

FINAL



KWAZULU-NATAL PROVINCE

EDUCATION
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE**

GRADE 11

MATHEMATICS
MARKING GUIDELINES
COMMON TEST
SEPTEMBER 2024

MARKS: 75

This marking guideline consists of 9 pages.

QUESTION 1

1.1	$\bar{x} = \frac{65 + 59 + 79 + 86 + 48 + 94 + 77 + 51 + 66 + 80}{10}$ $= \frac{705}{10}$ $= 70,5$ Answer only 2/2	✓ A 705 ✓ CA answer (2)
1.2	$\sigma = 14,38$	✓ A 14,38 (1)
1.3	Interval: $(\bar{x} - 1\sigma ; \bar{x} + 1\sigma)$ $(56,12 ; 84,88)$ $\therefore$ 6 marks lie within one standard deviation of the mean.	✓ CA interval ✓ CA answer (2)
1.4	$\frac{705 + x + 58}{12} = 67,5$ $x = 47$	✓ CA $\frac{(\text{sum of 10 marks}) + x + 58}{12} = 67,5$ ✓ CA $x = 47$ (2)
[7]		

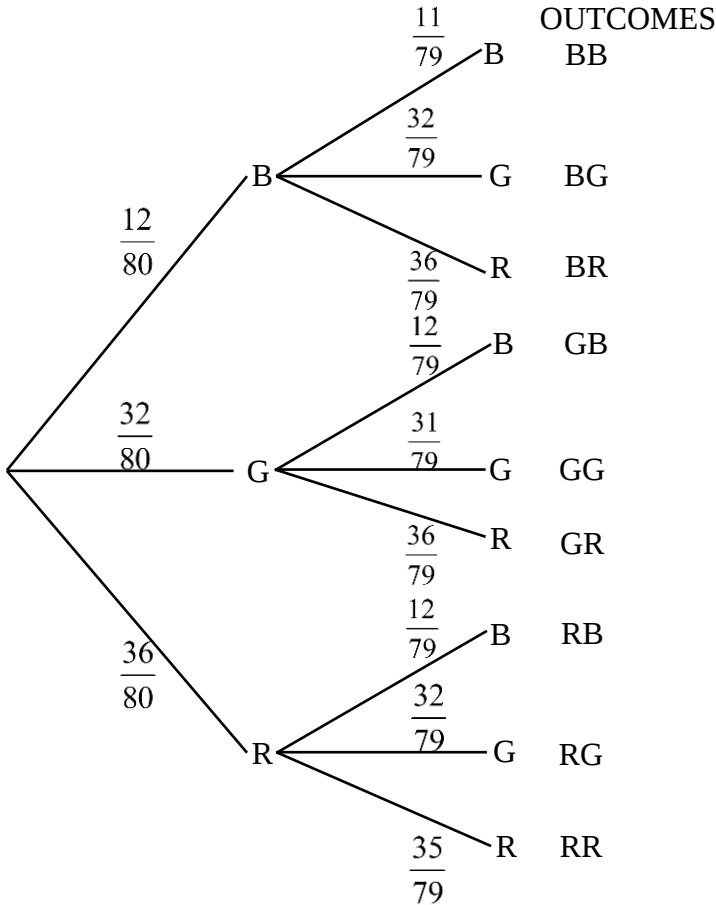
QUESTION 2

2.1	<table border="1"> <thead> <tr> <th>Age group (x)</th><th>Number of people</th><th>Cumulative frequency</th></tr> </thead> <tbody> <tr> <td>$18 < x \leq 22$</td><td>2</td><td>2</td></tr> <tr> <td>$22 < x \leq 26$</td><td>6</td><td>8</td></tr> <tr> <td>$26 < x \leq 30$</td><td>12</td><td>20</td></tr> <tr> <td>$30 < x \leq 34$</td><td>24</td><td>44</td></tr> <tr> <td>$34 < x \leq 38$</td><td>36</td><td>80</td></tr> <tr> <td>$38 < x \leq 42$</td><td>24</td><td>104</td></tr> <tr> <td>$42 < x \leq 46$</td><td>16</td><td>120</td></tr> <tr> <td>$46 < x \leq 50$</td><td>10</td><td>130</td></tr> </tbody> </table>	Age group (x)	Number of people	Cumulative frequency	$18 < x \leq 22$	2	2	$22 < x \leq 26$	6	8	$26 < x \leq 30$	12	20	$30 < x \leq 34$	24	44	$34 < x \leq 38$	36	80	$38 < x \leq 42$	24	104	$42 < x \leq 46$	16	120	$46 < x \leq 50$	10	130	✓ A 8 ✓ A all values correct (2)
Age group (x)	Number of people	Cumulative frequency																											
$18 < x \leq 22$	2	2																											
$22 < x \leq 26$	6	8																											
$26 < x \leq 30$	12	20																											
$30 < x \leq 34$	24	44																											
