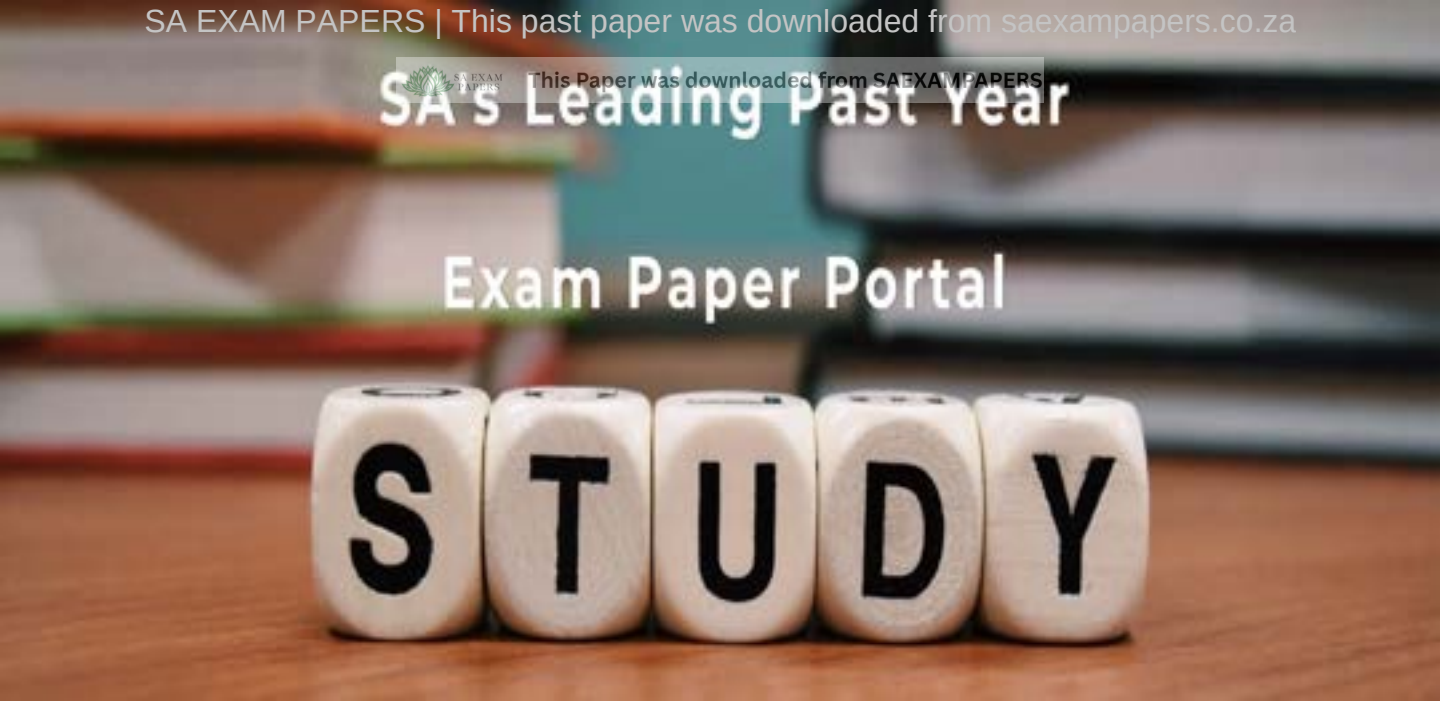


Province of the
EASTERN CAPE
EDUCATION

OR TAMBO COASTAL DISTRICT

NATIONAL SENIOR CERTIFICATE

GRADE 12

MATHEMATICS MARCH TEST 2026

MARKS: **100**

TIME: **2 HOURS**

This question paper consists of 11 pages

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1 This question paper consists of 8 questions three diagram sheets and formular sheet.

2 Answer ALL the questions.

3 Clearly show ALL calculations, diagrams, graphs, et cetera, that you have used in determining your answers.

4 An approved scientific calculator (non-programmable and non-graphical) may be used, unless stated otherwise.

5 If necessary, ALL answers should be rounded off to TWO decimal places, unless stated otherwise.

6 Number the answers correctly according to the numbering system used in this question paper.

7 Diagrams are NOT necessarily drawn to scale.

8 Write neatly and legibly.

QUESTION 1

Given the quadratic pattern: 5;12;21; 32;…

1.1 Determine the general term T_n of the pattern. (4)

1.2 Calculate the value of the 25^{th} term. (2)

1.3 Which term of the sequence has the value of 1152? (4)

1.4 Show that the difference between any two consecutive terms will always be an odd number (3)

[13]

QUESTION 2

2.1 The sum of the first *n* terms of an arithmetic series is $S_n = \frac{3n^2 - 5n}{2}$

2.1.1 Determine the first three terms of the sequence. (3)

2.1.2 Calculate the 20th term (T_{20}) using the S_n formula. (3)

2.2 For which value(s) of *k* will $\sum_{i=1}^{\infty} 4(k-1)^i$ converges. (3)

2.3 Given a geometric series with first term *a* and common ratio *r*. (5)
Let S_n be the sum of the first *n* terms and S_{2n} be the sum of the first *2n* terms.
Prove that the sum of the terms from T_{n+1} to T_{2n} is given by $S_n.r^n$

[14]

