



KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE**

GRADE 10

MATHEMATICS
COMMON ASSESSMENT TASK

MARCH 2025

Stanmorephysics.com

MARKS: 75

TIME: $1\frac{1}{2}$ hours

This question paper consists of 5 pages.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. This question paper consists of 3 questions.
2. Answer ALL the questions.
3. Number the answers correctly according to the numbering system used in this question paper.
4. Clearly show ALL calculations, diagrams, graphs, etc. which you have used in determining your answers.
5. Answers only will NOT necessarily be awarded full marks.
6. You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
7. If necessary, round off answers correct to TWO decimal places, unless stated otherwise.
8. Write neatly and legibly.

QUESTION 1

- 1.1 If $x \in \{0; 7; 9\}$, choose the value of x from the given set that will make the expression of $\sqrt{x-5}$ be:
- 1.1.1 Rational (1)
- 1.1.2 Irrational (1)
- 1.1.3 Non-real (1)
- 1.2 Between which two consecutive integers does $\sqrt{170}$ lie? Show all working details without the use of a calculator. (2)
- 1.3 Simplify the following fully:
- 1.3.1 $(x-2y)(x^2+2xy+4y^2)$ (2)
- 1.3.2 $(5-4x)^2$ (2)
- 1.3.3 $\frac{3}{x^2-9} + \frac{2}{x-3} - \frac{1}{x+3}$ (4)
- 1.3.4 $\frac{10^{2x+3} \cdot 4^{1-x}}{25^{2+x}}$ (4)
- 1.4 Factorise the following expressions fully:
- 1.4.1 $2x^2 - 18$ (2)
- 1.4.2 $8 + 125a^3$ (3)
- 1.4.3 $x^3 - 2x^2 + 5x - 10$ (3)
- 1.5 If $2^x = 3$, evaluate:
- 1.5.1 2^{-x} (1)
- 1.5.2 8^x (2)
- 1.5.3 $\left(\frac{1}{16}\right)^x$ (3)

[31]

QUESTION 2

2.1 Solve for x .

2.1.1 $3x(x-8) = 0$

(2)

2.1.2 $7x^2 - 5x - 2 = 0$

(3)

2.1.3 $3^{5x-4} - 729 = 0$

(3)

2.1.4 $2x^{\frac{-3}{2}} = 128$

(4)

2.1.5 $2^{x+1} + 2^{x-1} = 20$

(5)

2.2 If $(a^3 + 2a^{-3})^2 = (a^3 + 2a^{-3})^2 + b$, calculate the value of b .

(4)

2.3 Given: $-9 \leq -2x + 3 < 5$ 2.3.1 Solve for x .

(2)

2.3.2 Represent the solution of 2.3.1 on a number line.

(2)

2.4 Solve for x and y simultaneously:

$2x - y = 17$

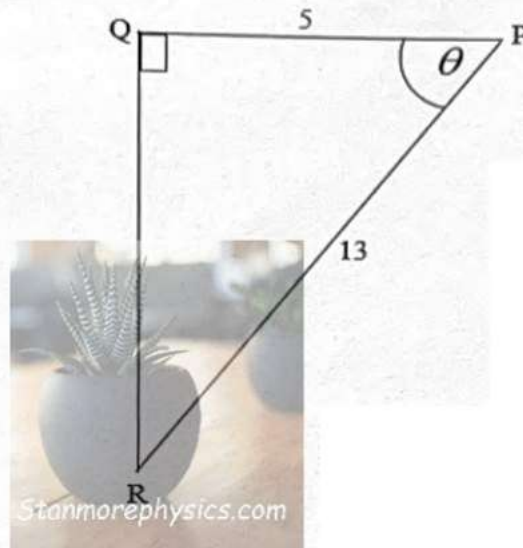
$4y + 3x = 9$

(4)

[29]

QUESTION 3

- 3.1 In the diagram below, $\triangle PQR$ is a right-angled triangle, $\hat{Q} = 90^\circ$, $\hat{P} = \theta$, $PQ = 5$ units and $PR = 13$ units.



- 3.1.1 Determine the numerical value of:

- (a) QR (2)
- (b) $\cos \theta$ (1)
- (c) $\cot \theta$ (1)
- (d) $\sec \hat{QRP}$ (1)

- 3.1.2 Write down the trigonometric ratio that is equal to $\frac{QR}{PR}$. (1)

- 3.2 If $\hat{A} = 34^\circ$ and $\hat{B} = 53^\circ$, use your calculator to evaluate the following (correct to TWO decimal places).

