓ calculation ✓ answer ✓ calculation ✓ final answer (4)</p>																		
<p>3.2.1</p> <table border="1" data-bbox="389 882 868 1228"> <thead> <tr> <th>Mark Interval</th> <th>Frequency</th> </tr> </thead> <tbody> <tr> <td>$20 \leq \text{mark} < 30$</td> <td>4</td> </tr> <tr> <td>$30 \leq \text{mark} < 40$</td> <td>5</td> </tr> <tr> <td>$40 \leq \text{mark} < 50$</td> <td>9</td> </tr> <tr> <td>$50 \leq \text{mark} < 60$</td> <td>3</td> </tr> <tr> <td>$60 \leq \text{mark} < 70$</td> <td>2</td> </tr> <tr> <td>$70 \leq \text{mark} < 80$</td> <td>4</td> </tr> <tr> <td>$80 \leq \text{mark} < 90$</td> <td>3</td> </tr> <tr> <td>$90 \leq \text{mark} < 100$</td> <td>2</td> </tr> </tbody> </table>	Mark Interval	Frequency	$20 \leq \text{mark} < 30$	4	$30 \leq \text{mark} < 40$	5	$40 \leq \text{mark} < 50$	9	$50 \leq \text{mark} < 60$	3	$60 \leq \text{mark} < 70$	2	$70 \leq \text{mark} < 80$	4	$80 \leq \text{mark} < 90$	3	$90 \leq \text{mark} < 100$	2	<p>✓✓✓✓✓ correct values in the table (5)</p>
Mark Interval	Frequency																		
$20 \leq \text{mark} < 30$	4																		
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$80 \leq \text{mark} < 90$	3																		
$90 \leq \text{mark} < 100$	2																		
<p>3.2.2 mean = $\frac{1706}{32}$ ✓ = 53,3 ✓</p>	<p>✓ substitution ✓ answer (2)</p>																		
<p>3.2.3 21; 24; 27; 29; 33; 33; 36; 36; 39; 42; 42; 42; 42; 42; 45; 46; 49; 49; 53; 54; 55; 64; 66; 73; 76; 77; 79; 80; 83; 88; 90 ; 91 median = $\frac{46 + 49}{2}$ ✓ median = 47,5 ✓</p>	<p>✓ average of 16th and 17th number ✓ answer (2)</p>																		
<p>3.2.4 $40 \leq \text{mark} < 50$ ✓✓</p>	<p>✓✓ answer (2)</p>																		

3.2.5 &

3.2.6



3.2.5

- √ labelling of x -axis
- √ labelling of y -axis
- √ correct bars (shape)
- √ correct intervals

(5)

3.2.6

- √ midpoints on bars
- √ joining of straight lines
- √ empty intervals on either side of histogram
- √ vertices on x -axis

(4)

[27]

4.1.1 $\sin 63^\circ = \frac{CD}{5} \checkmark$

$\Rightarrow CD = 5 \times \sin 63^\circ \checkmark$
 $= 4.46 \text{ cm} \checkmark$

- √ sin ratio

- √ calculation

- √ CD

(3)

4.1.2 $\cos 63^\circ = \frac{AD}{5} \checkmark$

$\Rightarrow AD = 5 \times \cos 63^\circ \checkmark$
 $= 2.27 \text{ cm} \checkmark$

- √ cos ratio

- √ calculation

- √ AD

$\tan 33^\circ = \frac{CD}{BD} \checkmark$

$\tan 33^\circ = \frac{4.46}{BD}$

$BD = \frac{4.46}{\tan 33^\circ} \checkmark$

$= 6.87 \text{ cm} \checkmark$

$\therefore AB = 2.27 + 6.87 = 9.14 \text{ cm} \checkmark$

- √ tan ratio

- √ calculation

- √ BD

- √ AB

(7)

