education

Department:
Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 11

MATHEMATICS P3

EXEMPLAR 2007

MEMORANDUM

This memorandum consists of 8 pages.

QUESTION ONE

1.1.1 No.
For any mutually exclusive events A and B, $P(A \cap B) = 0$.
However, in this case $P(A \cap B) = 0,12$. Therefore the events A and B are not mutually exclusive.

✓ no
✓ motivation
(2)

1.1.2 Yes.
For events A and B to be independent, $P(A) \times P(B) = P(A \cap B)$.
In this example, $P(A) \times P(B) = 0,2 \times 0,6$
$= 0,12$
$= P(A \cap B)$

✓ yes
✓ motivation
(2)

1.2.1 a = 70
b = 90
c = 120
d = 250

✓ a
✓ b
✓ c
✓ d
(4)

1.2.2 $P(\text{person liked the programme}) = \frac{130}{250} = 0,52.$

$P(\text{person is male}) = \frac{150}{250} = 0,6$

$P(\text{male person liked the programme}) = \frac{60}{250} = 0,24.$

$P(\text{person liked the programme}) \times P(\text{person is male}) = 0,52 \times 0,6$
$= 0,31$

Since $P(\text{person liked the programme} \times P(\text{person is male}) \neq P(\text{male person liked the programme})$, preference for the programme is not independent of gender.

✓ reading probabilities from table

✓ reading probability from table

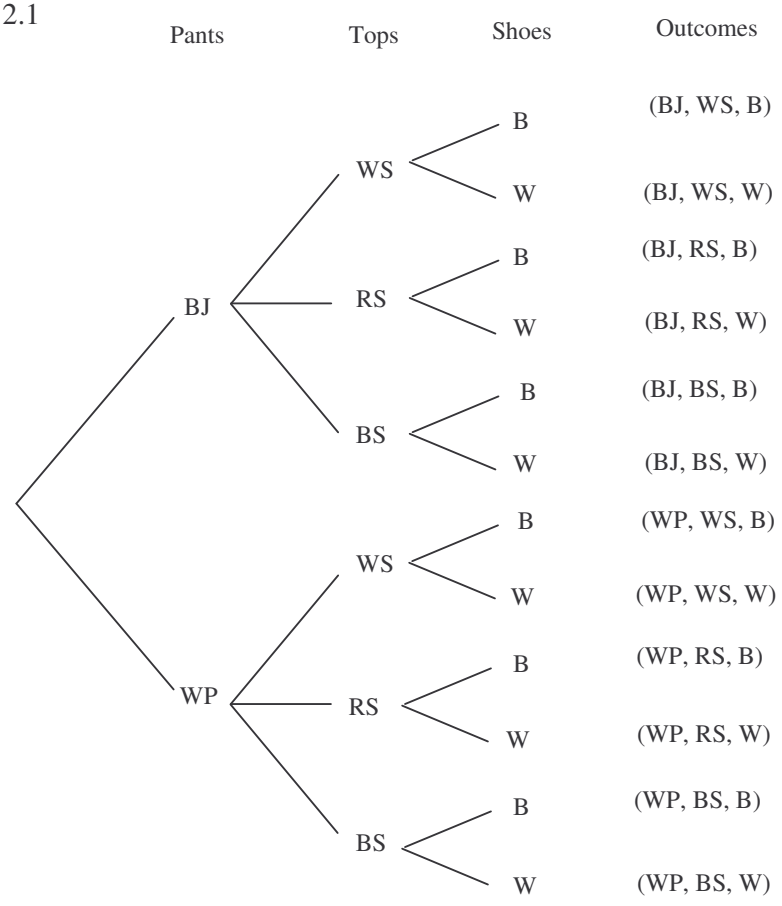
✓ calculation

✓ conclusion
(4)

[12]

QUESTION TWO

2.1



✓tier one
✓tier two
✓tier three

✓✓✓ outcomes

(6)

2.2.1 P(Zama wears blue jeans and black shoes) $= \frac{3}{12} = 0,25$

✓✓ answer

(2)

