



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

ANNUAL NATIONAL ASSESSMENTS 2010

GRADE 9 MATHEMATICS - ENGLISH

FORM A

MEMORANDUM

Important Information

- This is a marking guideline. In instances where learners have used different but mathematically sound strategies to solve the problems they (learners) should be credited.
- Unless stated otherwise, learners who give a correct answer only, should be awarded full marks.

QUESTION 1

1.	1.1	B	1.2	B	1.3	A	1.4	B	1.5	C	Give 1 mark for each correct answer.	
	1.6	D	1.7	C	1.8	C	1.9	C	1.10	B		

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QUESTION 2

2.1.1	$2x^2 + 3x - 4 - x^2 + 2x + 6$ $= x^2 + 5x + 2$	✓ ✓✓	Distributive law: 1 mark Answer: 2 marks	(3)
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2.1.2	$\frac{-4m^3n \times 10mn^2}{5m^4n^3} = \frac{-40m^{3+1}n^{2+1}}{5m^4n^3}$ $= \frac{-8m^{4-4}n^{3-3}}{1} = -8$	✓ ✓ ✓	Relevant Law of exponents: 1 mark Relevant Law of exponents: 1 mark Answer: 1 mark	(3)
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2.1.3	$= \frac{(16 \times 10^{-4}) + (4.0 \times 10^{-4})}{(4.0 \times 10^{-3}) - (2 \times 10^{-3})}$ $= \frac{(10^{-4})(16 + 4)}{(10^{-3})(4 - 2)}$ $= \frac{20 \times 10^{-1}}{2}$ $= \frac{2}{2}$ $= 1$	✓ ✓ ✓ ✓	Changing 1.6×10^{-3} to 16×10^{-4} : 1 mark Changing 0.2×10^{-2} to 2×10^{-3} : 1 mark Taking out common factors: 1 mark Answer: 1 mark	(4)
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2.2.1	$\frac{2}{3}(12a^2 - 3a - 6) = 8a^2 - 2a - 4$	✓ ✓ ✓	Each correct term: 1 mark	(3)
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2.2.2	$a^2 - 6ab + 8b^2$	✓ ✓ ✓	Each correct term: 1 mark	(3)
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2.3.1	$3k(2 + 4k - k^2)$	✓ ✓	$3k$: 1 mark $(2 - k^2 + 4k)$: 1 mark	(2)
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2.3.2	$16y^2 - 49 = (4y - 7)(4y + 7)$	✓ ✓	Each correct bracket: 1 mark	(2)
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2.3.3	✓ ✓ ✓ $3x^2 - 12 = 3(x^2 - 4) = 3(x - 2)(x + 2)$	Common factor: 1 mark Each correct bracket: 1 mark	(3)
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2.4	$\begin{array}{r l} 2 & 784 \\ \hline 2 & 392 \\ \hline 2 & 196 \\ \hline 2 & 98 \\ \hline 7 & 49 \\ \hline 7 & 7 \\ \hline & 1 \end{array}$ ✓ ✓ $784 = \underbrace{2 \times 2}_{2 \times 2} \times \underbrace{2 \times 2}_{\times 2} \times \underbrace{7 \times 7}_7 = 2^4 \times 7^2$ $\therefore \sqrt{784} = \sqrt{2^4 \times 7^2} = 4 \times 7 = 28 \quad \checkmark \quad \checkmark$	factorising correctly: 2 marks Answer: 2 marks	(4)
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2.5.1	$2x - 3 = 17 + x$ $2x - x = 17 + 3$ ✓ $\therefore x = 20$ ✓	Simplifying x : 1 mark Answer = 20: 1 mark	(2)
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2.5.2	$\frac{3x+4}{2} = 2$ $\therefore 3x+4=4 \quad \checkmark$ $\therefore 3x=0 \quad \checkmark$ $\therefore x=0 \quad \checkmark$	multiply by 2: 1 mark correct equation: 1 mark Answer: 1 mark	(3)
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2.5.3	$\frac{2(x+5)}{3} = 1 - \frac{3(x-5)}{4}$ $\therefore 8(x+5) = 12 - 9(x-5) \quad \checkmark$ $\therefore 8x + 40 = 12 - 9x + 45 \quad \checkmark \checkmark$ $\therefore 8x + 9x = 57 \quad \checkmark$ $\therefore 17x = 17$ $\therefore x = 1 \quad \checkmark$	multiply by 12: 1 mark Simplifying: 2 marks correct equation: 1 mark Answer: 1 mark	(5)
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QUESTION 3

