



**basic education**

Department:  
Basic Education  
REPUBLIC OF SOUTH AFRICA

# **ANNUAL NATIONAL ASSESSMENT**

## **GRADE 9**

## **MATHEMATICS**

## **EXEMPLAR TEST 2012**

## **MEMORUNDAM**

**ANNUAL NATIONAL ASSESSMENT 2012  
GRADE 9 MATHEMATICS EXEMPLAR TEST  
MEMORANDUM**

**QUESTION 1**

1.	1.1	<b>C</b>	1.2	<b>C</b>	1.3	<b>D</b>	1.4	<b>A</b>	1.5	<b>B</b>	Give 1 mark for each correct answer.	<b>[10]</b>
	1.6	<b>D</b>	1.7	<b>B</b>	1.8	<b>C</b>	1.9	<b>A</b>	1.10	<b>A</b>		

**QUESTION 2**

2.1	$3,56 \times 10^{-6} kl \checkmark \checkmark$	3,56: 1 mark $10^{-6} kl$ : 1 mark	(2)
2.2.	$-16 - 12 - 18 + 2 = -44 \checkmark \checkmark \checkmark \checkmark$	Substitution: 1 mark Simplifying: 2 marks Answer: 1 mark	(4)
2.3	$20a^3b^3 + 8a^2b^2 - 12ab \checkmark \checkmark \checkmark$	$20a^3b^3$ : 1 mark $8a^2b^2$ : 1 mark $-12ab$ : 1 mark	(3)
2.4.1	$(a^4b^6)(ab^2) = a^5b^8 \checkmark \checkmark$	$(a^4b^6)$ : 1 mark $a^5b^8$ : 1 mark	(2)
2.4.2	$x + y \checkmark \checkmark$	Answer: 2 marks	(2)
2.4.3	$\frac{3(24)a^{-3}b^0}{9a^{-4}b^{-3}} \checkmark \checkmark$ $= 8ab^3 \checkmark$	Simplifying: 2 marks Answer: 1 mark	(3)
2.4.4	$\frac{x-2}{2x} - \frac{x-3}{3x}$ $= \frac{3(x-2) - 2(x-3)}{6x} \checkmark \checkmark$ $= \frac{3x-6-2x+6}{6x} \checkmark$ $= \frac{x}{6x} \checkmark$ $= \frac{1}{6} \checkmark$	Simplifying: 3 marks Answer: 1 mark	(5)
2.4.5	$\frac{4x^2}{2a^2} \times \frac{2a^2}{4x} = x \checkmark \checkmark$	Simplifying: 1 mark Answer: 1 mark	(2)
2.4.6	$\frac{(x+1)(x-1)}{3(x+1)} \checkmark \checkmark$ $= \frac{x-1}{3} \checkmark$	Difference of two squares: 1 mark Common factor: 1 mark Answer: 1 mark	(3)

2.5.1	$3a(a^2 - 3a - 2)✓✓$	Common factor $3a$ : 1 mark $a^2 - 3a - 2$ : 1 mark	(2)
2.5.2	$(a + b)(4 - x^2)✓✓$ $= (a + b)(2 + x)(2 - x)✓✓$	Common factor: 2 marks Difference of two squares: 2 marks	(4)
2.6.1	$8x + 3 = 3x - 22$ $8x - 3x = -22 - 3$ $5x = -25✓$ $x = -5✓$	Simplifying: 1 mark Answer: 1 mark	(2)
2.6.2	$x - \frac{x-1}{2} = 3$ $2x - x + 1 = 6✓$ $x + 1 = 6✓$ $x = 5✓$	Multiplying by 2: 1 mark Simplifying: 1 mark Answer: 1 mark	(3)
2.6.3	$3^{x+1} = 3^4✓$ $x + 1 = 4✓$ $x = 3✓$	Applying exponential law: 2 marks Answer: 1 mark	(3)

### QUESTION 3

3.1	$\frac{5}{3} : \frac{8}{3} = 5 : 8✓✓$	Answer: 2 marks	(2)
3.2	Amount = $R155,50 \times \frac{6}{10}✓✓$ $= R93,30✓$	Calculation: 2 marks Answer: 1 mark	(3)
3.3	$p.n.i = SI ✓$ $3000(n)(0,8) = 960 ✓$ $n = 4 ✓$ or $A = P(1 + ni)✓$ $3960 = 3000(1 + 0,08n)✓$ $1,32 = 1 + 0,08n$ $0,32 = 0,08n$ $n = 4✓$	Formula: 1 mark Substitution: 1 mark Answer: 1 mark	(3)