2.2.2 P(Zama wears a red t-shirt and white shoes)

$= \frac{2}{12}$

$= 0,17$

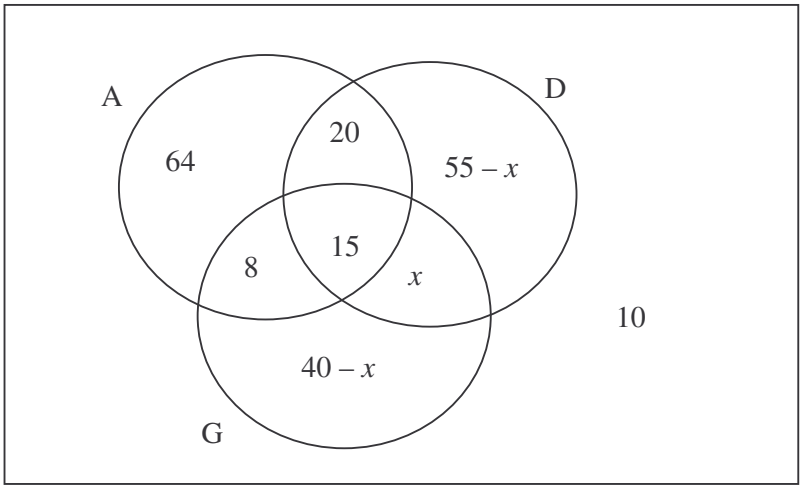
✓✓ answer

(2)

[10]

QUESTION 3

3.1



✓ for 15
✓ for 10

✓ for 8
✓ for 20
✓ x position
✓ $40 - x$
✓ $55 - x$
✓ for 64

(8)

3.2 10 learners

✓answer

(1)

3.3

$10 + 15 + x + 8 + 20 + 64 + 55 - x + 40 - x = 200$
$212 - x = 200$
$x = 12$

✓addition
✓ = 200
✓answer

(3)

3.4 P(learner has registered for at least two subjects)

$$= \frac{15 + 20 + 8 + 12}{200}$$

$$= \frac{55}{200}$$

$$= 0{,}275$$

✓✓addition of intersection values
✓division to gain probability
✓answer

(4)

[16]

QUESTION 4

4.1 Total number of boys who play soccer = $\frac{20}{50} \times 1200 = 480$.

✓ correct proportion
✓ answer
(2)

4.2 No. The survey used only 50 boys, there are 1200 boys at the school. The sample was a very small group and not necessarily representative of the majority of students.

✓No
✓✓Motivation
(3)

[5]

QUESTION 5

5.1 manufacturer A: growth rate in sales

$$= \frac{5760 - 5600}{5} = 32 \text{ units per month}$$

manufacturer B: growth rate in sales

$$= \frac{4600 - 4200}{5} = 80 \text{ units per month}$$

✓ difference quotient
✓ answer

✓ difference quotient
✓ answer

Manufacturer B had a better growth rate in sales over the given period.

✓conclusion
(5)

5.2.1 Manufacturer A

✓✓ answer
(2)

5.2.2 The scale on the *y*-axis is different for both graphs. Manufacturer A uses an interval of 50 units whilst Manufacturer B uses an interval of 200 units. As a result, the slope for Manufacturer A's graph is much steeper than the slope for Manufacturer B's graph.

✓✓an explanation relating to the slopes of the graphs
(2)

[9]

QUESTION 6

6.1 Saras is incorrect because only figures ABCDEF and MPQRST are similar.
The corresponding sides are in proportion
$\left(\frac{AB}{MP}=\frac{BC}{PQ}=\frac{CB}{RQ}=\frac{DE}{RS}=\frac{EF}{ST}=\frac{FA}{TM}=\frac{2}{1}\right)$
The corresponding angles are also equal.

✓ No
✓ sides in proportional
✓ angles in proportion
✓ ABCDEF & MPQRST identified as being similar
(4)

6.2.1

$$\frac{NC}{NB}=\frac{CM}{MA}$$
$$\frac{NC}{11.25}=\frac{5}{15}$$
$$NC=3.75$$

✓ $\frac{NC}{NB}=\frac{CM}{MA}$
✓ $\frac{NC}{NB}=\frac{5}{15}$
✓ $\frac{NC}{11,25}$
✓ NC = 3.75
(4)