<p>4.2 $\sin 30^\circ = \frac{h}{2.5} = 0,5 \checkmark$</p> <p>$h = 0,5 \times 2,5 = 1,25 \text{ m} \checkmark$</p> <p>Area $\triangle ABC = \frac{1}{2}$ base x height \checkmark</p> <p>$= \frac{1}{2} \times 10 \times 1,25$</p> <p>$= 6,25 \text{ m}^2 \checkmark$</p> <p>4.3 $\frac{h}{45} = \tan 27^\circ \checkmark \checkmark$</p> <p>$h = 45 \times \tan 27^\circ \checkmark$</p> <p>$h = 22.9 \text{ m} \checkmark$</p>	<p>\checkmark sin ratio</p> <p>\checkmark h</p> <p>\checkmark area formula</p> <p>\checkmark final answer (4)</p> <p>\checkmark $\tan 27^\circ$</p> <p>\checkmark ratio</p> <p>\checkmark calculation</p> <p>\checkmark answer (4)</p> <p>[18]</p>
<p>5.1 Area of right surface = $20 \times 96 = 1920 \text{ cm}^2 \checkmark$</p> <p>Area of front surface = $20 \times 48 = 960 \text{ cm}^2 \checkmark$</p> <p>Area of base = $96 \times 48 = 4608 \text{ cm}^2 \checkmark$</p> <p>Total surface area</p> <p>$= 4608 + (2 \times 1920) \checkmark + (2 \times 960) \checkmark$</p> <p>$= 10368 \text{ cm}^2 \checkmark$</p> <p>5.2 $6 \times \text{diameter} = 96 \text{ cm} \checkmark$</p> <p>Therefore diameter = $\frac{96}{6} = 16 \text{ cm} \checkmark$</p> <p>Hence the radius = $8 \text{ cm} \checkmark$</p>	<p>\checkmark area of right surface</p> <p>\checkmark area of front surface</p> <p>\checkmark area of base</p> <p>\checkmark recognising twice right surface</p> <p>\checkmark recognising twice front surface</p> <p>\checkmark final answer (6)</p> <p>\checkmark recognising the length of box (or width) can be used for diameter</p> <p>\checkmark calculating</p> <p>\checkmark answer (3)</p>

<p>5.3 Volume of one jam can = $\pi r^2 h \checkmark$ $= \pi \cdot (8)^2 \cdot (20) \checkmark$ Therefore volume of 18 cans = $18 \times \pi \cdot (8)^2 \cdot (20) \checkmark$ $= 72382,3 \text{ cm}^3 \checkmark$</p> <p>ALTERNATIVE</p> <p>Volume of one jam can = $\pi r^2 h \checkmark$ $= \frac{22}{7} \cdot (8)^2 \cdot (20) \checkmark$ Therefore volume of 18 cans = $18 \times \frac{22}{7} \cdot (8)^2 \cdot (20) \checkmark$ $= 72411,43 \text{ cm}^3 \checkmark$</p>	<p>\checkmark formula \checkmark substitution \checkmark multiplying by 18 \checkmark answer (4)</p> <p>\checkmark formula \checkmark substitution \checkmark multiplying by 18 \checkmark answer (4)</p>
<p>5.4 Volume of box = $L \times B \times H \checkmark$ $= 96 \times 20 \times 48$ $= 92160 \text{ cm}^3 \checkmark$ Therefore volume of space in box = $92160 - 72382,3 \checkmark$ $= 19777,7 \text{ cm}^3 \checkmark$</p> <p>ALTERNATIVE</p> <p>Volume of box = $L \times B \times H \checkmark$ $= 96 \times 20 \times 48$ $= 92160 \text{ cm}^3 \checkmark$ Therefore volume of space in box = $92160 - 72411,4 \checkmark$ $= 19748,6 \text{ cm}^3 \checkmark$</p>	<p>\checkmark formula \checkmark answer \checkmark subtraction \checkmark answer (4)</p> <p>\checkmark formula \checkmark answer \checkmark subtraction \checkmark answer (4)</p> <p>[17]</p>