$34 < x \leq 38$	36	80																											
$38 < x \leq 42$	24	104																											
$42 < x \leq 46$	16	120																											
$46 < x \leq 50$	10	130																											
2.2	Ogive	✓ A grounding at (18 ; 0) ✓ A minimum of 4 points correct ✓ CA smooth increasing curve (3)																											
2.3	$34 < x \leq 38$	✓ A $34 < x \leq 38$ (1)																											
2.4	No. of youth (under 35 years) = 52 Percentage = $\frac{52}{130} \times 100$ $\approx 40\%$ Accept 50 to 54 Accept 38,46% to 41,54%	✓ CA 52 ✓ CA answer (2)																											

[8]

QUESTION 3

3.1	$P(A) = 1 - P(\text{not } A)$ $= 1 - 0,55$ $= 0,45$ $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$ $P(A \text{ and } B) = 0,45 + 0,4 - 0,67$ $= 0,18$ $P(A) \times P(B) = 0,45 \times 0,4$ $= 0,18$ $\therefore A \text{ and } B \text{ are independent since } P(A \text{ and } B) = P(A) \times P(B)$	✓ A 0,45 ✓ CA substitution ✓ CA 0,18 ✓ CA $P(A) \times P(B)$ ✓ CA conclusion (5)
3.2.1	$a = 10$ $b = 13$ $e = 13$ $f = 17$	✓ A $a = 10$ ✓ CA $b = 13$ ✓ CA $e = 13$ ✓ CA $f = 17$ (4)
3.2.2	$P[C \text{ or } (J \text{ and } D)] = \frac{10+17+13+9}{100} + \frac{9}{100}$ $= \frac{58}{100} \text{ or } 0,58$	✓ CA $\frac{49}{100}$ ✓ CA $\frac{9}{100}$ ✓ CA answer (3)
3.3.1	Number of green sweets $= 80 \times \frac{40}{100} = 32$ Number of blue sweets $= \frac{3}{20} \times 80 = 12$ Number of red sweets $= 80 - 44 = 36$	A ✓ 32 and 12 ✓ CA 36 (2)

3.3.2	 OUTCOMES BB BG BR GB GG GR RB RG RR	✓ CA branch at first pick with probabilities ✓ CA branches at second pick with probabilities 2nd CA mark applies only if without replacement is considered ✓ CA outcomes (3)
3.3.3	$P(\text{same colour}) = P(BB)+P(GG)+P(RR)$ $= \frac{12}{80} \times \frac{11}{79} + \frac{32}{80} \times \frac{31}{79} + \frac{36}{80} \times \frac{35}{79}$$= \frac{149}{395} \text{ or } 0,38$	✓ CA any two probabilities of same colour ✓ CA 3rd probability of same colour ✓ CA answer (3)
		[20]

