



Education

KwaZulu-Natal Department of Education
REPUBLIC OF SOUTH AFRICA

MATHEMATICS

COMMON TEST

MARCH 2018

MARKING GUIDELINE

NATIONAL
SENIOR CERTIFICATE

GRADE 10

MARKS: 50

TIME: 1 hour

This marking guideline consists of 5 pages.

QUESTION 1

1.1.1	$(4r^2 - 2rp + p^2)(2r + p)$ $= 8r^3 + p^3$	$\checkmark 8r^3 \checkmark + p^3$	(2)
1.1.2	$\left(\frac{\sqrt{5}}{a^x}\right)\left(a - \frac{\sqrt{5}}{a^x}\right)$ $= a^2 - \frac{5}{a^{2x}}$	$\checkmark a^2 \checkmark - \frac{5}{a^{2x}}$	(2)
1.2.1	$\frac{ax^2 - a^2x}{x^2 - a^2} \times \frac{x^2 + ax - bx - ab}{ax}$ $= \frac{ax(x-a)}{(x-a)(x+a)} \times \frac{x(x+a) - b(x+a)}{ax}$ $= \frac{ax(x-a)}{(x-a)(x+a)} \times \frac{(x+a)(x-b)}{ax}$ $= x-b$	$\checkmark ax(x-a)$ $\checkmark (x-a)(x+a)$ $\checkmark (x+a)(x-b)$ $\checkmark (x-b)$	(4)
1.2.2	$\frac{1}{m^3} - \frac{1}{mn^2}$ $= \frac{n^2 - m^2}{m^3n^2}$ $= \frac{(n-m)(n+m)}{m^3n^2}$	$\checkmark m^3n^2$ denominator $\checkmark n^2 - m^2$ numerator \checkmark answer	(3) (11)

QUESTION 2

2.1	$\frac{18n \times 8n - 1}{9n4^{2m-5}}$ $= \frac{(3^2 \cdot 2)^n \times (2^2)^{m-5}}{3^{2m} \cdot 2^n \times 2^{3m-5}}$ $= \frac{3^{2n} \cdot 2^{2m-10}}{3^{2m} \cdot 2^{3m-5}}$ $= 2^3$ $= 8$	\checkmark prime bases \checkmark raising powers \checkmark answer	(3)
-----	---	--	-----

2.2.1	$x^2 = 512$ $x^2 = 2^9$ $x^{\frac{2}{2}} = (2^9)^{\frac{1}{2}}$ $x = 2^0$	✓ 2 prime base ✓ answer (2)
2.2.2	$3^{2002} - 3^{2000} = 8.3^x$ $3^{2000}3^2 - 3^{2000} = 8.3^x$ $3^{2000}(3^2 - 1) = 8.3^x$ $3^{2000}(8) = 8.3^x$ $3^{2000} = 3^x$ $x = 2000$	✓ $3^{2000}.3^2$ ✓ bracket i.e. $(3^2 - 1)$ ✓ answer (3)
2.3.1	$4^{x+y} = 64$ or $4^{x+y} = 4^3$ $(2^2)^{x+y} = 2^6$ or $x + y = 3$ $2^{2x+2y} = 2^6$ $2x + 2y = 6$ $x + y = 3$	✓ 2 common base ✓ equating exponents (2)
2.3.2	$3^{x^2-4} = 1$ $3^{x^2-4} = 3^0$ $x^2 - y^2 - 1 = 0$ $x - y^2 = 1$	✓ 3^0 (1)
2.3.3	$x + y = 3$ (1) $x - y = 1$ (2) $2x = 4$ $x = 2$ $2 + y = 3$ $y = 1$ $3^x 5^y = 3^2 5^1$ $= 45$	✓ solving simultaneously (any method) (1) + (2) ✓ $x = 2$ ✓ $y = 1$ ✓ answer (4) 15

QUESTION 3

3.1.1	$8x^2 + 14x - 15 = 0$ $(4x - 3)(2x + 5) = 0$ $x = \frac{3}{4}$ or $-\frac{5}{2}$	✓ factors ✓ $x = \frac{3}{4}$ or $-\frac{5}{2}$ (2)
3.1.2	$l = 2\pi \sqrt{\frac{x}{g}}$ $\frac{l}{2\pi} = \sqrt{\frac{x}{g}}$ $x = \frac{g l^2}{4\pi^2}$	✓ dividing by 2π or squaring both sides ✓ answer (2)
3.1.3	3.1.3.1 $x \in R$	✓ $x \in R$ (1)
	3.1.3.2 $x = 1$	✓ $x = 1$ (1)
3.2	$-8 \leq -2t < 18$ $-9 < t \leq 4$ $(-9; 4]$	✓ $-9 < t \leq 4$ ✓ $(-9; 4]$ (2) 8

QUESTION 4

4.1	13 tiles and 16 tiles	✓ 13 and 16 (1)
4.2	$T_n = 3n + 1$	✓ $3n$ ✓ $+1$ (2)
4.3	$T_{500} = 3(200) + 1$ $= 601$ tiles	✓ substitution ✓ answer (2)
4.4	$3n + 1 = 1000$ $3n = 999$ $n = 333$ There will be 1000 tiles in pattern 333.	✓ substitution ✓ answer (2) 7

QUESTION 5

5.1.1	$\sin \alpha = \frac{MN}{KN}$	✓ $\frac{MN}{KN}$	(1)
5.1.2	$\cot \beta = \frac{LM}{MN}$	✓ $\frac{LM}{MN}$	(1)
5.2	$\frac{\cos 30^\circ}{\cos \text{ec } 60^\circ}$ $= \frac{\left(\frac{\sqrt{3}}{2}\right)}{\left(\frac{2}{\sqrt{3}}\right)}$ $= \frac{\sqrt{3} \times \sqrt{3}}{2 \times 2}$ $= \frac{3}{4}$	✓ $\frac{\sqrt{3}}{2}$ ✓ $\frac{2}{\sqrt{3}}$ ✓ $\frac{3}{4}$	(3)

5.3	Height of Short Tree $\cos 40^\circ = \frac{8}{cx}$ $\therefore cx = \frac{8}{\cos 40^\circ}$ $cx = 10,44 \text{ m}$ Height of Tall Tree $\sin 40^\circ = \frac{\text{height of tall tree}}{30,44}$ $\text{height of tall tree} = \sin 40^\circ \times 30,44$ $= 19,57 \text{ m}$	✓ $\cos 40^\circ$ using correct trig ratio ✓ 10,44 m ✓ CA 30,44 m ✓ CA 19,57 m	(4) [9]
-----	--	--	------------

TOTAL MARKS: 50

