Download more resources like this on ECOLEBOOKS.COM

basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

MATHEMATICS P3

FEBRUARY/MARCH 2011

MEMORANDUM

MARKS: 100

This memorandum consists of 11 pages.

Copyright reserved

QUESTION 1

1.1	Mean $= \frac{3,2+3,2+3,2+4,2+4,5+4,9+8,3+9,5+11,7+12,2+12,5}{11}$ $= \frac{77,4}{11}$ $= 7,03$ Median = 4,9 Mode = 2,3	✓ Mean ✓ Median ✓ Mode (3)
1.2	Mode This is the lowest value and will indicate that the increases are very poor.	✓ mode ✓ reason (2)
1.3	Mean. This is the highest value and can be used to indicate that increases are good.	✓ Mean ✓ Reason (2) **[7]**

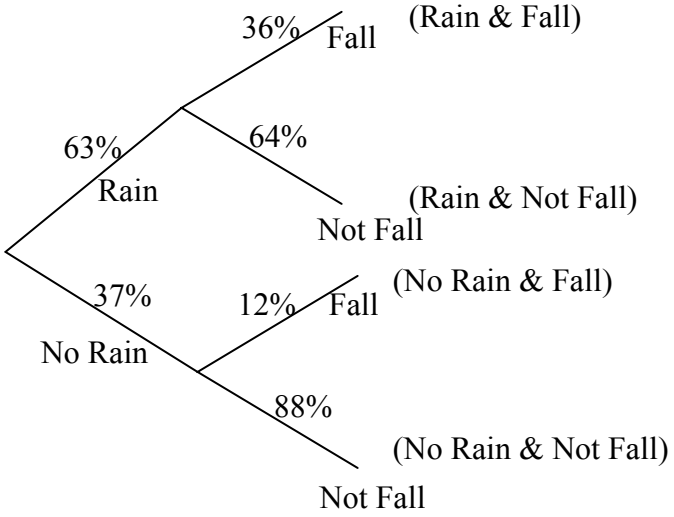
QUESTION 2

2.1	$\sigma = \frac{90-65}{2}$ $\sigma = 12,5$	✓ method ✓ answer (2)
2.2	University A: $78-65=13$ Her result lies just over 1 standard deviation from the mean. University B: $\bar{x}+\sigma=54$ $\bar{x}+2\sigma=59$ Her result lies just over 2 standard deviations from the mean. Her result for University B is better.	✓ 1 sd from the mean ✓ 2 sd from the mean ✓ University B. (3) **[5]**