3.4.	$A = P(1 + i)^n$ ✓ $A = R10\,000(1 + 0,1)^3$ ✓ $= R13\,310,00$ ✓	Formula: 1 mark Substitution: 1 mark Answer: 1 mark	(3)
------	--	---	-----

[11]

**QUESTION 4**

4.1	<table border="1" style="margin-left: 20px;"> <tr> <td>1</td> <td>2</td> <td>3</td> <td></td> </tr> <tr> <td>6</td> <td>9</td> <td>12</td> <td></td> </tr> </table> 15 matches ✓✓	1	2	3		6	9	12		Answer: 2 marks	(2)
1	2	3									
6	9	12									
4.2	$T_n = 3n + 3$ ✓✓	3n: 1 mark 3: 1 mark (1 mark per term)	(2)								
4.3	$T_{20} = 3(20) + 3 = 63$ ✓✓	Substitution: 1 mark Answer : 1 mark	(2)								

[6]

**QUESTION 5**

5.1	$P(3; 3)$ ✓	Answer: 1 mark	(1)
5.2	$\text{Gradient of } AD = \frac{4}{-2} = -2$ $\text{Equation of } AD \text{ is } y = -2x + 4$ ✓✓  $\text{Gradient of } BC = \frac{4}{-2} = -2$ $\text{Equation of } BC \text{ is } y = -2x - 4$ ✓✓	$-2x$ : 1 mark $4$ : 1 mark  $-2x$ : 1 mark $-4$ : 1 mark	(4)
5.3	$AD \parallel BC$ ✓ (because the Gradient of $AD =$ Gradient of $BC$ ) ✓	$AD \parallel BC$ : 1 mark Reason : 1 mark	(2)

[7]

### QUESTION 6

6.1	<p>In <math>\triangle AEW</math> :</p> $\hat{E}_2 + \hat{W}_1 = 110^\circ \text{ (sum of } \angle\text{s of } \triangle = 180^\circ)\checkmark$ <p>but <math>\hat{E}_2 = \hat{W}_1</math> (angles opp. equal sides of <math>\triangle</math>) <math>\checkmark</math></p> $= 55^\circ$ $x = \hat{W}_1 = 55^\circ \text{ (alt } \angle\text{s ; CS } \parallel \text{ HW)}\checkmark$	<p>Statement with reason: 1 mark</p> <p>Statement with reason: 1 mark</p> <p>Statement with reason: 1 mark</p>	(3)
6.2.1	<p>In <math>\triangle ABD</math> and <math>\triangle ACD</math></p> $AB = AC \text{ (given)}\checkmark$ $BD = CD \text{ (given)}\checkmark$ $AD = AD \text{ (common side)}\checkmark$ $\therefore \triangle ABD \equiv \triangle ACD \text{ (s,s,s)}\checkmark$	<p>statement with reason: 1 mark</p> <p>statement with reason: 1 mark</p> <p>statement with reason: 1 mark</p> <p>Correct case: 1 mark</p>	(4)
6.2.2	$\hat{A}_1 = \hat{A}_1 \text{ (corr } \angle\text{s of congruent } \triangle\text{s)}\checkmark$ <p>DA bisects <math>\hat{BAC}</math> <math>\checkmark</math></p>	<p>Correct statement with reason: 1 mark</p> <p>Conclusion: 1 mark</p>	(2)
6.3	$x + 50^\circ + 2x - 20^\circ = 180^\circ$ <p>(co-interior <math>\angle</math>e; <math>AB \parallel CD</math>) <math>\checkmark</math></p> $3x + 30^\circ = 180^\circ$ $3x = 150^\circ$ $x = 50^\circ \checkmark$ $\hat{B} + x + 50^\circ = 180^\circ$ <p>(co-interior <math>\angle</math>e; <math>AC \parallel BD</math>) <math>\checkmark</math></p> $\hat{B} + 100^\circ = 180^\circ$ $\hat{B} = 80^\circ \checkmark$	<p>Statement with reason: 1 mark</p> <p>Statement with reason: 1 mark</p> <p><math>x</math>: 1 mark</p> <p><math>B</math>: 1 mark</p>	(4)
6.4.1	<p>In <math>\triangle PQR</math> and <math>\triangle STR</math></p> $\hat{P} = \hat{RST} \text{ (corr. } \angle\text{s; } ST \parallel PQ)\checkmark$ $\hat{Q} = \hat{STR} \text{ (corr. } \angle\text{s; } ST \parallel PQ)\checkmark$ $\hat{R} = \hat{R} \text{ (common } \angle)\checkmark$ $\triangle PQR \equiv \triangle STR \text{ } (\angle, \angle, \angle)\checkmark$	<p>Correct statement with reason: 1 mark</p> <p>Correct statement with reason: 1 mark</p> <p>Correct statement with reason: 1 mark</p> <p>Correct case: 1 mark</p>	(4)
6.4.2	$2 \frac{PQ}{ST} = \frac{QR}{TR} = \frac{PR}{SR} \text{ (prop. sides of sim } \triangle\text{s)}\checkmark$ $\frac{PQ}{3} = \frac{10}{6}$ $PQ = \frac{5}{3} \times 3cm \checkmark$ $= 5cm \checkmark$	<p>Correct statement with reason: 1 mark</p> <p>Substitution &amp; calculation: 1 mark</p> <p>Answer: 1 mark</p>	(3)

