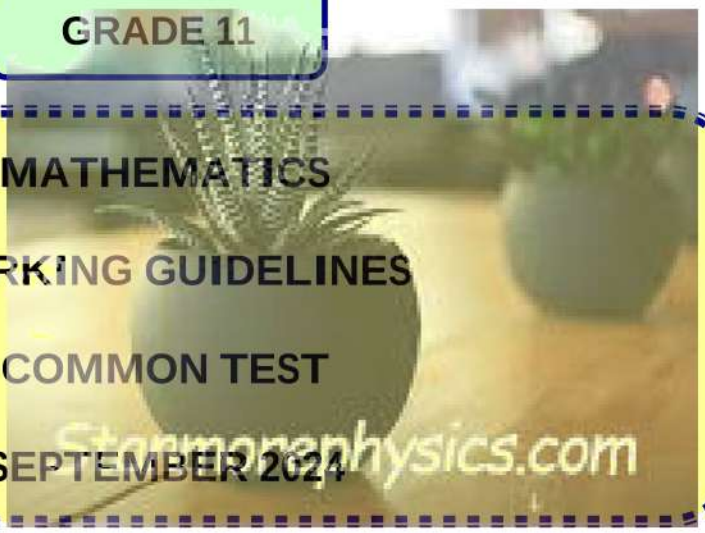
KWAZULU-NATAL PROVINCE

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.

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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: $(\bar{x} - 1\sigma\ ;\ \bar{x} + 1\sigma)$ $(56,12\ ;\ 84,88)$ ∴ 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]

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QUESTION 2

2.1

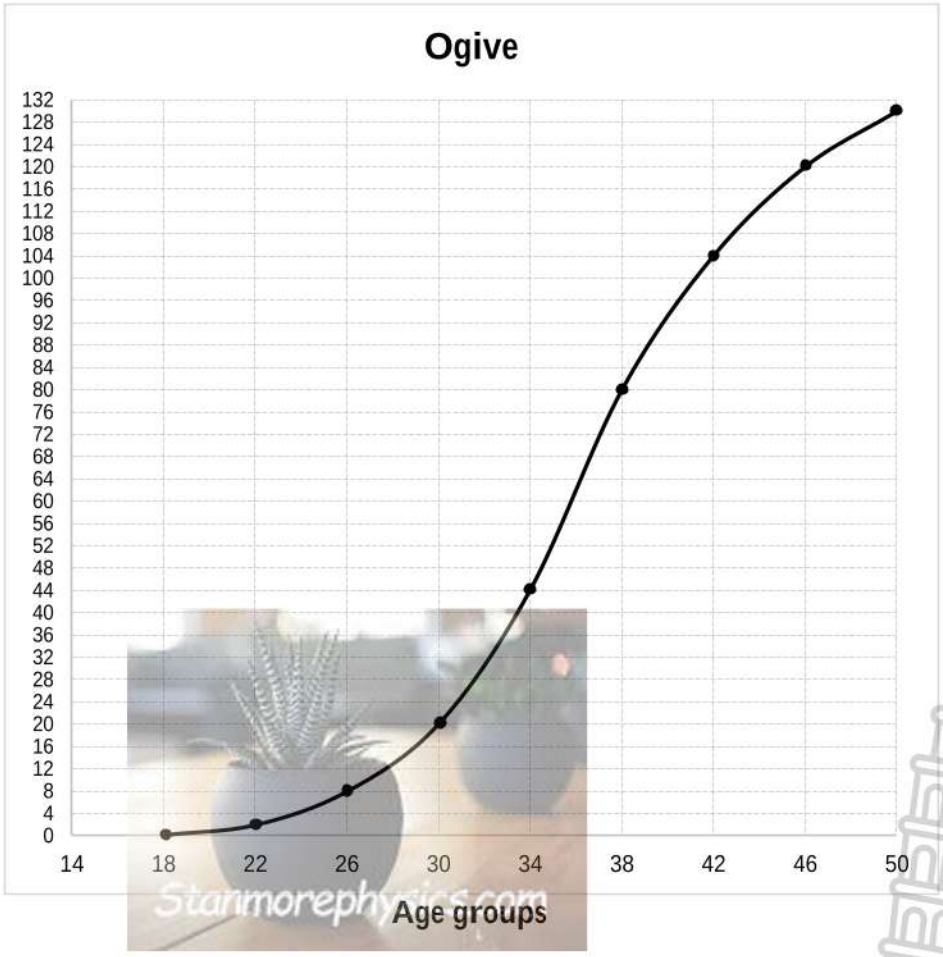
Age group (x)	Number of people	Cumulative frequency
$18 < x \leq 22$	2	2
$22 < x \leq 26$	6	8
$26 < x \leq 30$	12	20
$30 < x \leq 34$	24	44
$34 < x \leq 38$	36	80
$38 < x \leq 42$	24	104
$42 < x \leq 46$	16	120
$46 < x \leq 50$	10	130

