KWAZULU-NATAL PROVINCE

EDUCATION
REPUBLIC OF SOUTH AFRICA

# MATHEMATICS

# COMMON TEST

# MARCH 2024

# MARKING GUIDELINE

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## NATIONAL SENIOR CERTIFICATE

## GRADE 10

**MARKS:** 75

**This marking guideline consists of 6 pages.**

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GRADE 10
Marking Guideline

**QUESTION 1**

| | | | |
|---|---|---|---|
| 1.1.1 | Irrational | ✓answer | (1) |
| 1.1.2 | Rational | ✓answer | (1) |
| 1.1.3 | Rational | ✓answer | (1) |
| 1.1.4 | Rational | ✓answer | (1) |
| 1.2 | $\sqrt{4}$ and $\sqrt{9}$<br>=2 and 3 | ✓ $\sqrt{4}$ and $\sqrt{9}$<br>✓both answers | (2) |
| 1.3 | Let $0,11111..... = k$<br>$1,11111..... = 10k$<br>$9k = 1$<br>$k = \frac{1}{9}$ | ✓$1,11111..... = 10k$<br>✓$k = \frac{1}{9}$ | (2) |
| 1.4.1 | $= (x-2)(x^2+2x+4)$ | ✓$(x-2)$<br>✓$(x^2+2x+4)$ | (2) |
| 1.4.2 | $= x^2(2x+1)-3(2x+1)$<br>$= (x^2-3)(2x+1)$ | ✓✓each term<br>✓answer | (3) |
| 1.4.3 | $(x^2-4)(x^2+4)$<br>$= (x-2)(x+2)(x^2+4)$ | ✓$(x^2-4)(x^2+4)$<br>✓✓$(x-2)(x+2)(x^2+4)$ | (3) |
| 1.5.1 | $= 2x^3-4x^2+2x-x^2+2x-1$<br>$= 2x^3-5x^2+4x-1$ | ✓simplification<br>✓answer<br>Answer only: full marks | (2) |
| 1.5.2 | $= (3x+5)(3x+5)$<br>$= 9x^2+15x+15x+25$<br>$= 9x^2+30x+25$ | ✓expansion<br>✓$9x^2+15x+15x+25$<br>✓ answer | (3) |
| 1.5.3 | $= \frac{2^x-2^x.2^{-2}}{2^x.2-2^x}$<br>$= \frac{2^x(1-2^{-2})}{2^x(2-1)}$<br>$= 1-\frac{1}{4}$<br>$= \frac{3}{4}$ | ✓factors<br>✓common factor<br>✓$\frac{1}{4}$<br>✓$\frac{3}{4}$ | (4) |

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|---|---|---|---|
| 1.5.4 | $=\frac{3}{a-4}+\frac{2}{a+3}-\frac{21}{(a-4)(a+3)}$<br>$=\frac{3(a+3)+2(a-4)-21}{(a-4)(a+3)}$<br>$=\frac{3a+9+2a-8-21}{(a-4)(a+3)}$<br>$=\frac{5a-20}{(a-4)(a+3)}$<br>$=\frac{5(a-4)}{(a-4)(a+3)}$<br>$=\frac{5}{a+3}$ | ✓factorisation of a quadratic trinomial<br>✓finding the LCD and the simplification of the numerator<br>✓simplification<br>✓factorising the numerator<br>✓answer | (5) |
| | | | **[29]** |

**QUESTION 2**

| | | | |
|---|---|---|---|
| 2.1.1 | $x=-3$ or $x=1$ | ✓✓each answer | (2) |
| 2.1.2 | $(2x-1)(x-2)=0$<br>$x=\frac{1}{2}$ or $x=2$ | ✓factors<br>✓✓each answer | (3) |
| 2.1.3 | $2^{3x-1}=2^6$<br>$3x-1=6$<br>$3x=7$<br>$x=\frac{7}{3}$ | ✓$2^6$<br>✓equating exponents<br>✓answer | (3) |
| 2.1.4 | $(3^3)^{x-2}=(3^4)^{2x+1}$<br>$3^{3x-6}=3^{8x+4}$<br>$3x-6=8x+4$<br>$x=-2$ | ✓$(3^3)^{x-2}=(3^4)^{2x+1}$<br>✓simplification<br>✓equating exponents<br>✓answer | (4) |
| 2.2 | $-6<2x\leq 2$<br>$-3<x\leq 1$<br>$x\in(-3;1]$ | ✓transposing<br>✓$-3<x\leq 1$<br>✓✓each end | (4) |
| 2.3 | $x+3y-5=0 \ldots\ldots\ldots\ldots\ldots\rightarrow(1)$<br>$2x-6y+2=0 \ldots\ldots\ldots\ldots\ldots\rightarrow(2)$<br>From equation (1)<br>$x=5-3y \ldots\ldots\ldots\ldots\ldots\rightarrow(3)$ | ✓making $x$ the subject of the formula | |