QUESTION 4

4.1	$A = P(1+i)^n$ $6423 = 5591(1+i)^8$ $1+i = \sqrt[8]{\frac{6423}{5591}}$ $i = 0,01749\dots$ $r = 1,75\% \text{ p.a.}$	✓A correct substitution into correct formula ✓A $1+i = \sqrt[8]{\frac{6423}{5591}}$ ✓CA answer (3)
4.2	$1+i_{\text{eff}} = \left(1 + \frac{i_{\text{nom}}}{m}\right)^m$ $1+i_{\text{eff}} = \left(1 + \frac{0,09}{2}\right)^2$ $r_{\text{eff}} = \left[\left(1 + \frac{0,09}{2}\right)^2 - 1\right] \times 100$ $r_{\text{eff}} = 9,20\% \text{ p.a.}$	✓A formula ✓A correct substitution into correct formula ✓CA answer (3)
4.3.1	$A = P(1-i)^n$ $= 250\,000(1-0,12)^6$ $= R116\,101,02$	✓A correct substitution into correct formula ✓CA CA only if i and n are correct (2)
4.3.2	$A = P(1+i)^n$ $= R250\,000\left(1 + \frac{0,11}{4}\right)^{6 \times 4}$ $= R479\,406,53$	✓A $i = \frac{0,11}{4}$ ✓CA correct substitution into correct formula ✓CA answer (3)
4.3.3	Top-up amount = R479 406, 53 – R116 101, 02 = R363 305, 51	✓CA answer (1)

4.3.4	$A = P(1+i)^n$ $363\,305,51 = P\left(1 + \frac{0,1225}{12}\right)^{6 \times 12}$ $P = R174\,857,32$	$\checkmark A \quad i = \frac{0,1225}{12} \text{ and } n = 72$ $\checkmark \text{CA correct substitution into correct formula}$ $\checkmark \text{CA answer}$
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(3)

4.4	8% p.a. compounded 12% p.a. compounded 0 1 2 3 4 5 6 7 (years) $A = P(1+i)^n$ $= 25\,000\left(1 + \frac{0,08}{12}\right)^{3 \times 12}$ $A_3 = R31\,755,93 - R10\,000$ $= R21\,755,93$ $A_4 = R21\,755,93\left(1 + \frac{0,08}{12}\right)^{12}$ $= R23\,561,66$ $A_7 = R23\,561,66\left(1 + \frac{0,12}{4}\right)^{3 \times 4}$ $= R33\,593,29$ OR $A = R\left[\left[25\,000\left(1 + \frac{0,08}{12}\right)^{3 \times 12} - 10\,000\right]\left(1 + \frac{0,08}{12}\right)^{12}\right] \times \left(1 + \frac{0,12}{4}\right)^{3 \times 4}$ $= R33\,593,29$	$\checkmark A \quad 25\,000\left(1 + \frac{0,08}{12}\right)^{3 \times 12}$ $\checkmark \text{CA } R31\,755,93 - R10\,000$ $\checkmark \text{CA } R21\,755,93\left(1 + \frac{0,08}{12}\right)^{12}$ $\checkmark \text{CA } R23\,561,66\left(1 + \frac{0,12}{4}\right)^{3 \times 4}$ $\checkmark \text{CA } R33\,593,29$
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(5)

OR

$$A \checkmark 25\,000\left(1 + \frac{0,08}{12}\right)^{3 \times 12}$$

$$\checkmark A \quad -R10\,000$$

$$\checkmark A \quad \left(1 + \frac{0,08}{12}\right)^{12}$$

$$\checkmark A \quad \left(1 + \frac{0,12}{4}\right)^{3 \times 4}$$

$$\checkmark \text{CA } R33\,593,29$$

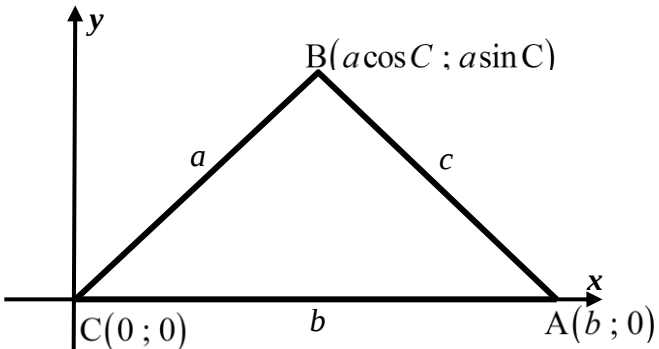
(5)

