



education

Department:
Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE**

GRADE 11

MATHEMATICS P3

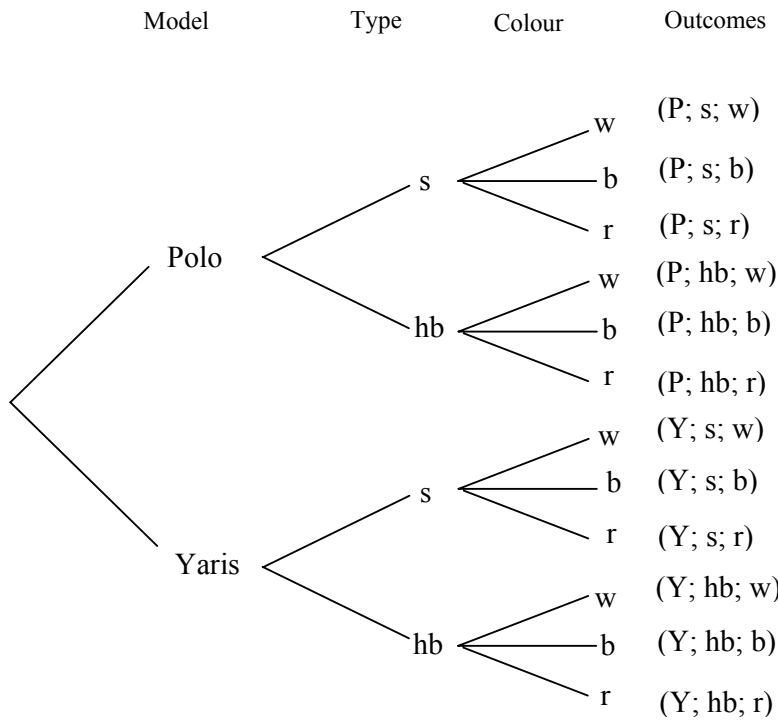
NOVEMBER 2007

MEMORANDUM

This memorandum consists of 8 pages.

QUESTION 1

1.1



✓ first tier (model)
✓ second tier (type)
✓ third tier (colour)

✓✓✓ all outcomes

(6)

1.2.1 $P(\text{red car}) = \frac{4}{12} = \frac{1}{3} = 0,33.$

✓ $\frac{1}{3}$
✓ answer

(2)

1.2.2 $P(\text{VW Polo hatchback}) = \frac{3}{12} = \frac{1}{4} = 0,25.$

✓ $\frac{1}{4}$
✓ answer

(2)

[10]

QUESTION 2

2.1.1 $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$
 $0,65 = 0,3 + 0,5 - P(A \text{ and } B)$
 $\therefore P(A \text{ and } B) = 0,15$

2.1.2 $P(A) \times P(B) = 0,3 \times 0,5 = 0,15$
 $\therefore P(A) \times P(B) = P(A \text{ and } B)$
 \Rightarrow Events A and B are independent.

2.2.1 $a = 50$
 $b = 250$
 $c = 100$
 $d = 150$
 $e = 100$
 $f = 400$

2.2.2 $P(\text{person is 40 years and younger and had 2 or fewer accidents})$
 $= \frac{200}{400} = 0,5$

$$P(\text{person is 40 years and younger}) = \frac{300}{400} = 0,75$$

$$P(\text{person had 2 or fewer accidents}) = \frac{250}{400} = 0,625$$

$$P(\text{person is 40 years and younger}) \times P(\text{person had 2 or fewer accidents}) = 0,75 \times 0,625 = 0,4725 .$$

$$\therefore P(\text{person is 40 years and younger}) \times P(\text{person had 2 or fewer accidents}) \neq P(\text{person is 40 years and younger and had 2 or fewer accidents})$$

Number of accidents is not independent of age.

✓ formula and substitution

✓ answer

(2)

✓ calculating probability of product.