DOWNLOAD MORE RESOURCES LIKE THIS ON ECOLEBOOKS.COM

Download more resources like this on ECOLEBOOKS.COM

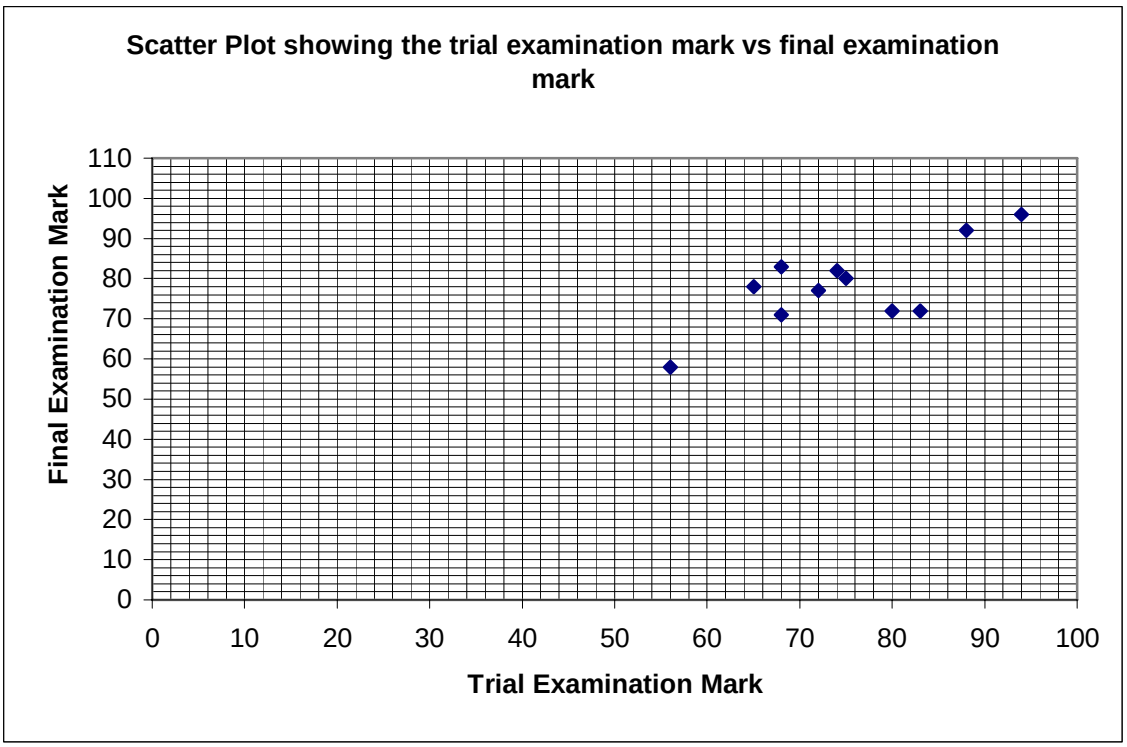
QUESTION 3

3.1		✓✓ structure of the tree diagram ✓ 63% Rain ✓ 36% Fall ✓ 64% Not fall ✓ 88% Not Fall (6)
3.2	P(Not Fall) $=\left(\frac{37}{100}\times\frac{88}{100}\right)+\left(\frac{63}{100}\times\frac{64}{100}\right)$ $=\frac{407}{1250}+\frac{252}{625}$ $=\frac{911}{1250}$ $=0{,}7288$	✓ $\frac{37}{100}\times\frac{88}{100}$ ✓ $\frac{63}{100}\times\frac{64}{100}$ ✓ answer (3)
3.3	P(Dry & Fall) $=\frac{37}{100}\times\frac{12}{100}$ $=\frac{111}{2500}$ $=0{,}0444$	✓ $\frac{37}{100}\times\frac{12}{100}$ ✓ answer (2) **[11]**

QUESTION 4

Average of trial examination	80	68	94	72	74	83	56	68	65	75	88
Final examination mark	72	71	96	77	82	72	58	83	78	80	92

4.1



3 marks: All points plotted correctly.

2 marks: 7 – 10 points plotted correctly

1 mark: 3 – 6 points plotted correctly

(3)

4.2

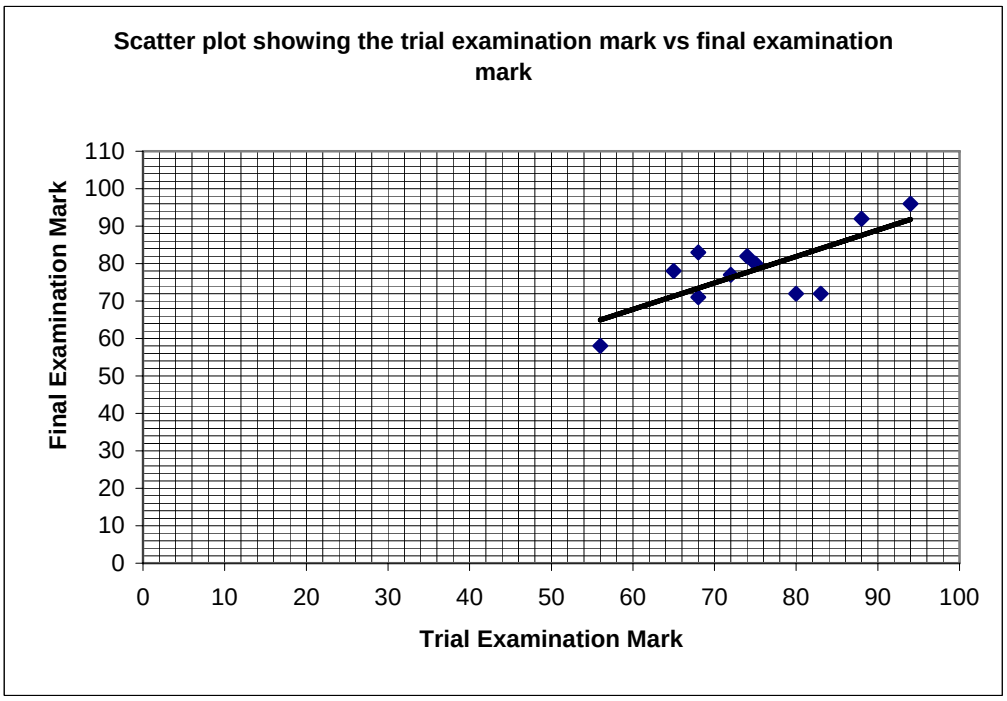
$a = 25,38$ (25, 38342009…)
$b = 0,71$ (0, 7069044703…)
$\hat{y} = a + bx$
$\hat{y} = 25,38 + 0,71x$