### QUESTION 7

7.1	$AB^2 = 12^2 + 5^2 m^2$ (Pyth)✓ $AB^2 = 169 m^2$ ✓ $AB = 13m$ ✓	Formula/substitution: 1 mark Calculation: 1 mark Answer: 1 mark	(3)
7.2	Volume = $5000 cm^3$ $\pi r^2 h = 5000$ ✓ $\pi(20)^2 h = 5000$ ✓ $h = 4,0 cm$ ✓	Formula: 1 mark Substitution: 1 mark Answer: 1 mark	(3)
7.3.1	$AB^2 + AC^2 = 9 + 16 units^2$ ✓ $= 25 units^2$ ✓ & $BC^2 = 25 units^2$ ✓ $\therefore AB^2 + AC^2 = BC^2$ ✓ $\therefore ABC$ is right-angled at A	Correct statement : 1 mark Calculation: 2 marks Conclusion: 1 mark	(4)
7.3.2	$S\text{-area} = 2 \times \text{area}\Delta ABC + (AB + AC + BC) \cdot h$ ✓✓ $= \frac{2(3)(4)}{2} + (12)(12) cm^2$ ✓ $= 12 + 144 cm^2$ $= 156 cm^2$ ✓	Formula: 2 marks Substitution: 1 mark Answer: 1 mark	(4)

[14]

### QUESTION 8

8.1.1	$A(-2;2)$ ✓ $B(-5;-4)$ ✓ $C(1;-7)$ ✓ $D(4;-1)$ ✓	Answer: 1 mark per pair of coordinates	(4)
8.1.2	$A'(0;0)$ ✓ $B'(-3;-6)$ ✓ $C'(3;-9)$ ✓ $D'(6;-3)$ ✓	Answer: 1 mark per pair of coordinates	(4)
8.1.3	$C''(1;7)$ ✓✓	Answer: 2 marks	(2)
8.1.4	$B''(5;-4)$ ✓✓	Answer: 2 marks	(2)

[12]

**QUESTION 9**

9.1.	Class-interval	Tally marks	Frequency	For each correct interval: 2 marks	
	140-144	✓	4✓		
	145-149	✓	3 ✓		
	150-154	-    ✓	9✓		
	155-159	- ✓	6✓		
	160-164	-    ✓	10✓		
	165-169	✓	5✓		
	170-174	✓	3✓		
9.2.1	Range = 174 – 140 ✓ = 34✓			Answer:2 marks	(2)
9.2.2	160 – 164✓✓			Answer: 2marks	(2)
9.2.3	$i_{20} < median < i_{21}$ Class-interval 155 - 159✓✓			Answer: 2marks	(2)

[20]

**TOTAL: [140]**