[20]

QUESTION 5

5.1	$b = 2$ $q = -1$	$\checkmark A \ b = 2$ $\checkmark A \ q = -1$ (2)
5.2	Period = 180°	$\checkmark A$ Answer (1)
5.3	$h(x) = \cos 2x - 1 + 1$ $= \cos 2x$	$\checkmark CA \ \cos 2x$ (1)
5.4	$f(x) = h(x)$ $\sin(x + 45^\circ) = \cos 2x$ $\sin(x + 45^\circ) = \sin(90^\circ - 2x)$ $x + 45^\circ = 90^\circ - 2x + k.360^\circ$ or $x + 45^\circ = 180^\circ - (90^\circ - 2x) + k.360^\circ$ $3x = 45^\circ + k.360^\circ$ or $-x = 45^\circ + k.360^\circ$ $x = 15^\circ + k.120$ or $x = -45^\circ - k.360^\circ; k \in Z$ $\therefore x = 15^\circ$ or $x = 135^\circ$ OR $f(x) = h(x)$ $\sin(x + 45^\circ) = \cos 2x$ $\cos[90^\circ - (x + 45^\circ)] = \cos 2x$ $90^\circ - x - 45^\circ = 2x + k.360^\circ$ or $90^\circ - x - 45^\circ = 360^\circ - 2x + k.360^\circ$ $-3x = -45^\circ + k.360^\circ$ or $-x + 2x = 360^\circ - 45^\circ + k.360^\circ$ $x = 15^\circ - k.120^\circ$ or $x = 315^\circ + k.360^\circ; k \in Z$ $\therefore x = 15^\circ$ or $x = 135^\circ$	$\checkmark A$ co-ratio $\checkmark CA$ both equations $\checkmark CA$ general solution $\checkmark CA$ both values of x $\checkmark A \ k \in Z$ OR $\checkmark A$ co-ratio $\checkmark CA$ both equations $\checkmark CA$ general solution $\checkmark CA$ both values of x $\checkmark A \ k \in Z$ (5)
5.5	$\frac{1}{2} f(x) \times 4g(x) = -2$ $f(x) \times g(x) = -1$ $x = 45^\circ$ NOTE: Correct answer only: award full marks.	$\checkmark A \ f(x) \times g(x) = -1$ $\checkmark A \ x = 45^\circ$ (2)
[11]		

QUESTION 6

6.1	 $AB^2 = (x_A - x_B)^2 + (y_A - y_B)^2$ $c^2 = (b - a \cos C)^2 + (0 - a \sin C)^2$ $c^2 = b^2 - 2ab \cos C + a^2 \cos^2 C + a^2 \sin^2 C$ $c^2 = b^2 + a^2 (\cos^2 C + \sin^2 C) - 2ab \cos C$ $c^2 = a^2 + b^2 - 2ab \cos C$	✓ A $B(a \cos C ; a \sin C)$ and $A(b ; 0)$ ✓ A substitution into distance formula ✓ A Expansion ✓ A $\cos^2 C + \sin^2 C = 1$ (4)
6.2	In $\triangle ABC$: $\cos \hat{A} = \frac{BC}{AC}$ $\cos 26,57^\circ = \frac{BC}{15\sqrt{5}}$ $BC = 15\sqrt{5} \times \cos 26,57^\circ$ $BC = 29,998... / 30 \text{ units.}$ In $\triangle BCD$: $BD^2 = BC^2 + CD^2 - 2(BC)(CD)\cos \hat{C}$ $= (30)^2 + (10)^2 - 2(30)(10)\cos 116,57^\circ$ $= 1268,374509$ $BD = 35,61 \text{ units}$	✓ A Correct ratio and substitution ✓ A $BC = 29,998... / 30 \text{ units}$ ✓ A $116,57^\circ$ ✓ CA correct substitution into correct formula ✓ CA Answer (5)

[9]**TOTAL MARK: 75**