



# education

---

Department:  
Education  
**REPUBLIC OF SOUTH AFRICA**

**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 10**

**MATHEMATICS P2**

**2007**

**MEMORANDUM**

**MARKS: 100**

**TIME: 2 hours**

**This question paper consists of 10 pages and 1 diagram sheet.**

**QUESTION 1**

1.1	$E\left(\frac{x_1 + x_2}{2}; \frac{y_1 + y_2}{2}\right)$ $E\left(\frac{-1+3}{2}; \frac{0+2}{2}\right)$ $E(1; 1)$	✓ formula ✓ substitution ✓ x-coordinate ✓ y-coordinate (4)
1.2	$\frac{a+0}{2} = -1$ $a+0 = -2$ $a = -2$	✓✓ substitution ✓ answer (3)
1.3	$m_{EQ} = \frac{y_2 - y_1}{x_2 - x_1}$ $m_{EQ} = \frac{1 - (-2)}{1 - (-3)}$ $m_{EQ} = \frac{3}{4}$	✓ formula ✓ substitution ✓ answer (3)
1.4	$PQ = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$ $PQ = \sqrt{(2 - (-2))^2 + (-1 - (-3))^2}$ $PQ = \sqrt{16 + 4}$ $PQ = \sqrt{20}$ $PQ = 4,47$	✓ formula ✓ substitution ✓ answer (3)
1.5	$QR = \sqrt{(-2 - (0))^2 + (-3 - (3))^2}$ $QR = \sqrt{4 + 36}$ $QR = \sqrt{40}$ $QR = 6,32$	✓ substitution ✓ answer (2)
1.6	$PQ^2 + PR^2$ $= (\sqrt{20})^2 + (\sqrt{20})^2$ $= 20 + 20$ $= 40$ $= RQ^2$ <p>∴ Pythagoras' Theorem is true ∴ ΔPQR is right angled at P.</p>	✓ statement ✓ substitution ✓ answer ✓ reason (4)

1.7	$\begin{aligned} \text{Area } \Delta PQR &= \frac{1}{2} \cdot PR \cdot PQ \\ &= \frac{1}{2} \sqrt{20} \sqrt{20} \\ &= \frac{1}{2} \times 20 \\ &= 10 \text{ square units} \end{aligned}$	✓ formula ✓ substitution  ✓ answer	(3)
1.8	$\begin{aligned} \text{area } \Delta PEQ : \text{area } \Delta PQR. \\ &= 1 : 2 \end{aligned}$	✓ answer	(1)
			<b>[23]</b>

**QUESTION 2**

2.1	$\begin{aligned} \text{radius} &= \frac{1}{2}(7 - 2 \times 0,5) \\ &= 3 \text{ cm} \end{aligned}$	$\checkmark \frac{1}{2}(7 - 2 \times 0,5)$	(1)
2.2	$\begin{aligned} \text{Area} &= \pi r^2 \\ \text{Area} &= \pi(3)^2 \\ \text{Area} &= 28,27 \text{ cm}^2 \end{aligned}$	✓ substitution ✓ answer	(2)
2.3	$\begin{aligned} \text{Volume} &= \pi r^2 h \\ &= \pi(3)^2(25) \\ &= 706,86 \text{ cm}^3 \end{aligned}$	✓ formula ✓ substitution ✓ answer	(3)
2.4	$\begin{aligned} \text{Surface Area} &= 2\pi r h \\ &= 2\pi(3,5)(25) \\ &= 549,78 \text{ cm}^2 \end{aligned}$	✓ radius = 3,5 cm ✓ substitution  ✓ answer	(3)
2.5	$r^2 = (2)^2 = 4$ <p>increased by a factor of 4.</p>	✓ $r^2$ ✓ answer	(2)
			<b>[10]</b>

**QUESTION 3**

3.1	Reflection about the line $y = x$	✓ reflection ✓ $y = x$ (2)
3.2		✓ P(1 ; 1) ✓ Q(2 ; 1) ✓ R(4 ; 4) ✓ S(4 ; - 1) (4)
3.3	$D'' (-(-4) ; -1+3)$ $D'' (4 ; 2)$	✓ x-coordinate ✓ y-coordinate (2)
3.4	A reflection of ABCD over the $x$ -axis	✓ reflection ✓ $x$ -axis (2)
3.5	$(x ; y) \rightarrow (x ; y - 4)$	✓ $x$ mapping ✓ $y$ mapping (2) <b>[12]</b>

**QUESTION 4**

4.1.1	$\sin 28^\circ = \frac{AC}{BC}$ $\sin 28^\circ = \frac{AD}{AB}$ OR $\sin 28^\circ = \frac{CD}{AC}$	✓✓ answer (2)
4.1.2	$\frac{BD}{AB} = \cos 28^\circ$ $BD = 5,1 \times \cos 28^\circ$ $BD = 4,5$	✓ $\cos 28^\circ$ ✓ $\frac{BD}{AB}$ ✓ answer (3)