✓✓ a
✓ b

✓ answer

(4)

4.3



✓ slope
✓ accurate drawing

(2)

DOWNLOAD MORE RESOURCES LIKE THIS ON ECOLEBOOKS.COM

Download more resources like this on ECOLEBOOKS.COM

4.4	$r = 0{,}74$ (0, 7391817008…)	✓✓ answer (2)
4.5	$\hat{y} = 25{,}38 + 0{,}71x$ $\hat{y} = 25{,}38 + 0{,}71(75)$ $= 78{,}63\ \%$ If the original values of a and b then $\hat{y} = 78{,}401$	✓ substitution ✓ answer (2) **[13]**

QUESTION 5

	Broken a limb	**Not broken a limb**	**TOTAL**
Male	463	b	782
Female	a	c	d
TOTAL	913	617	1 530

5.1	$a = 450$ $b = 319$ $c = 298$ $d = 748$	✓ answer for a ✓ answer for b ✓ answer for c ✓ answer for d (4)
5.2	P(Female who has not broken a limb) $= \frac{298}{1530}$ $= \frac{149}{765}$	✓ 298 ✓ answer (2)
5.3	P(Female & broken a limb) $= \frac{450}{1530}$ $= \frac{5}{17}$ $= 0{,}2941176471...$ $= 0{,}29$ P(Female) × P(Broken a limb) $= \frac{748}{1530} \times \frac{913}{1530}$ $= 0{,}29$ The events of being female and having broken a limb are independent. If a candidate answers not independent due to the fact that the answers are not accurate to more than 2 decimal places, award full marks.	✓ $\frac{463}{1530}$ ✓✓ $\frac{782}{1530} \times \frac{913}{1530}$ ✓ independent (4) **[10]**

QUESTION 6

6.1	Number of different ways the shirts and trousers can be arranged $=(7+4)!$ $=11!$ $=39\ 916\ 800$	✓ 11 ✓ 11! (2)
6.2	Number of ways so that the shirts are together and trousers are together $=7!.4!.2$ $=241\ 920$	✓ 7! ✓ 4! ✓ $\times 2$ (3)
6.3	P(Shirt at beginning and trouser at the end) $=\dfrac{9!\times 4\times 7}{11!}$ $=\dfrac{14}{55}$	✓ $\times 4\times 7$ ✓ 9! ✓ 11! ✓ answer (4) **[9]**

QUESTION 7

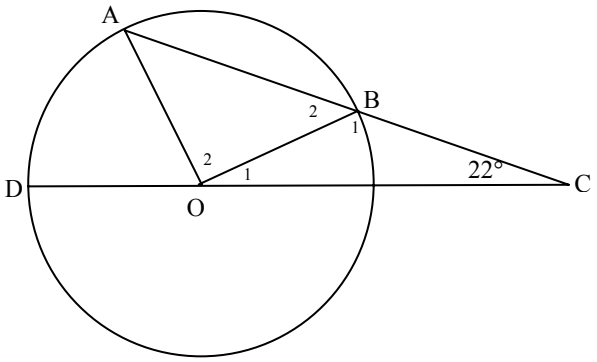
ÉcoleBooks

7.1	7 4 –5 –32 –113 –356 –3 –9 –27 –81 –243 – 113; – 356	✓✓ answers (2)
7.2	$T_{k+1}=T_k-(3)^k$ $T_1=7$ $k\geq 1$ **OR** $T_{k+1}=T_k-3(3)^{k-1}$; $T_1=7$; $k\geq 1$ **OR** $T_k=T_{k-1}-(3)^{k-1}$; $T_1=7$; $k\geq 2$	✓ $T_{k+1}=T_k-(3)^k$ ✓ $T_1=7$ ✓ $k\geq 1$ (3) **[5]**