3.2.1 $\cos(B - A)$ (2)

3.2.2 $\sin^2 B$ (2)

- 3.3 Without using a calculator, determine the value of:

$$\frac{\operatorname{cosec} 45^\circ \cdot \sin 60^\circ}{\sin 45^\circ \cdot \cos 30^\circ} \quad (5)$$

TOTAL: [15]
75



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GRADE 10





MATHEMATICS
COMMON TEST
MARCH 2025
MARKING GUIDELINE


MARKS: 75

This marking guideline consists of 9 pages.

QUESTION 1

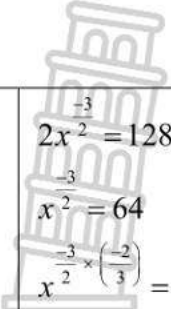

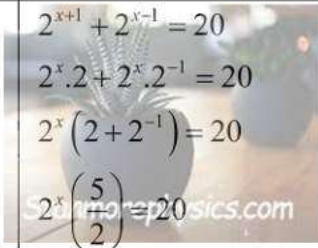
1.1.1	9	✓A	(1)
1.1.2	7	✓A	(1)
1.1.3	0	✓A	(1)
1.2	$\sqrt{169} < \sqrt{170} < \sqrt{196}$ $13 < \sqrt{170} < 14$	✓A square root of perfect sq. ✓A answers	(2)
1.3.1	$(x-2y)(x^2+2xy+4y^2)$ $= x^3 + 2x^2y + 4xy^2 - 2x^2y - 4xy^2x^3 - 8y^3$ $= x^3 - 8y^3$	✓A removing brackets ✓CA answer	(2)
1.3.2	$(5-4x)^2$ $= (5-4x)(5-4x)$ $= 25 - 20x - 20x + 16x^2$ $= 25 - 40x + 16x^2$	✓A removing brackets ✓CA answer	(2)
1.3.3	$\frac{3}{x^2-9} + \frac{2}{x-3} - \frac{1}{x+3}$ $= \frac{3}{(x+3)(x-3)} + \frac{2}{x-3} - \frac{1}{x+3}$ $= \frac{3+2(x+3)-1(x-3)}{(x+3)(x-3)}$ $= \frac{3+2x+6-x+3}{(x+3)(x-3)}$ $= \frac{x+12}{(x+3)(x-3)}$	✓A $(x+3)(x-3)$ ✓A numerator ✓CA simplification ✓CA answer	(4)



1.3.4	$\frac{10^{2x+3} \cdot 4^{1-x}}{25^{2+x}}$ $= \frac{(5 \cdot 2)^{2x+3} \cdot (2^2)^{1-x}}{(5^2)^{2+x}}$ $= \frac{5^{2x+3} \cdot 2^{2x+3} \cdot 2^{2-2x}}{5^{4+2x}}$ $= 5^{2x+3-4-2x} \cdot 2^{2x+3+2-2x}$ $= 5^{-1} \cdot 2^5$ $= \frac{32}{5}$		<p>✓A prime bases</p> <p>✓CA removing brackets</p> <p>✓CA simplification</p> <p>✓CA answer</p>	(4)
1.4.1	$2x^2 - 18$ $= 2(x^2 - 9)$ $= 2(x-3)(x+3)$		<p>✓A common factor</p> <p>✓CA answer</p>	(2)
1.4.2	$8 + 125a^3$ $= (2 + 5a)(4 - 10a + 25a^2)$		<p>✓A $(2 + 5a)$</p> <p>✓A $-10a$</p> <p>✓A $(4 \dots + 25a^2)$</p>	(3)
1.4.3	$x^3 - 2x^2 + 5x - 10$ $= x^2(x-2) + 5(x-2)$ $= (x^2 + 5)(x-2)$		<p>✓A grouping</p> <p>✓A $(x^2 + 5)$</p> <p>✓CA $(x-2)$</p>	(3)
1.5.1	2^{-x} $= \frac{1}{2^x}$ $= \frac{1}{3}$		<p>✓A answer</p>	(1)
1.5.2	8^x $= 2^{3x}$ $= (2^x)^3$ $= (3)^3$ $= 27$		<p>✓A $(2^x)^3$</p> <p>✓A answer</p>	(2)

