



NATIONAL SENIOR CERTIFICATE EXAMINATION
EXEMPLAR 2008

MATHEMATICS: PAPER III

MARKING GUIDELINES

Time: 3 hours

100 marks

SECTION A

QUESTION 1

1.1 $T_k = 5 - 4k$
 $\therefore 1; -3; -7; -11 \dots$
 $T_{n+1} = T_n - 4$ if $n \geq 1$ and $T_1 = 1$

(4)

1.2 $T_1 = 5 \quad T_2 = 12 \quad T_3 = 21 \quad T_4 = 32$
 $5 \quad 12 \quad 21 \quad 32$
 $7 \quad 9 \quad 11$
 $2 \quad 2$
 $d = 2$
 $\therefore a = 1$ and $T_0 = 0$
 $T_k = k^2 + bk$
 $T_1 = 1 + b = 5$
 $\therefore b = 4$
 $T_k = k^2 + 4k$

ALTERNATIVELY:

$$T_k = 5 + (k-1)7 + \frac{(k-1)(k-2)}{2} \times 2$$

$$= 5 + 7k - 7 + \frac{k^2 - 3k + 2}{1}$$

$$= k^2 + 4k$$

(5)

[9]

QUESTION 2

2.1 $9 \times 9 \times 9 \times 5 \times 4$
 $= 14580$

(4)

2.2 $0,7 \times 0,9 + 0,3 \times 0,45$
 $= 0,765$
 $\therefore 76,5\%$

(6)

2.3 $X \text{ ----- } P$
 $\therefore \frac{6!}{2!}$
 $= 360$

(4)

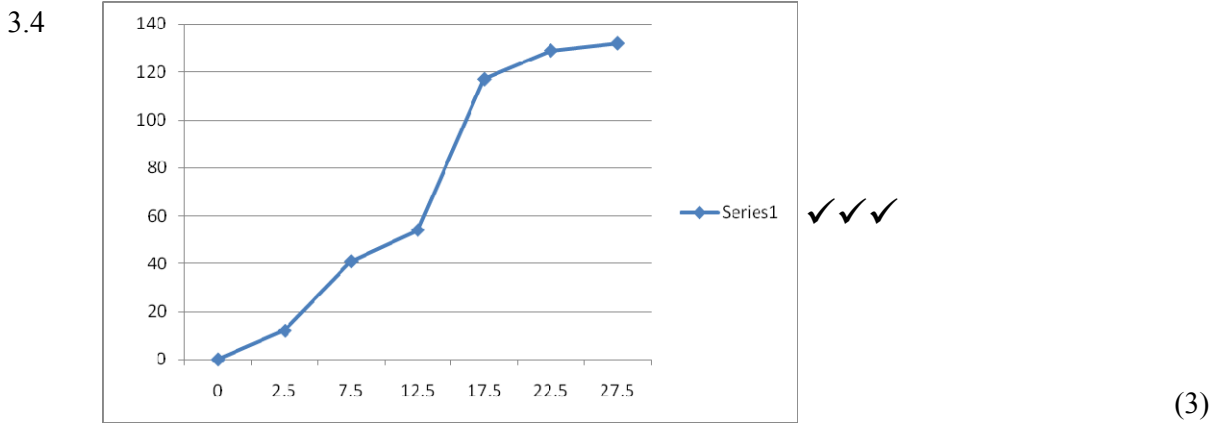
[14]

QUESTION 3

3.1 Interval with 61st value: $15 < x \leq 20$ ✓ (1)

3.2 14,13 ✓✓✓ (3)

3.3 6,17 ✓✓✓ (3)



3.5 15 ✓ (1)

3.6 From graph: Median: 15 ✓
 With median higher than mean – data negatively skewed. ✓ (3)

[14]

QUESTION 4

4.1 (a) Mean – could have 65% more than mean value ✓
 (b) Mode – also possible ✓
 (c) Median – not possible – always 50% above/ below ✓ (3)

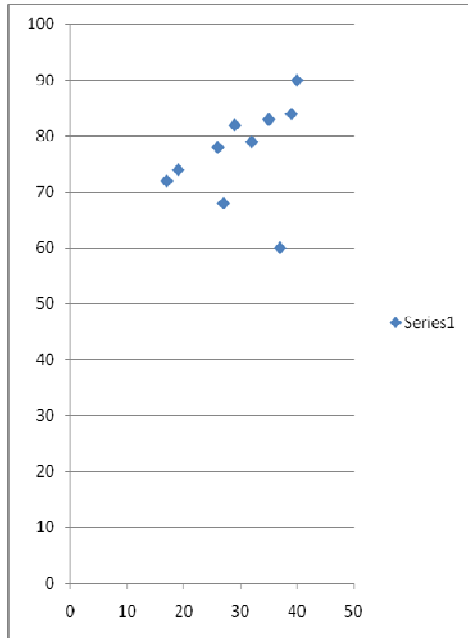
4.2 Maybe only one student passed in the previous year then 100% increase means only 2 passed this year. ✓
 Numbers should be included. ✓ (2)