✓A 8

✓A all values correct

(2)

2.2



✓ 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

Accept 50 to 54

$$\text{Percentage} = \frac{52}{130} \times 100$$

$$\approx 40\%$$

Accept 38,46% to 41,54%

✓ CA 52

✓ CA answer

(2)

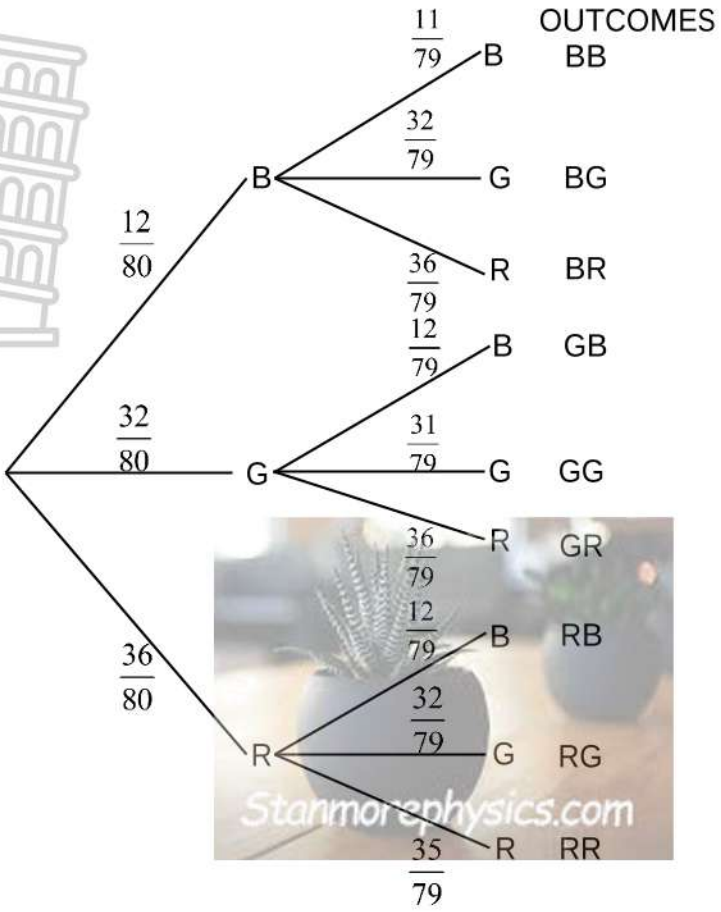
[8]

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QUESTION 3

3.1	$P(A) = 1 - P(\text{not } A)$ $= 1 - 0,55$ $= 0,45$	✓A 0,45
	$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$ $P(A \text{ and } B) = 0,45 + 0,4 - 0,67$ $= 0,18$	✓CA substitution ✓CA 0,18
	$P(A) \times P(B) = 0,45 \times 0,4$ $= 0,18$	✓CA $P(A) \times P(B)$
	$\therefore$ A and B are independent since $P(A \text{ and } B) = P(A) \times P(B)$	✓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	$P[C \text{ or } (J \text{ and } D)] = \frac{10+17+13+9}{100} + \frac{9}{100}$ $= \frac{58}{100}$ 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)

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3.3.2		✓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	$P(\text{same colour}) = P(BB)+P(GG)+P(RR)$ $= \frac{12}{80}\times\frac{11}{79}+\frac{32}{80}\times\frac{31}{79}+\frac{36}{80}\times\frac{35}{79}$ $= \frac{149}{395}$ or 0,38	✓CA any two probabilities of same colour ✓CA 3rd probability of same colour ✓ CA answer (3)
		[20]

QUESTION 4

4.1	$A = P(1+i)^n$ $6423 = 5591(1+i)^8$ $1+i = \sqrt[8]{\frac{6423}{5591}}$ $i = 0{,}01749\ldots$ r = 1,75% p.a.	✓A correct substitution into correct formula ✓A $1+i = \sqrt[8]{\frac{6423}{5591}}$ ✓CA answer (3)
4.2	$1+i_{eff} = \left(1+\frac{i_{nom}}{m}\right)^m$ $1+i_{eff} = \left(1+\frac{0{,}09}{2}\right)^2$ $r_{eff} = \left[\left(1+\frac{0{,}09}{2}\right)^2 - 1\right] \times 100$ $r_{eff} = 9{,}20\%$ 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	$A = P(1+i)^n$ $= R250\,000\left(1+\frac{0.11}{4}\right)^{6\times4}$ = 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)

