KWAZULU-NATAL PROVINCE

EDUCATION

REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 10

MATHEMATICS

COMMON TEST

MARCH 2023

MARKING GUIDELINE

MARKS: 75

This marking guideline consists of 5 pages.

Stanmorephysics

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GRADE 10
Marking Guideline

QUESTION 1

1.1.1	$x=2$	✓answer	(1)
1.1.2	$x=4$	✓answer	(1)
1.1.3	$x=-2$	✓answer	(1)
1.1.4	$x=5$	✓answer	(1)
1.2	$\sqrt[3]{27}<\sqrt[3]{40}<\sqrt[3]{64}$ $=3<\sqrt[3]{40}<4$	✓radical form ✓answer	(2)
1.3.1	$=(x^2-4)(x^2+4)$ $=(x-2)(x+2)(x^2+4)$	✓both factors ✓both factors	(2)
1.3.2	$=2zy(3z-5)+5(3z-5)$ $=(2zy+5)(3z-5)$	✓✓each term ✓answer	(3)
1.4.1	$=m^3+4m^2n+16mn^2-4m^2n-16mn^2-64n^3$ $=m^3-64n^3$	✓simplification ✓answer Answer only: full marks	(2)
1.4.2	$=\left(2x-\frac{3}{x}\right)\left(2x-\frac{3}{x}\right)$ $=4x^2-12+\frac{9}{x^2}$	✓expansion ✓answer	(2)
1.4.3	$=\frac{x^2-4x}{(x-1)(x^2+x+1)}-\frac{1}{x-1}-\frac{2}{x^2+x+1}$ $=\frac{x^2-4x-x^2-x-1-2(x-1)}{(x-1)(x^2+x+1)}$ $=\frac{-5x-1-2x+2}{(x-1)(x^2+x+1)}$ $=\frac{1-7x}{(x-1)(x^2+x+1)}$	✓factorisation of difference of cubes ✓✓finding the LCD and the simplification of the numerator ✓simplification ✓answer	(5)
1.5	$=\frac{2022+1}{(2022-1)(2022+1)}$ $=\frac{1}{2021}$ OR	✓factorising a denominator ✓answer	(2)
1.5	Let 2022 be: x $=\frac{x+1}{(x-1)(x+1)}$ $=\frac{1}{2021}$	✓factorisation ✓answer	(2)
			[23]

QUESTION 2

2.1.1	$3x^2-5x-12=0$ $(3x+4)(x-3)=0$ $x=-\frac{4}{3}$ or $x=3$	✓standard form ✓factorisation ✓answer	(3)
2.1.2	$\left(2^{-1}\right)^{x-1}=2^7$ $2^{-x+1}=2^7$ $x=-6$	✓exponential form ✓simplification ✓answer	(3)
2.1.3	$x^{\frac{1}{5}}=32$ $x=\left(2^5\right)^{\frac{1}{5}}$ $x=2^4$ $x=16$	✓dividing ✓$\left(2^5\right)^{\frac{1}{5}}$ ✓answer	(3)
2.2	$-4<-2x\leq 6$ $-3\leq x<2$ 	✓transposing✓dividing ✓answer ✓number line	(4)
2.3	$x+3y+5=0$.....$\rightarrow(1)$ $3x-2y=-4$.....$\rightarrow(2)$ From equation (1) $x=3y-5$.....$\rightarrow(3)$ Substitute eq. (3) into eq. (2) $3(-3y-5)-2y=-4$ $-9y-15-2y=-4$ $y=-1$ $x=-3(-1)-5$ $x=-2$ $(-2;-1)$ OR $x+3y+5=0$.....$\rightarrow(1)$ $3x-2y=-4$.....$\rightarrow(2)$ Multiply eq. (1) by -3 $-3x-9y=15$.....$\rightarrow(3)$ $3x-2y=-4$.....$\rightarrow(2)$ Add eq. (2) and eq. (3)	✓making x the subject of the formula ✓substitution ✓simplification ✓ y -value ✓ x -value ✓multiplying by -3 ✓eliminating x	(5)

	$-11y=11$ $y=-1$ $x+3(-1)+5=0$ $x=-2$ $(-2;-1)$ 	✓simplification ✓ y -value ✓ x -value	(5)
2.4	Let the first number be: x and the second number be: y $xy=60 \ldots\ldots\ldots\ldots \rightarrow (1)$ $x+y=15 \ldots\ldots\ldots \rightarrow (2)$ the sum of their reciprocals is $\frac{1}{x}+\frac{1}{y}=\frac{y+x}{xy}$ since $x+y=15$ and $xy=60$ $\therefore \frac{1}{x}+\frac{1}{y}=\frac{15}{60}=\frac{1}{4}$ $\therefore$ the sum of their reciprocals is $\frac{1}{4}$.	✓equation 1 ✓equation 2 ✓adding reciprocals ✓finding the LCD ✓substitution	(5)
			[23]

QUESTION 3

3.1.1	$\cos\theta=\frac{5}{\sqrt{74}}$	✓answer	(1)
3.1.2	$\cot\theta=\frac{5}{7}$	✓answer	(1)
3.1.3	$\text{cosec}^2\theta=\left(\frac{\sqrt{74}}{7}\right)^2=\frac{74}{49}$	✓substitution ✓answer Answer only: full marks	(2)
3.1.4	$\cos\theta=\frac{5}{\sqrt{74}}$ $\theta=54,46^\circ$	✓✓answer	(2)
3.2.1	$x^2=(13)^2-(12)^2 \quad (Pythagoras)$ $x=-5$	✓substitution ✓answer	(2)
3.2.2	$\sec\theta=-\frac{13}{5}$	✓answer	(1)
3.2.3	$5\tan\theta+1=5\left(-\frac{12}{5}\right)+1=-11$	✓substitution ✓answer	(2)
			[11]

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QUESTION 4

4.1.1	$3x = 80,13^\circ$ $x = 26,71^\circ$	✓$80,13^\circ$ ✓answer Answer only: full marks	(2)
4.1.2	$\frac{1}{\sin\left(x-35^\circ\right)} = 7,814$ $\sin\left(x-35^\circ\right) = \frac{1}{7,814}$ $x = 42,35^\circ$	✓$\frac{1}{\sin\left(x-35^\circ\right)}$ ✓cross multiplication ✓answer	(3)
4.1.3	$\cos\left(2x+10^\circ\right) = 0,477$ $2x+10 = 61,51^\circ$ $x = 25,76^\circ$	✓$\cos\left(2x+10^\circ\right) = 0,477$ ✓$2x+10 = 61,51^\circ$ ✓answer	(3)
4.2.1	$= \tan\left(70^\circ + 40^\circ\right)$ $= -2,7$	✓substitution ✓answer Answer only: full marks	(2)
4.2.2	$= \left(\sin 70^\circ\right)^2$ $= 0,9$	✓substitution ✓answer	(2)
4.2.3	$= \sqrt[3]{\frac{2}{\cos\left(\frac{3\left(40^\circ\right)}{2}\right)}}$ $= 1,6$	✓substitution ✓answer	(2)
4.4	$= \frac{\left(\frac{\sqrt{3}}{3}\right)^2 (1)\left(\frac{1}{2}\right)}{\left(\frac{1}{2}\right)}$ $= \frac{1}{3}$	✓$\left(\frac{\sqrt{3}}{3}\right)^2$ ✓(1) ✓$\left(\frac{1}{2}\right)$ ✓$\left(\frac{1}{2}\right)$ ✓answer	(5)
			[19]

TOTAL: 75

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