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|---|---|---|---|
| | Substitute eq. (3) into eq. (2)<br>$2(5-3y)-6y+2=0$<br>$10-6y-6y+2=0$<br>$y=1$<br>$x=5-3(1)$<br>$x=2$<br>$(2;1)$<br><br>**OR**<br>$x+3y-5=0 \ldots\ldots\ldots\ldots\ldots \rightarrow (1)$<br>$2x-6y+2=0 \ldots\ldots\ldots\ldots\ldots \rightarrow (2)$<br>Multiply eq. (1) by $-2$<br>$-2x-6y+10=0 \ldots\ldots\ldots \rightarrow (3)$<br>$2x-6y+2=0 \ldots\ldots\ldots\ldots \rightarrow (2)$<br>Add eq. (3) and eq. (4)<br>$12y-12=0$<br>$y=1$<br>$x=5-3(1)$<br>$x=2$<br>$(2;1)$ | ✓substitution<br>✓simplification<br>✓ $y$ -value<br><br>✓ $x$ -value<br><br><br><br>✓multiplying eq(1) by $-2$<br><br><br>✓eliminating $x$<br>✓simplification<br><br>✓ $y$ -value<br><br>✓ $x$ -value | (5)<br><br>(5) |
| 2.4 | Let the smaller number be: $x$<br>and the bigger number be: $y$<br>$y-x=5 \ldots\ldots\ldots\ldots \rightarrow (1)$<br>$6x=4y \ldots\ldots\ldots \rightarrow (2)$<br>From eq(1)<br>$y=x+5 \ldots\ldots\ldots\ldots (3)$<br>Subst. (3) into (2)<br>$6x=4(x+5)$<br>$6x=4x+20$<br>$x=10$<br>$y=15$<br>**OR**<br>From eq(1)<br>$x=y-5 \ldots\ldots\ldots\ldots \rightarrow (3)$<br>Subst. (3) into (2)<br>$6(y-5)=4y$<br>$6y-30=4y$<br>$y=15$<br>$x=10$<br>**OR** | ✓$y$-subject of formula<br>✓substitution<br>✓$x$-value<br>✓$y$-value<br><br>✓$x$-subject of the formula<br>✓substitution<br>✓$y$-value<br>✓$x$-value | (4)<br><br>(4) |

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|---|---|---|---|
| | From eq(2)<br>$y=\frac{3}{2}x.....\rightarrow(3)$<br>Subst. eq(3) into eq(1)<br>$\frac{3}{2}x-x=5$<br>$\frac{1}{2}x=5$<br>$x=10$<br>$y=15$ | ✓$y$-subject of formula<br>✓substitution<br>✓$x$-value<br>✓$y$-value | (4) |
| 2.5 | $RHS=\frac{1+3^x}{1+3^x-1}$<br>$=\frac{1+3^x}{3^x}$<br>$=\frac{1}{3^x}+\frac{3^x}{3^x}$<br>$=3^{-x}+1$<br>**OR**<br>$LHS=1+\frac{1}{3^x}$<br>$=\frac{3^x+1}{3^x}$<br>$RHS=\frac{1+3^x}{1+3^x-1}$<br>$=\frac{1+3^x}{3^x}$<br>$\therefore LHS=RHS$ | ✓substitution<br>✓$\frac{1}{3^x}+\frac{3^x}{3^x}$<br>✓$3^{-x}+1$<br>✓finding the L.C.D<br>✓substitution<br>✓ answer | (3) |
| | | | **[28]** |

**QUESTION 3**

| | | | |
|---|---|---|---|
| 3.1.1(a) | $\tan\theta=\frac{s}{q}$ | ✓answer | (1) |
| 3.1.1(b) | $-\sin\theta=-\frac{s}{p}$ | ✓answer | (1) |
| 3.1.1(c) | $=\left(\frac{p}{q}\right)^2$<br>$=\frac{p^2}{q^2}$ | ✓substitution<br>✓answer<br>Answer only: full marks | (2) |

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|---|---|---|---|
| 3.1.2 | $\cos 35° = \frac{q}{12}$<br>$q = 9,83$ | ✓trig. ratio<br>✓answer | (2) |

| | | | |
|---|---|---|---|
| 3.2.1 | $= \sin(20° + 55°)$<br>$= 0,97$ | ✓substitution<br>✓answer<br>Answer only: full marks | (2) |
| 3.2.2 | $= (\tan 55°)^2$<br>$= 2,04$ | ✓substitution<br>✓answer | (2) |
| 3.2.3 | =2cosec20°+sin5(55°)<br>$= \frac{2}{\sin 20°} + \sin 5(55°)$<br>$= 4,85$ | ✓substitution<br>✓$\frac{2}{\sin 20°}$<br>✓answer | (3) |
| 3.2.4 | $= \frac{\frac{\sqrt{2}}{2} \cdot \left(\frac{\sqrt{3}}{1}\right)^2}{\frac{\sqrt{2}}{2}} + \frac{1}{2}$<br>$= 3\frac{1}{2}$ | ✓$\frac{\sqrt{2}}{2}$ ✓$\left(\frac{\sqrt{3}}{1}\right)^2$<br>✓$\frac{\sqrt{2}}{2}$<br>✓$\frac{1}{2}$<br>✓answer | (5) |
| | | | **[18]** |

**TOTAL: 75**

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