1.5.3	$\left(\frac{1}{16}\right)^x$ $= \left(\frac{1}{2^4}\right)^x$ $= (2^{-4})^x$ $= (2^x)^{-4}$ $= (3)^{-4}$ $= 3^{-4}$ $= \frac{1}{81}$ 	<p>✓A 2^{-4}</p> <p>✓CA simplification</p> <p>✓CA answer</p>	(3)
			[31]

QUESTION 2

2.1.1	$3x(x-8) = 0$ $x = 0 \text{ or } x = 8$	<p>✓A</p> <p>✓A</p>	(2)
2.1.2	$7x^2 - 5x - 2 = 0$ $(7x+2)(x-1) = 0$ $x = \frac{-2}{7} \text{ or } x = 1$	<p>✓A factors</p> <p>✓CA ✓CA</p>	(3)
2.1.3	$3^{5x-4} - 729 = 0$ $3^{5x-4} = 729$ $3^{5x-4} = 3^6$ $5x - 4 = 6$ $5x = 10$ $x = 2$	<p>✓A prime base</p> <p>✓CA simplification</p> <p>✓CA answer</p>	(3)

<p>2.1.4</p>	 $2x^{-3} = 128$ $x^{-3} = 64$ $x^{-3} \times \left(\frac{-2}{3}\right) = 2^6 \times \left(\frac{-2}{3}\right)$ $x = 2^{-4}$ $x = \frac{1}{16}$ <p>OR</p> $2x^{-3} = 128$ $x^{-3} = 64$ $x^{-3} \times \left(\frac{-2}{3}\right) = 64 \times \left(\frac{-2}{3}\right)$ $x = \frac{1}{16}$ 	<p>✓A division by 2</p> <p>✓A × reciprocal of exp.</p> <p>✓CA 2^{-4}</p> <p>✓CA answer</p> <p>✓A division by 2</p> <p>✓A × reciprocal of exp.</p> <p>✓CA ✓CA answer</p>	<p>(4)</p>
<p>2.1.5</p>	 $2^{x+1} + 2^{x-1} = 20$ $2^x \cdot 2 + 2^x \cdot 2^{-1} = 20$ $2^x (2 + 2^{-1}) = 20$ $2^x \left(\frac{5}{2}\right) = 20$ $2^x = 8$ $2^x = 2^3$ $x = 3$	<p>✓A common factor</p> <p>✓CA simplification</p> <p>✓CA division by $\frac{5}{2}$</p> <p>✓CA prime bases</p> <p>✓CA answer</p>	<p>(5)</p>
<p>2.2</p>	$(a^3 + 2a^{-3})^2 = (a^3 - 2a^{-3})^2 + b$ $(a^3 + 2a^{-3})^2 - (a^3 - 2a^{-3})^2 = b$ $[(a^3 + 2a^{-3}) + (a^3 - 2a^{-3})][(a^3 + 2a^{-3}) - (a^3 - 2a^{-3})] = b$ $(a^3 + 2a^{-3} + a^3 - 2a^{-3})(a^3 + 2a^{-3} - a^3 + 2a^{-3}) = b$ $(2a^3)(4a^{-3}) = b$ $8 = b$	<p>✓A factorising</p> <p>✓CA simplification</p> <p>✓CA simplification</p> <p>✓CA answer</p>	



	<p>OR</p> $(a^3 + 2a^{-3})^2 - (a^3 - 2a^{-3})^2 = b$ $a^6 + 4 + 4a^{-6} - (a^6 - 4 + 4a^{-6}) = b$ $a^6 + 4 + 4a^{-6} - a^6 + 4 - 4a^{-6} = b$ $8 = b$	<p>✓A $a^6 + 4 + 4a^{-6}$ ✓A $a^6 - 4 + 4a^{-6}$ ✓CA simplification ✓CA answer</p>	(4)
2.3.1	$-9 \leq -2x + 3 < 5$ $-9 - 3 \leq -2x < 5 - 3$ $-12 \leq -2x < 2$ $\therefore -1 < x \leq 6$ 	<p>✓A simplification ✓CA answer</p>	(2)
2.3.2		<p>✓CA critical values ✓CA ○ ●</p>	(2)
2.4	$2x - y = 17 \dots \dots \dots \text{equation 1}$ $4y + 3x = 9 \dots \dots \dots \text{equation 2}$ $y = 2x - 17 \dots \dots \dots \text{equation 3}$ <p>substitute equation 3 into equation 2</p> $4(2x - 17) + 3x = 9$ $8x - 68 + 3x = 9$ $11x = 77$ $\therefore x = 7$ <p>substitute x - value into equation 3</p> $y = 2(7) - 17$ $y = -3$ <p>OR</p>	<p>✓A equation 3 ✓CA substitution ✓CA value of x ✓CA value of y</p>	