✓ conclusion

(2)

✓ one mark for any two correct

✓ one mark for any two correct

✓ one mark for any two correct

(3)

✓ reading probability from table

✓ reading probabilities from table

✓ calculation using product rule

✓ conclusion

(4)

[11]

QUESTION 3	
3.1 5	✓ answer (1)
3.2 $31 + 23 + 48 + 10 + 15 + 18 + 5 + x = 160$ $150 + x = 160$ $x = 10$ \therefore 10 learners play all three codes of sport.	✓ LHS of equation ✓ 160 ✓ answer (3)
3.3 $P(\text{play soccer}) = \frac{10 + 10 + 23 + 18}{160} = \frac{61}{160} = 0,381$	✓ numerator ✓ 160 ✓ answer (3)
3.4 $P(\text{play at least two codes}) = \frac{10 + 10 + 15 + 18}{160} = \frac{53}{160} = 0,331$ $\approx 33\%$	✓ numerator ✓ 160 ✓ answer (3)
	[10]
QUESTION 4	
4.1.1 Difference = $40000 - 20000$ $= 20000$	✓ calculation ✓ answer (2)
4.1.2 The length of the slab is doubled and the breadth is also doubled. The picture for July is therefore four times larger than the picture for June.	✓ double the length and breadth ✓ four times larger (2)
4.1.3 No. The picture shows that sales is in fact four times more.	✓ no ✓ explanation (2)
4.2.1 Graph A	✓ answer (1)
4.2.2 The vertical axis has a different scale. In graph A the scale is in terms of 2 units while in graph B it is in terms of 10 units.	✓✓ (2)
4.2.3 I would use Graph A since it appears to show a greater increase in the sale of car alarms although it has the same increase as Graph B for the period 2004 to 2006. Graph A shows that there is a drastic increase in the sales of car alarms. Any person who has not fitted an alarm in his/her car may feel insecure and think that he/she needs to get an alarm since this is a fast growing trend.	✓ graph A ✓✓ explanation (3)
	[12]

<p>QUESTION 5</p> <p>5.1 29,5% equivalent to 13,6 million. Population = $\frac{100 \times 13,6}{29,5} = 46,1$ million</p> <p>5.2 No. The prediction of HIV cases in South Africa is inaccurate because the figures have been calculated on the infection rate of women who attended the antenatal clinics. These percentages leave out men and children who might be also infected with the HIV virus. The figures also exclude women who might be infected with HIV and have not attended an ante-natal clinic. The sample used may therefore not be a true representation of the entire population</p>	<p>✓ relationship between 29,5% and 13,6 million ✓✓ calculation and answer (3)</p> <p>✓ inaccurate ✓ calculated on infection rate of those women who attended antenatal clinics ✓% omit men and children ✓ exclude women who did not attend an antenatal clinic (4)</p> <p>[7]</p>
<p>QUESTION 6</p> <p>6.1.1 A and B are similar. The corresponding sides are in proportion ($\frac{18}{9} = \frac{12}{6} = \frac{2}{1}$) and they are equiangular (each angle = 90°) and breadth : length = 2 : 3</p> <p>6.1.2 $\frac{1}{5} \times 6 \text{ cm} = 1,2 \text{ cm}$</p> <p>6.1.3 Yes. The two quadrilaterals are symmetric about a horizontal centrefold.</p>	<p>✓ selecting correct flags ✓ reason (2)</p> <p>✓ answer (1)</p> <p>✓ yes ✓ reason (2)</p> <p>[5]</p>
<p>QUESTION 7</p> <p>7.1.1 OE = EC = 4,5....(line drawn from the midpoint of 1 side of a ..)</p> <p>7.1.2 $BO = \frac{1}{4} BC$ $\therefore CO = \frac{3}{4} BC$, i.e $BC = \frac{4}{3}(9) = 12$ units. $\therefore BO = 3$ units.</p> <p>7.1.3 $\frac{AO}{OD} = \frac{BO}{OC}$(AB CD, proportional intercept, theorem) $\frac{AO}{6} = \frac{3}{9}$ $\therefore AO = 2$ units</p>	<p>✓4,5 ✓ reason (2)</p> <p>✓ $CO = \frac{3}{4} BC$ ✓ 3 units. (2)</p> <p>✓ $\frac{AO}{OD} = \frac{BO}{OC}$ ✓ $\frac{AO}{6} = \frac{3}{9}$ ✓ 2 units (3)</p>