4.1.3	$\frac{DC}{AD} = \tan 28^\circ$	✓✓ answer (2)
4.2.1	$\frac{4}{y} = \tan 30^\circ$ $4 = y \cdot \tan 30^\circ$ $y = \frac{4}{\tan 30^\circ}$ $y = 6,93$	✓ $\frac{4}{y}$ ✓ $\tan 30^\circ$  ✓ answer (3)
4.2.2	$x^2 + x^2 = y^2$ (Pythagoras) $2x^2 = 48,0249$ $x^2 = 24,01245$ $x = 4,9$	✓ statement ✓ substitution  ✓ answer (3)  [13]

**QUESTION 5**

5.1	$\cos \hat{D}_1 = \frac{BD}{AD}$ $\cos \hat{D}_1 = \frac{15}{18}$ $\cos \hat{D}_1 = 0,833333$ $\hat{D}_1 = 33,6^\circ$	✓ ratio  ✓ substitution  ✓ answer (3)
5.2	$\frac{AB}{AD} = \sin 33,6^\circ$ $\frac{AB}{18} = \sin 33,6^\circ$ $AB = 18 \times \sin 33,6^\circ$ $AB = 9,96 m$	✓ ratio  ✓ substitution  ✓ answer (3)
5.3	$\frac{BC}{BD} = \sin 57^\circ$ $\frac{BC}{15} = \sin 57^\circ$ $BC = 15 \times \sin 57^\circ$ $BC = 12,58 m$ $AC = BC + AB$ $AC = 12,58 + 9,96$ $AC = 22,54 m$	✓ ratio ✓ substitution  ✓ answer for BC  ✓ answer for AC (4) [10]

**QUESTION 6**

6.1	$\frac{10,6}{100} \times 1\,219\,090$ $= 129\,223,54 \text{ km}^2$	✓ substitution ✓ answer (2)
6.2	$\frac{169\,580}{1\,219\,090} \times 100$ $= 13,91 \%$	✓✓ substitution ✓ answer (3)
6.3	$\frac{92\,100}{1\,219\,090} \times 360^\circ$ $= 27,2^\circ$	✓✓ substitution ✓ answer (3) <b>[8]</b>

**QUESTION 7**

7.1	<table border="1"> <thead> <tr> <th>Heights, <math>h</math>, in centimetres</th> <th>Frequency</th> </tr> </thead> <tbody> <tr> <td><math>140 \leq h &lt; 150</math></td> <td>3</td> </tr> <tr> <td><math>150 \leq h &lt; 160</math></td> <td>7</td> </tr> <tr> <td><math>160 \leq h &lt; 170</math></td> <td>9</td> </tr> <tr> <td><math>170 \leq h &lt; 180</math></td> <td>3</td> </tr> </tbody> </table>	Heights, $h$ , in centimetres	Frequency	$140 \leq h < 150$	3	$150 \leq h < 160$	7	$160 \leq h < 170$	9	$170 \leq h < 180$	3	✓ row 1 frequency ✓ row 2 frequency ✓ row 3 frequency ✓ row 4 frequency (4)
Heights, $h$ , in centimetres	Frequency											
$140 \leq h < 150$	3											
$150 \leq h < 160$	7											
$160 \leq h < 170$	9											
$170 \leq h < 180$	3											
7.2	<p style="text-align: center;"><b>Histogram of heights of learners</b></p>	✓ labels ✓ heading ✓✓✓ bars (6)										
7.3	Modal class = $150 \leq h < 160$	✓ answer (1)										
7.4	$percentage = \frac{9+3}{22} \times 100$ $percentage = 54,54\%$	✓✓ answer (2)										
7.5	No. More than half of the learners are taller than 160 cm which is not reflected by the modal class.	✓ No ✓ Explanation (2) <b>[15]</b>										

**QUESTION 8**

8.1.1	$\text{Mean} = \frac{5028}{32}$ $= 157,13 \text{ kg}$	<ul style="list-style-type: none"> <li>✓ 5028</li> <li>✓ dividing by 32</li> <li>✓ answer</li> </ul> <p style="text-align: right;">(3)</p>
8.1.2	$\text{Median} = \frac{90 + 92}{2}$ $= 91 \text{ kg}$	<ul style="list-style-type: none"> <li>✓ sum of middle values divided by 2</li> <li>✓ answer</li> </ul> <p style="text-align: right;">(2)</p>
8.1.3	$390 - 81 = 309$	<ul style="list-style-type: none"> <li>✓ answer</li> </ul> <p style="text-align: right;">(1)</p>
8.2	<p>The mean No. Half the cattle are below 90kgs (the median) and only 6 cattle weigh more than 157 kgs. The mean is skewed by the 6 heavy cattle.</p>	<ul style="list-style-type: none"> <li>✓ mean</li> <li>✓ No</li> <li>✓ explanation</li> </ul> <p style="text-align: right;">(3)</p> <p style="text-align: right;"><b>[9]</b></p>

**TOTAL : 100 marks**