<p> $2x - y = 17$.....equation 1 $4y + 3x = 9$.....equation 2 $x = \frac{y+17}{2}$.....equation 3 substitute equation 3 into equation 2 $4y + 3\left(\frac{y+17}{2}\right) = 9$ $4y + \frac{3y+51}{2} = 9$ $8y + 3y + 51 = 18$ $11y = -33$ $y = -3$ substitute y - value into equation 3 $x = \frac{(-3)+17}{2}$ $x = 7$ OR $2x - y = 17$.....equation 1 $4y + 3x = 9$.....equation 2 multiply equation (1) by 4 $8x - 4y = 68$ $\therefore 4y = 8x - 68$ but $4y = 9 - 3x$ from equation 1 $\therefore 8x - 68 = 9 - 3x$ $11x = 77$ $x = 7$ substitute x - value into equation 1 $2(7) - y = 17$ $y = 3$ </p>	<p> \checkmarkA equation 3 \checkmarkCA substitution \checkmarkCA value of y \checkmarkCA value of x \checkmarkA $4y = 8x - 68$ \checkmarkCA equating \checkmarkCA value of x \checkmarkCA value of y </p>	<p>(4) [29]</p>
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QUESTION 3

3.1.1a	$PR^2 = QR^2 + QP^2 \quad \text{Pythag}$ $13^2 = QR^2 + 5^2$ $\sqrt{QR^2} = \sqrt{13^2 - 5^2}$ $QR = 12$ <p style="text-align: center;">ANSWER ONLY: FULL MARKS</p>	✓A correct substitution ✓CA answer	(2)
3.1.1b	$\cos \theta = \frac{5}{13}$	✓A	(1)
3.1.1c	$\cot \theta = \frac{5}{12}$	✓CA	(1)
3.1.1d	$\sec \hat{QRP} = \frac{13}{12}$	✓CA	(1)
3.1.2	$\sin \theta = \frac{QR}{PR} \quad \text{OR} \quad \cos \hat{QRP} = \frac{QR}{PR}$	✓A	(1)
3.2.1	$\cos(53^\circ - 34^\circ)$ $= 0,95$ <p style="text-align: center;">PENALISE HERE FOR ROUNDING</p>	✓A correct substitution ✓CA	(2)
3.2.2	$\sin^2 B$ $= (\sin 53^\circ)^2$ $= 0,64$	✓A correct substitution ✓CA	(2)
3.3	$\frac{2}{\sqrt{2}} \times \frac{\sqrt{3}}{2}$ $= \frac{\sqrt{2}}{\sqrt{2}} \times \frac{\sqrt{3}}{2}$ $= \frac{2}{\sqrt{2}} \times \frac{2}{\sqrt{2}}$ $= 2$	✓A $\operatorname{cosec} 45^\circ = \frac{2}{\sqrt{2}}$ ✓A $\sin 45^\circ = \frac{\sqrt{2}}{2}$ ✓A $\cos 30^\circ = \frac{\sqrt{3}}{2}$ ✓CA simplification ✓CA answer	

NSC
Marking Guideline

<p>OR</p> $\frac{\sqrt{2} \times \frac{\sqrt{3}}{2}}{1 \times \frac{\sqrt{3}}{2}}$ $= \sqrt{2} \times \frac{\sqrt{2}}{1}$ $= 2$	 <p>Stanmorephysics.com</p>	 <p>✓A cosec 45° = √2 ✓A sin 45° = 1/√2 ✓A cos 30° = √3/2</p> <p>Stanmorephysics.com</p> <p>✓CA simplification ✓CA answer</p>	<p>(5)</p>
			<p>[15]</p>
		<p>TOTAL:</p>	<p>75</p>