4.3 4.3.1 Very negative relationship – longer the duration, less money spent. ✓ (2)
 4.3.2 No – means money would be paid to them to go on date.
 Extrapolation – time period too long. ✓ (2)

[9]

QUESTION 5

5.1



✓✓✓

(3)

5.2 $y = A + Bx$

$A = 65,27$ ✓

$B = 0,39$ ✓

$\therefore y = 65,27 + 0,39x$ ✓✓

(4)

5.3 $r = 0,35$ ✓✓

(2)

5.4 Moderately strong with calculated r value (positive correlation). ✓

(2)

5.5 Candidate 9 ✓

(1)

5.6 $y = 65,27 + 0,39(38)$

$= 80,09$ ✓

Advise change – 80% needed. Or no change – work harder at core – 2% needed.

(2)

[14]

60 marks

SECTION B

QUESTION 6

6.1 6.1.1 $\hat{S}_1 = 70^\circ$ alt \checkmark
 $\hat{V} = 110^\circ$ cyclic quad \checkmark (3)

6.1.2 $\hat{Q}_1 = \hat{W}_1$ tan chrd
 $\hat{Q}_1 = 70^\circ$ \checkmark (1)

6.1.3 $\hat{Q}_2 = 80^\circ$ in Δ \checkmark
 $\hat{T}_1 = 100^\circ$ opp cyclic quad \checkmark (3)

6.2 6.2.1 $\frac{GB}{BF} = \frac{GD}{DE}$ line || one side Δ \checkmark
 $\therefore \frac{3}{6} = \frac{a}{8}$
 $\therefore a = 4 \text{ units}$ \checkmark (2)

6.2.2 $\frac{GC}{CA} = \frac{GD}{DE}$ line || one side Δ \checkmark
 $\frac{7}{b+2} = \frac{4}{8}$ \checkmark
 $\therefore b = 12 \text{ units}$ \checkmark (3)

6.3 6.3.1 $\hat{A} = \hat{D}_1$ \checkmark \angle 's same segment \checkmark
 $\hat{D}_1 = \hat{B}_2$ \checkmark isos Δ (radii) \checkmark
 $\therefore \hat{A} = \hat{B}_2$ (4)

6.3.2 $\hat{B}_1 = \hat{C}_2$ \checkmark \angle 's same segment
 $\hat{C}_2 = \hat{D}_2 + \hat{E}$ \checkmark ext \angle Δ \checkmark
 $\therefore \hat{D}_2 = \hat{E}$ \checkmark isos Δ (radii) \checkmark
 $\therefore \hat{C}_2 = 2\hat{D}_2$ (6)

6.3.3 $\hat{C}_4 = 2\hat{D}_1 + 2\hat{D}_2$ \checkmark \angle at cntr = $2 \times$ at \angle circ \checkmark
 $\hat{D}_1 = \hat{A}$ \checkmark proved \checkmark
 $2\hat{D}_2 = \hat{B}$ \checkmark proved \checkmark
 $\therefore \hat{C}_4 = 2\hat{A} + \hat{B}$ (3)

6.4 6.4.1 In $\triangle KLN$ and $\triangle ONM$

$$(i) \hat{L}_1 = \hat{N}_1 \quad KL \parallel NM \quad \checkmark$$

$$(ii) \hat{K} = \hat{O}_2 \quad \text{given} \quad \checkmark$$

$$(iii) \hat{N}_2 = \hat{M}_1 \quad 3rd \angle \quad \checkmark$$

$$\therefore \triangle KLN \parallel \triangle ONM \quad AAA \quad \checkmark$$

(4)

$$6.4.2 \quad \frac{NL}{NK} = \frac{MN}{MO} \quad \checkmark \quad \Delta's \parallel \quad \checkmark$$

$$\therefore MO = ML \quad \text{given} \quad \checkmark$$

$$\text{and } MN = 2ML \quad \text{given} \quad \checkmark$$

$$\therefore \frac{NL}{NK} = \frac{2ML}{ML} \quad \checkmark$$

$$\therefore NL = 2NK$$

(5)

6.5 $QT = 3cm \quad \checkmark$ line centre \perp chrd

$$OT^2 = 5^2 - 3^2$$

$$OT = 4cm \quad \checkmark$$

let $RS = x$

$$\therefore OT^2 + TS^2 = OS^2$$

$$4^2 + (3+x)^2 = 8,5^2 \quad \checkmark$$

$$\therefore x^2 + 6x - 47,25 = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = 4,5 \text{ or } -10,5 \quad \checkmark$$

$$\therefore TS = 8,5cm \quad \checkmark$$

$$\therefore PS = 17cm \quad \checkmark$$

(6)

40 marks

TOTAL FOR THIS PAPER = 100 MARKS