6.2.2 $\frac{MN}{AB}=\frac{CM}{AC}$

$\frac{MN}{25}=\frac{5}{20}$

MN = 6,25 cm

✓ $\frac{MN}{AB}=\frac{CM}{AC}$
✓ $\frac{MN}{AB}=\frac{5}{20}$
✓ $\frac{MN}{25}$
✓ MN = 6,25
(4)

6.2.3 $NC^2+MC^2=5^2+(3,75)^2$

$NC^2+MC^2=39,0625$

$MN^2=39,0625$

Now, $NC^2+MC^2=MN^2$

Δ MNC is a right angled triangle with $M\hat{C}N=90°$

✓ $NC^2+MC^2=39,0625$
✓ $MN^2=39,0625$
✓ Conclusion
(3)

[15]

QUESTION 7

7.1.1 In Δ's AEC and CDB

$\hat{A} = \hat{C}$ angles of an isosceles Δ; AB = BC

$\hat{E} = \hat{D} = 90^o$ given

$\therefore$ Δ AEC ||| Δ CDB $(\angle;\angle;\angle)$

✓ $\hat{A} = \hat{C}$
✓reasons
✓ $\hat{E} = \hat{D} = 90^o$
✓reasons
(4)

7.1.2 From 7.1.1
Δ AEC ||| Δ CDB

$\frac{AE}{DC} = \frac{CE}{BD}$ …… sides in proportion

$\Rightarrow$ AE x BD = DC x CE

✓Δ AEC ||| Δ CDB
✓ $\frac{AE}{DC} = \frac{CE}{BD}$
✓ sides in proportion
(3)

7.2.1 $\frac{AF}{AC} = \frac{AD}{AB} = \frac{2}{3}$ (Proportionality Theorem; DF // BC)

✓ $\frac{AF}{AC} = \frac{AD}{AB}$
✓ $\frac{2}{3}$
✓ reason
(3)

7.2.2 In Δ' s ADF, ABC

$\hat{D}_1 = \hat{B}$ (Corresponding angles, DF//BC)

$\hat{F}_1 = \hat{C}$ (Corresponding angles, DF//BC)

$\hat{A}$ is common

$\therefore \Delta ADF ||| \Delta ABC$ $(\angle\angle\angle)$

✓ $\hat{D}_1 = \hat{B}$
✓reason
✓ $F_1 = C$
✓ reason
✓ $\hat{A}$ is common
✓ $\angle\angle\angle$
(6)

7.2.3 from 7.2.2

$\frac{DF}{BC} = \frac{AD}{AB} = \frac{2}{3}$ (prop theorom)

$\frac{8}{BC} = \frac{2}{3}$ (DF =EG = 8 cm)

$2BC = 24$

$BC = 12cm$

✓✓ $\frac{AD}{AB} = \frac{2}{3}$
✓ $\frac{8}{BC} = \frac{2}{3}$
✓2 BC = 24
✓BC = 12cm
✓ reason (6)

[22]

QUESTION 8

8.1 PQ = QY = XP = 4 (Q is midpoint of PY; Prop Theorom)

$$\frac{PY}{XY}=\frac{8}{12}=\frac{2}{3}$$

✓ PQ = QY = XP
✓ 4
✓ $\frac{PX}{YX}=\frac{2}{3}$

(3)

8.2 $\frac{\text{Area of } \Delta XQR}{\text{Area of } \Delta XYR}$

$= \frac{XQ}{XY}$ …(Triangles between the same parallel lines)

$=\frac{8}{12}$ …

$=\frac{2}{3}$

✓ $\frac{XQ}{XY}$
✓ $\frac{8}{12}=\frac{2}{3}$
✓ Theorem

(3)

8.3

$\frac{\text{Area of } \Delta XMZ}{\text{Area of } \Delta XYZ}$

$=\frac{\Delta XMZ}{\Delta XRZ}\times\frac{\Delta XRZ}{\Delta XYZ}$ (Triangle between……)

$=\left(\frac{1}{2}\right)\left(\frac{1}{2}\right)=\frac{1}{4}$

✓✓ $\frac{\Delta XMZ}{\Delta XRZ}\times\frac{\Delta XRZ}{\Delta XYZ}$
✓✓ $\left(\frac{1}{2}\right)\left(\frac{1}{2}\right)$
✓ $\frac{1}{4}$

(5)

[11]