<p>7.1.4 <u>Area of ΔAOB</u> Area of ΔACB $= \frac{BO}{BC} = \frac{3}{12} = \frac{1}{4}$</p>	<p>✓✓ $\frac{BO}{BC}$ $\frac{1}{4}$ (3)</p>
<p>7.2.1 $\frac{CM}{PC} = \frac{MY}{YX}$ YC XP and intercept theorem $\frac{PM}{BP} = \frac{MY}{YX}$ YP AB and intercept theorem Therefore, $\frac{CM}{PC} = \frac{PM}{BP}$</p>	<p>✓ $\frac{CM}{PC} = \frac{MY}{YX}$ $\frac{PM}{BP} = \frac{MY}{YX}$ $\frac{CM}{PC} = \frac{PM}{BP}$ statement of theorem (3)</p>
<p>7.2.2 $\frac{PM}{CM} = \frac{XM}{YM}$ YC XP and intercept theorem $\frac{BM}{PM} = \frac{XM}{YM}$ YP AB and intercept theorem Therefore $\frac{PM}{CM} = \frac{BM}{PM}$ $PM^2 = CM \times BM$</p>	<p>✓✓ $\frac{PM}{CM} = \frac{XM}{YM}$ $\frac{BM}{PM} = \frac{XM}{YM}$ $\frac{PM}{CM} = \frac{BM}{PM}$ statement of theorem (6) $PM^2 = CM \times BM$ [19]</p>

QUESTION 88.1.1 In Δ 's ABD and ABC \hat{A} is common

$$\hat{D}_1 = \hat{B}C = 90^\circ \quad \dots \text{ given}$$

$$\therefore \Delta ABD \quad ||| \quad \Delta ACB \quad (\angle; \angle; \angle)$$

✓ common angle

✓ $\hat{D}_1 = \hat{B}C$

✓ reason

(3)

8.1.2 From 8.1.1

$$\frac{AB}{AC} = \frac{AD}{AB} \quad \text{sides in proportion}$$

$$\frac{x}{z} = \frac{p}{x}$$

$$x^2 = p.z$$

✓ proportion

✓ substitution of sides

(2)

8.1.3 In Δ 's CBD and ABC \hat{C} is common

$$\hat{D}_2 = \hat{B}C = 90^\circ \quad \dots \text{ given}$$

$$\therefore \Delta BDC \quad ||| \quad \Delta ABC \quad (\angle; \angle; \angle)$$

✓ common angle

✓ $\hat{D}_2 = \hat{B}C$

✓ reason

(3)

8.1.4 From 8.1.3

$$\frac{BC}{AC} = \frac{DC}{BC} \quad \text{sides in proportion}$$

$$\frac{y}{z} = \frac{q}{y}$$

$$y^2 = q.z$$

✓ proportion

✓ substitution of sides

(2)

8.1.5

$$\begin{aligned} x^2 + y^2 &= p.z + q.z \\ &= z(p + q) \\ &= z.z \end{aligned}$$

$$x^2 + y^2 = z^2$$

$$\text{Now } AB^2 + BC^2 = AC^2$$

✓ common factor

✓ conclusion

(2)

<p>8.2.1 DO:OC = $m:2m$ OE:OB = $n:2n$ Now $AB^2 = (2BD)^2$... AD=DB, given $= 4[DO^2 + BO^2]$... Pythagoras $= 4[m^2 + 4n^2]$ $= 4m^2 + 16n^2$</p> <p>Similarly $AC^2 = (2EC)^2$... AE=EC, given $= 4[EO^2 + CO^2]$... Pythagoras $= 4[n^2 + 4m^2]$ $= 4n^2 + 16m^2$</p>	<p>✓ writing in terms of m and n</p> <p>✓ Pythagoras</p> <p>✓ answer</p> <p>✓ Pythagoras</p> <p>✓ answer (5)</p>
<p>8.2.2 Now $AB^2 + AC^2 = 4m^2 + 16n^2 + 4n^2 + 16m^2$ $= 20n^2 + 20m^2$ $= 5(4n^2 + 4m^2)$ $= 5[(2n)^2 + (2m)^2]$ $= 5(BO^2 + CO^2)$ $= 5BC^2$</p>	<p>✓ answer</p> <p>✓ common factor</p> <p>✓ write as squares</p> <p>✓ substitution</p> <p>✓ Pythagoras (5)</p>

QUESTION 9		
9.1	$\frac{AB}{FE} = \frac{BC}{EC}$ $\frac{x+1}{1} = \frac{1}{x}$ $x^2 + x = 1$ $x^2 + x - 1 = 0$ $x = \frac{-1 \pm \sqrt{1+4}}{2}$ $x = \frac{-1 + \sqrt{5}}{2} = 0,62 \text{ units } (x > 0)$	sides in proportion ✓ proportion ✓ equation ✓ standard form ✓ substitution ✓ answer (5)
9.2	AB = 1,62 units AD:AB = 1:1,62	✓ answer (1) [6]