DOWNLOAD MORE RESOURCES LIKE THIS ON ECOLEBOOKS.COM

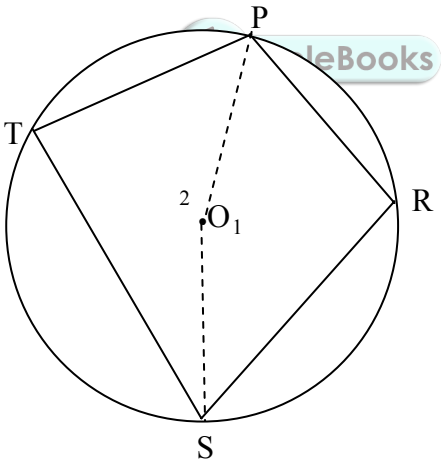
Download more resources like this on ECOLEBOOKS.COM

QUESTION 8

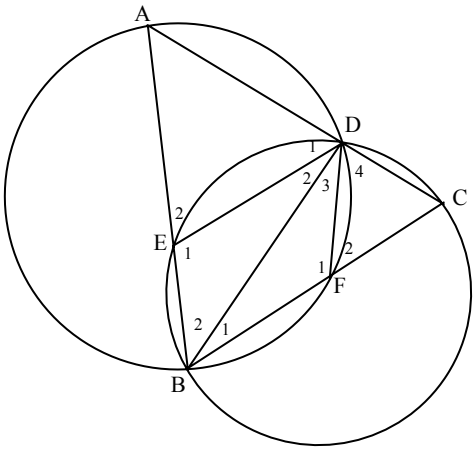


8.	AO = OB (radii) AO = BC (given) OB = BC $\hat{O}_1 = 22°$ (∠s opp = radii) $\hat{B}_2 = 44°$ (ext ∠ Δ = sum int opp) $\hat{A} = 44°$ (∠s opp = radii) $A\hat{O}D = 66°$ (ext ∠ Δ = sum int opp)	✓ S ✓ S ✓ S/R ✓ S ✓ S ✓ answer **[5]**

QUESTION 9



9.1	Join PO and OS Let $\hat{O}_1 = 2x$ $\hat{T} = x$ (∠ at circ centre = 2 ∠ at circumference) $\hat{O}_2 = 360° - 2x$ (∠s round a point) $\hat{R} = 180° - x$ (∠ at circ centre = 2 ∠ at circumference) $\hat{T} + \hat{R} = x + 180° - x$ $= 180°$	✓ construction ✓ S/R ✓ S ✓ S/R ✓ S (5)



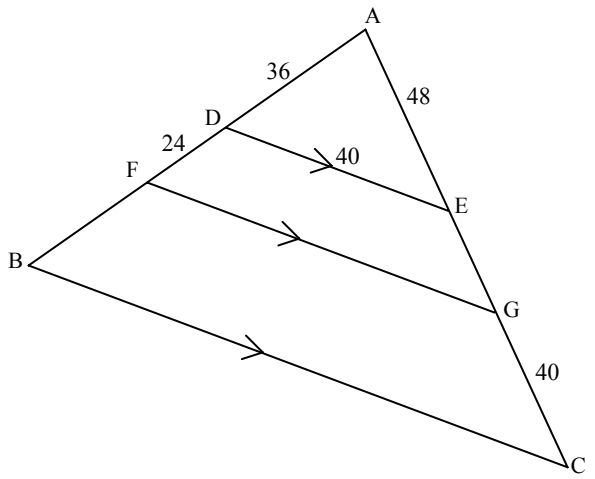
9.2.1(a)	$\hat{D}_4 = \hat{C}$ $\hat{C} = x$ $D\hat{E}B = 180° - x$	(∠s opp = sides) (∠ sum Δ) (opp ∠ cyclic quad supp)	✓ S/R ✓ S ✓ S/R (3)
9.2.1(b)	$\hat{A} = 180° - 2x$	(ext ∠ cyclic quad = int opp ∠)	✓ S ✓ R (2)
9.2.2	$\hat{D}_1 + \hat{A} = \hat{E}_1$ $\hat{D}_1 = x$ $\hat{C} = x$ $\hat{D}_1 = \hat{C} = x$ DE ∥ CB	(ext ∠ Δ = sum int opp) (∠ sum Δ) OR proved above (corres ∠s =)	✓ S/R ✓ statement ✓ Reason (3) **[13]**