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4.3.4

$$A = P(1+i)^n$$

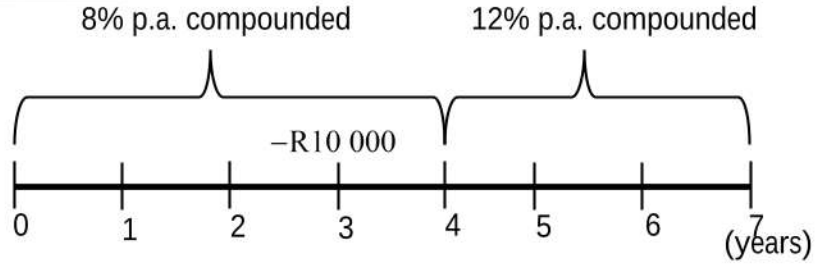
$$363\,305,51 = P\left(1+\frac{0.1225}{12}\right)^{6\times12}$$

$$P = R174\,857,32$$

✓A $i = \frac{0,1225}{12}$ and $n = 72$
✓CA correct substitution into correct formula
✓CA answer

(3)

4.4



$$A = P(1+i)^n$$

$$= 25\,000\left(1+\frac{0,08}{12}\right)^{3\times12}$$

$$A_3 = R31\,755,93 - R10\,000$$

$$= R21\,755,93$$

$$A_4 = R21\,755,93\left(1+\frac{0,08}{12}\right)^{12}$$

$$= R23\,561,66$$

$$A_7 = R23\,561,66\left(1+\frac{0.12}{4}\right)^{3\times4}$$

$$= R33\,593,29$$

✓A $25\,000\left(1+\frac{0,08}{12}\right)^{3\times12}$
✓CA $R31\,755,93 - R10\,000$
✓CA $R21\,755,93\left(1+\frac{0,08}{12}\right)^{12}$
✓CA $R23\,561,66\left(1+\frac{0.12}{4}\right)^{3\times4}$
✓CA R33 593, 29

(5)

OR

$$A = R\left[\left[25\,000\left(1+\frac{0,08}{12}\right)^{3\times12} - 10\,000\right]\left(1+\frac{0,08}{12}\right)^{12}\right]\times\left(1+\frac{0.12}{4}\right)^{3\times4}$$

$$= R33\,593,29$$

OR

A✓ $25\,000\left(1+\frac{0,08}{12}\right)^{3\times12}$
✓A $-R10\,000$
✓A $\left(1+\frac{0,08}{12}\right)^{12}$
✓A $\left(1+\frac{0.12}{4}\right)^{3\times4}$
✓CA R33 593, 29

(5)

[20]

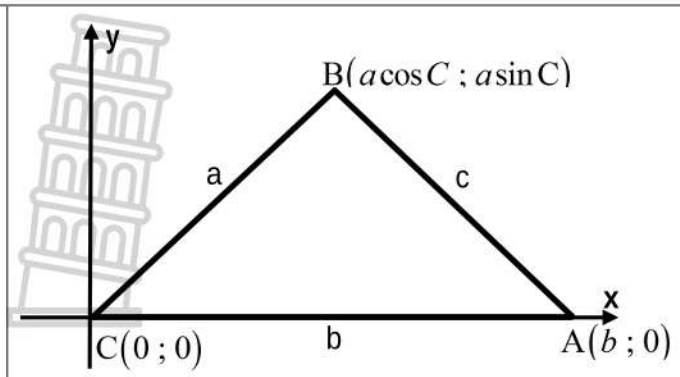
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QUESTION 5

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

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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 ΔABC: $\cos A\hat{C}B = \frac{BC}{AC}$ $\cos 26,57° = \frac{BC}{15\sqrt{5}}$ $BC = 15\sqrt{5} \times \cos 26,57°$ $BC = 29,998... / 30$ units. In ΔBCD: $BD^2 = BC^2 + CD^2 - 2(BC)(CD)\cos B\hat{C}D$ $= (30)^2 + (10)^2 - 2(30)(10)\cos 116.57°$ $= 1268,374509$ $BD = 35,61$ units	✓A Correct ratio and substitution ✓A $BC = 29,998... / 30$ units ✓A $116.57°$ ✓CA correct substitution into correct formula ✓CA Answer (5)
		[9]

TOTAL MARK: 75

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