3.1	<i>Compound Interest calculation</i> $A = P \left(1 + \frac{r}{100} \right)^n = 8000 \left(1 + \frac{0,035}{1} \right)^3$ $= 8869,74$ $\therefore CI = R869,74$	<i>Simple Interest Calculation:</i> $SI = \frac{P \cdot n \cdot r}{100}$ $= \frac{(8000)(3)(7,5)}{100} \quad \text{or}$ $= 80(3)(7,5)$ $= 1800$ $SI = 9800 - 8000 = R1800$ The SI investment is better	Correct Formula (for CI and SI): 2 marks Simplification (for CI and SI): 2 marks Correct choice: 1 mark Note: $i = \frac{r}{100}$ in all formulae. (5)
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3.2	<table border="1"> <tr> <th></th><th>S(km/h)</th><th>T(h)</th><th>D(h)</th></tr> <tr> <td>A → B</td><td>70</td><td>$\frac{9}{2}$</td><td>$70 \times \frac{9}{2}$</td></tr> <tr> <td>B → A</td><td>90</td><td>x</td><td>315</td></tr> </table> Distance from A to B = 315 km ✓ Time from B to A = $\frac{315}{90}h = 3,5h = 3h 30 \text{ min.}$ ✓		S(km/h)	T(h)	D(h)	A → B	70	$\frac{9}{2}$	$70 \times \frac{9}{2}$	B → A	90	x	315	Distance = 315 km: 2 marks Substitution into formula: 1 mark Answer: 1 mark	(4)
	S(km/h)	T(h)	D(h)												
A → B	70	$\frac{9}{2}$	$70 \times \frac{9}{2}$												
B → A	90	x	315												

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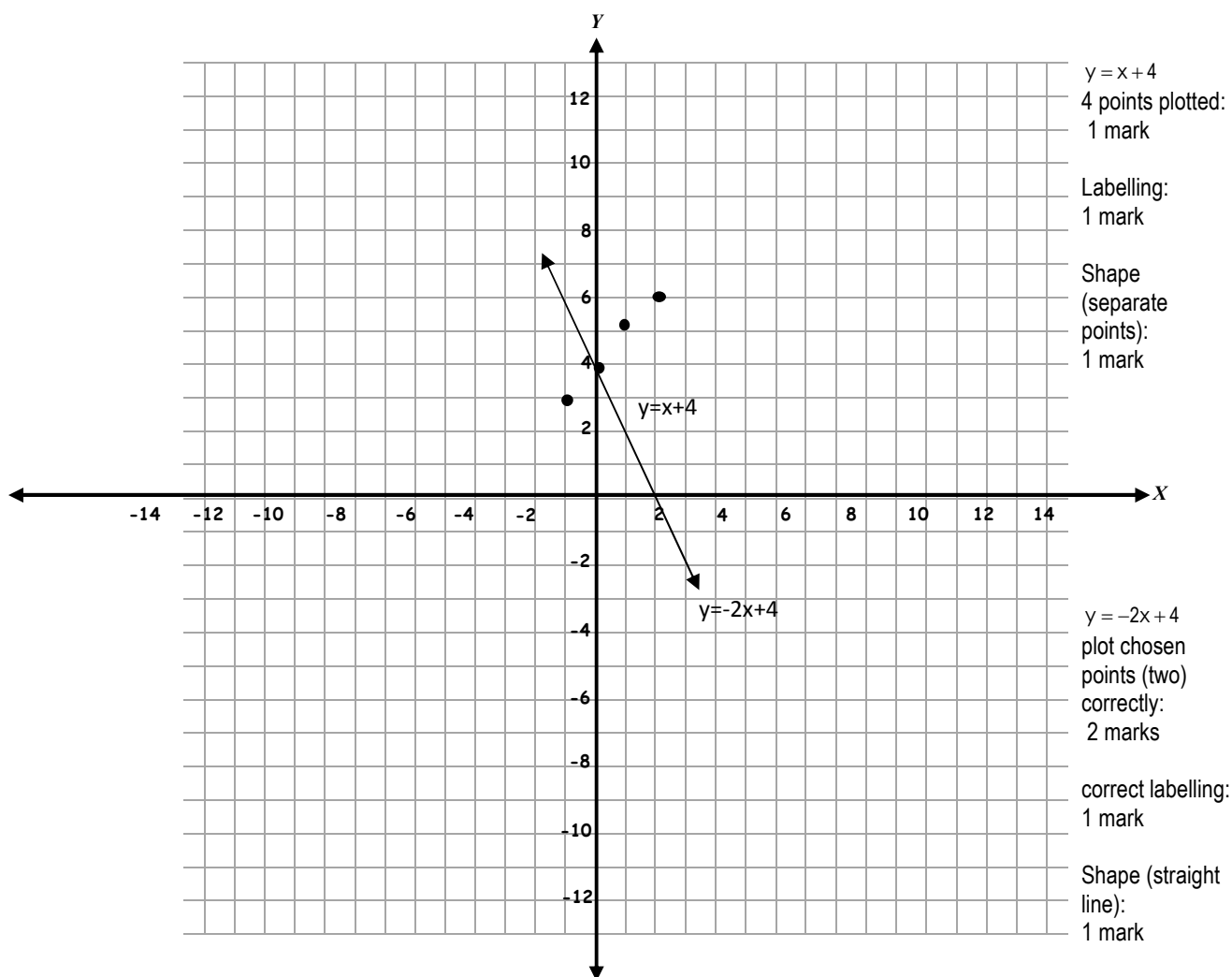
QUESTION 4