ÉcoleBooks

DOWNLOAD MORE RESOURCES LIKE THIS ON ECOLEBOOKS.COM

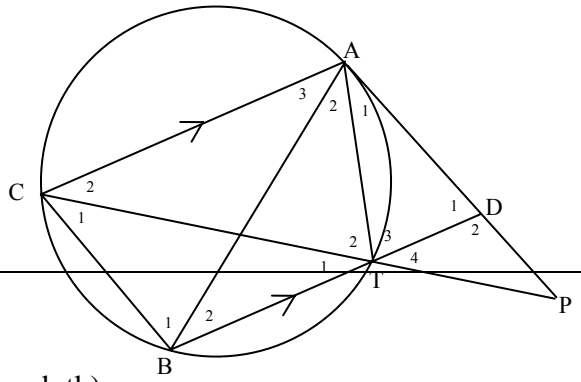
Download more resources like this on ECOLEBOOKS.COM

QUESTION 10



10.1	$\frac{EG}{48} = \frac{24}{36}$ (DE ∥ FG) $EG = \frac{48 \times 24}{36}$ EG = 32 cm	✓ S/R ✓ answer (2)
10.2	$\frac{BC}{DE} = \frac{AC}{AE}$ $BC = \frac{120 \times 40}{48}$ = 100 cm **OR** $\frac{AB}{AD} = \frac{AC}{AE}$ $AB = \frac{120 \times 36}{48}$ AB = 90 ΔABC ||| ΔADE (∠∠∠) $\frac{BC}{DE} = \frac{AB}{AD}$ (sides in proportion) $BC = \frac{90 \times 40}{36}$ BC = 100 cm **OR** ΔABC ||| ΔADE (∠∠∠) $\frac{BC}{DE} = \frac{AC}{AE}$ (sides in proportion) $BC = \frac{120 \times 40}{36}$ BC = 100 cm	✓ statement ✓✓ substitution ✓ answer (4) ✓ S ✓ S ✓ 90 ✓ answer (4) ✓ S ✓ S ✓ substitution ✓ answer (4) **[6]**

QUESTION 11



11.1	Let $\hat{A}_1 = x$ In ΔABC and ΔADT 1. $\hat{A}_1 = \hat{B}_2 = x$ (tan ch th) $\hat{B}_2 = \hat{A}_3 = x$ (AC ∥ BD alt ∠s) $\hat{A}_1 = \hat{A}_3$ 2. $\hat{T}_3 = B\hat{C}A$ (ext ∠ cyclic quad) 3. $\hat{B}_1 = \hat{D}_1$ (3rd ∠ on triangle) ΔABC ||| ΔADT (∠∠∠)	✓ statement ✓ reason ✓ statement ✓ statement ✓ reason ✓ statement (6)
11.2	$\hat{A}_1 = \hat{C}_2 = x$ (tan ch th) $\hat{T}_1 = \hat{C}_2 = x$ (AC ∥ BD; alt ∠s) $\therefore \hat{T}_1 = \hat{A}_1 = x$ $\hat{T}_4 = x$ (vert opp angles) $\hat{T}_4 = \hat{A}_1$ (= x) PT is a tangent (conv tan ch th) **OR** $\hat{A}_1 = \hat{B}_2 = \hat{A}_3 = x$ (AC ∥ BT) $\hat{A}_3 = \hat{T}_1 = \hat{T}_4 = x$ (∠s in same segment) $\hat{A}_1 = \hat{T}_4 = x$ PT is a tangent (conv tan ch th) **OR** $\hat{B}_1 = \hat{T}_2$ (∠s in same seg) $\hat{B}_1 = \hat{D}_1$ (||| Δs) $\hat{D}_1 = \hat{T}_2$ PT is a tangent (conv tan ch th)	✓ S/R ✓ S/R ✓ Reason (3) ✓ S/R ✓ S/R ✓ Reason (3) ✓ S/R ✓ S/R ✓ Reason (3)
11.3	In ΔAPT and ΔTPD 1. $\hat{P}$ is common. 2. $\hat{T}_4 = \hat{A}_1$ (proven) 3. $A\hat{T}P = \hat{D}_2$ (3rd ∠ on triangle) ΔAPT ||| ΔTPD (∠∠∠)	✓ S/R ✓ S/R ✓ S (3)

DOWNLOAD MORE RESOURCES LIKE THIS ON ECOLEBOOKS.COM

Download more resources like this on ECOLEBOOKS.COM

11.4	$\frac{AP}{PT} = \frac{PT}{PD}$ $(\Delta APT \parallel\parallel \Delta TPD)$ $AP.PD = PT.PT$ $AP.\frac{1}{3}AP = PT^2$ $AP^2 = 3PT^2$	✓ statement ✓ reason ✓ $DP = \frac{1}{3}AP$ ✓ substitution (4) **[16]**

TOTAL: 150

Copyright reserved