4.1	✓ ✓ 5; 7	Each term: 1 mark	(2)
4.2	✓ Two is added every time to obtain the next term OR there is a constant difference of 2 between two consecutive terms.	Answer: 1 mark	(1)
4.3	✓ $T_n = 2n - 3$	Correct answer: 1 mark	(1)
4.4	$2n - 3 = 37$ ✓ $2n = 40$ $n = 20$ ✓ $\therefore T_{20} = 37$	Equation: 1 mark Answer: 1 mark	(2)

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QUESTION 5

5.1	5.1.1	b	5.1.2	a	5.1.3	c	1 mark each	(3)																				
5.2	$y = x + 4$ <table><tr><td>x</td><td>-1</td><td>0</td><td>1</td><td>2</td></tr><tr><td>y</td><td>3</td><td>4</td><td>5</td><td>6</td></tr></table> $y = -2x + 4$ Note: learners can choose other x-values in the table below. <table><tr><td>x</td><td>-1</td><td>0</td><td>1</td><td>2</td></tr><tr><td>y</td><td>6</td><td>4</td><td>2</td><td>0</td></tr></table>						x	-1	0	1	2	y	3	4	5	6	x	-1	0	1	2	y	6	4	2	0		
x	-1	0	1	2																								
y	3	4	5	6																								
x	-1	0	1	2																								
y	6	4	2	0																								



(7)

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QUESTION 6

6.1.1	Rhombus	1 mark	(1)
6.1.2	In $\triangle KCL$: $KL^2 = CK^2 + LC^2$...Pythagoras $\checkmark \checkmark$ $= (5 \text{ cm})^2 + (12 \text{ cm})^2$ $= 25 \text{ cm}^2 + 144 \text{ cm}^2$ $\checkmark$ $= 169 \text{ cm}^2$ $KL = \sqrt{169} \text{ cm}$ $\checkmark$ $KL = 13 \text{ cm}$ $\checkmark$	$KL^2 = CK^2 + LC^2$ and reason : 2 marks Simplification: 1 mark Finding square root $\sqrt{169}$: 1 mark Answer: 1 mark	(5)
6.1.3	Perimeter = $13 \text{ cm} \times 4 = 52 \text{ cm}$ $\checkmark$	Answer: 1 mark	(1)

6.1.4	In $\triangle JBK$ and $\triangle LDM$ 1. $BK = MD$ $\left(\frac{1}{2}BC = \frac{1}{2}AD\right)$ ✓✓ 2. $JK = ML$ (sides of a rhombus) ✓✓ 3. $\hat{B} = \hat{D} = 90^\circ$ or $BJ = DL$ $\left(\frac{1}{2}AB = \frac{1}{2}CD\right)$ ✓✓ $\triangle JBK \equiv \triangle LDM$ $(90^\circ, H, S)$ ✓ or 1. $BK = MD$ 2. $BJ = DL$ 3. $\hat{B} = \hat{D} = 90^\circ$ $\triangle JBK \equiv \triangle LDM$ $(S, <, S)$	Correct statement and reason: 2 marks Correct statement and reason: 2 marks Correct statement and reason: 2 marks Correct case: 1 mark	(7)
6.1.5	Draw diagonal KM Area $\triangle AMJ$ + Area $\triangle BKJ$ = Area $\triangle MJK$ $= \frac{1}{2}$ Area rectangle ABKM ✓✓ and Area $\triangle DML$ + Area $\triangle KCL$ = Area $\triangle MLK$ $= \frac{1}{2}$ Area rectangle DCKM ✓✓ $\Rightarrow$ Area JKLM = $\frac{1}{2}$ Area ABCD $\Rightarrow t = \frac{1}{2}$ ✓	Correct statement: 2 marks Correct statement: 2 marks $t = \frac{1}{2}$: 1 mark	(5)
6.2.1	$3a + 2a + 20^\circ = 180^\circ$ [sum of angles on a straight line = 180°] ✓✓ $5a + 20^\circ = 180^\circ$ $5a = 180^\circ - 20^\circ$ ✓✓ $5a = 160^\circ$ $a = 32^\circ$ ✓ Note: It is incorrect to equate $3a = 4a - 32$ although this calculation leads to an answer of 32°	Statement with reason: 2 marks Simplification: 1 marks Answer: 1 mark	(4)
6.2.2	$\hat{FEA} = 3a$ $= 3(32^\circ)$ ✓ $= 96^\circ$ ✓ $\hat{HCD} = \hat{GCE} = 4a - 32^\circ$ $\hat{HCD} = \hat{GCE}$ ✓✓ $= 128 - 32^\circ$ $= 96^\circ$ ✓	Substitution: 1 mark Answer: 1 mark Statement with reason: 2 marks Answer: 1 mark	(5)
6.2.3	FK//GH [$\hat{FEC} + \hat{GCE} = 180^\circ$] ✓✓ OR FK//GH [sum of co-interior angles = 180°] OR $\hat{FEA} = \hat{GCE}$ [corresponding angles are equal]	FK//GH: 1 mark Reason: 1 mark	(2)

6.3.1	$AC = AE \Rightarrow \hat{C}_1 = \hat{E}_1$ (angles opp. equal sides of $\triangle ACE$) $\Rightarrow \hat{C}_2 = \hat{E}_2$ (supplements of equal angles)	$\hat{C}_1 = \hat{E}_1$: 1 mark Reason: 1 mark $\hat{C}_2 = \hat{E}_2$: 1 mark Reason: 1 mark	(4)
6.3.2	In $\triangle ABC$ and $\triangle AGE$ 1. $\hat{C}_2 = \hat{E}_2$ (proved) ✓ 2. $\hat{B} = \hat{G}$ ($\angle$ s opp. equal sides of $\triangle ABC$) ✓✓ 3. $\hat{A}_1 = \hat{A}_3$ (sum of $\angle$ s = 180°) ✓ $\triangle ABC \parallel \triangle AGE$ ($<, <, <$) ✓	Showing 3 angles equal: 4 marks Conclusion on similarity: 1 mark	(5)
6.4.1	$\frac{2500000}{1000} \text{ m}^3 = 2\,500 \text{ m}^3$ ✓✓ Note: Answer only full marks OR $2\,500\,000 \text{ litres} = 2\,500 \text{ kl} = 2\,500 \text{ m}^3$	Conversion: 1 mark Answer: 1 mark	(2)
6.4.2	$V = l \times b \times h$ $2500 \text{ m} = 50 \text{ m} \times 25 \text{ m} \times h$ $h = \frac{2500 \text{ m}^3}{1250 \text{ m}^2}$ ✓ $h = 2 \text{ m}$ ✓	Formula: 1 mark Substitution: 1 mark Making h the subject of the formula: 1 mark Answer: 1 mark	(4)
6.4.3	$speed = \frac{d}{t}$ ✓ $speed = \frac{100 \text{ m}}{67.02 \text{ s}}$ ✓ $speed = 1,49209... \text{ m/s}$ ✓ $speed = 1,49 \text{ m/s}$ ✓	Formula: 1 mark Substitution: 1 mark Correct answer (not rounded off): 1 mark Answer correct to two decimal places: 1 mark	(4)
6.4.4	Area of paving = $(55 \text{ m} \times 30 \text{ m}) - (50 \text{ m} \times 25 \text{ m})$ $= 1650 \text{ m}^2 - 1250 \text{ m}^2$ $= 400 \text{ m}^2$	Correct formula with substitution: 2 marks Simplification: 1 mark Answer: 1 mark	(4)

QUESTION 7

7.1.1	$P(R\ 50) = \frac{2}{6} = \frac{1}{3} \quad \checkmark$	answer: 1 mark Note: learners can stop at $\frac{2}{6}$	(1)
7.1.2		first branch: 1 mark second branch: 1 mark third branch: 1 mark	(3)
7.2.1	$P(\text{Yellow and Black}) = \frac{1}{4} \times \frac{1}{2} = \frac{1}{8} \quad \checkmark$	correct fractions in product: 1 mark answer: 1 mark	(2)
7.2.2	Relative freq. of purple = $\frac{15}{50} \checkmark = \frac{3}{10} \checkmark$	correct fraction: 2 marks	(2)

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QUESTION 8

8.1	Number of terms = 8 $\Rightarrow$ median lies between 4 th and 5 th scores $\therefore \frac{y+5}{2} = \frac{11}{2} \Rightarrow y = 6 \quad \checkmark$	1 mark: correct equation 1 mark: answer	(2)
8.2	$\text{Mean} = 5 = \frac{1+3+5+5+6+6+6+z}{8}$ $\therefore 5 \times 8 = 32 + z \quad \checkmark \checkmark$ $\Rightarrow z = 8$	1 mark: correct equation 1 mark: answer	(3)
8.3	Mode = most recurring score = 6	1 mark: answer	(1)

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Total [140]