QUESTION 3

Given $f(x)=\frac{2}{x-1}+3$

3.1 Write down the equation:

3.1.1 Vertical asymptote (1)

3.1.2 Horizontal asymptote (1)

3.2 Calculate the x and y intercepts of f. (3)

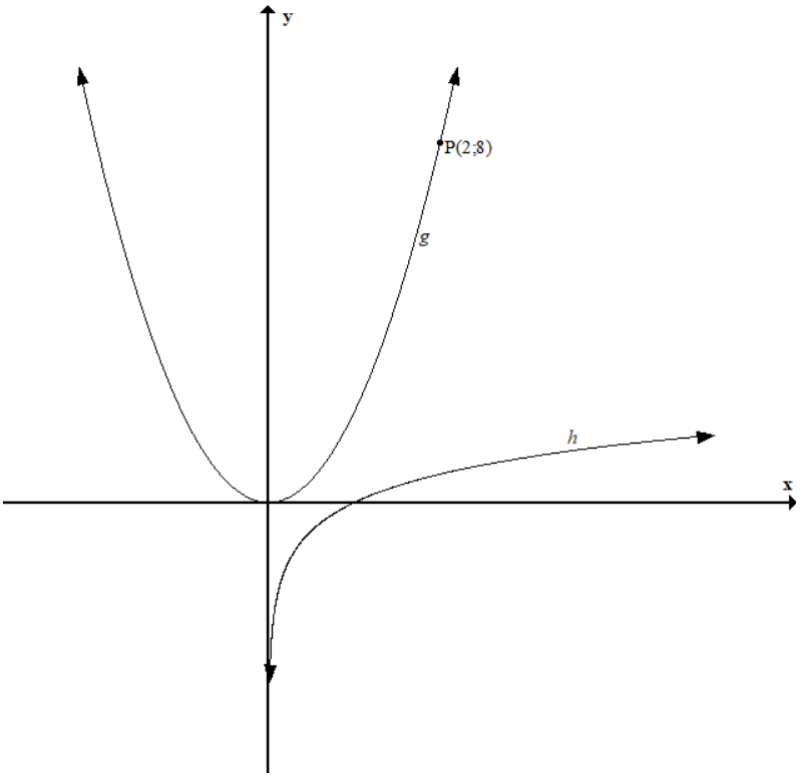
3.3 Sketch the graph of f, showing all intercepts and asymptotes. (4)

3.4 For which values of x is $f(x)\leq 0$ (2)

[11]

QUESTION 4

The diagrams below show the graphs of $g(x) = ax^2$ and $h(x) = \log_b x$. The point P (2;8) lies on the graph of *g*.



4.1 Determine the value of *a* (2)

4.2 If *h* passes through (8;3), find the value of *b*. (2)

4.3 Write down the equation of $h^{-1}(x)$ in the form $y = \ldots$ (2)

4.4 Determine the domain of *h*. (2)

4.5 Determine the value(s) of *x* for which

4.5.1 $g(x).h(x) < 0$ (2)

4.5.2 $x.h(x) \geq 0$ (2)

[12]

QUESTION 5

Given $f(x) = 2x^2 - 4x - 6$

5.1 Rewrite $f(x)$ in the form $f(x) = a(x-p)^2 + q$ by completing the square. (3)

5.2 Determine the coordinates of the:

5.2.1 turning point of f. (2)

5.2.2 x-intercepts of f. (3)

5.3 Sketch the graph of f (3)

5.4 Write down the y-intercepts of f^{-1} (2)

5.5 Write down the domain of f^{-1} (2)

5.6 If $f(x)$ is shifted 2 units to the right and 5 units up, write down the new equation (2)

[17]

QUESTION 6

6.1 Simplify without using a calculator:

$$\frac{\sin(x-180°).\tan(x+180°).\cos(90+x)}{\sin^2(180^\circ + x)}$$ (6)

6.2 If $\cos 25° = \sqrt{1-k^2}$, determine the following in terms of k:

6.2.1 $\sin 25°$ (2)

6.2.2 $\sin 50°$ (3)

6.2.3 $\cos 70^\circ$ (5)

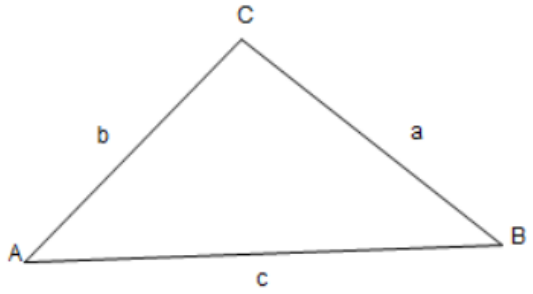
6.3 Prove that $\frac{\sin 3\theta}{\sin\theta} - \frac{\cos 3\theta}{\cos\theta} = 2$ (5)

6.4 If $\cos(A+B) = m$ and $\cos(A-B) = n$, prove that $\cos A.c\cos B = \frac{m+n}{2}$ (3)

[24]

QUESTION 7

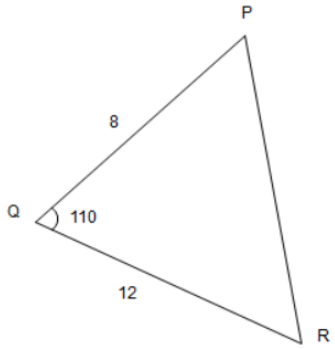
Given ΔABC, use the triangle to prove that $a^2 = b^2 + c^2 - 2bc\cos A$ (4)



[4]

QUESTION 8

Given ΔPQR with PQ=8units, QR=12units and $\hat{Q} = 110°$



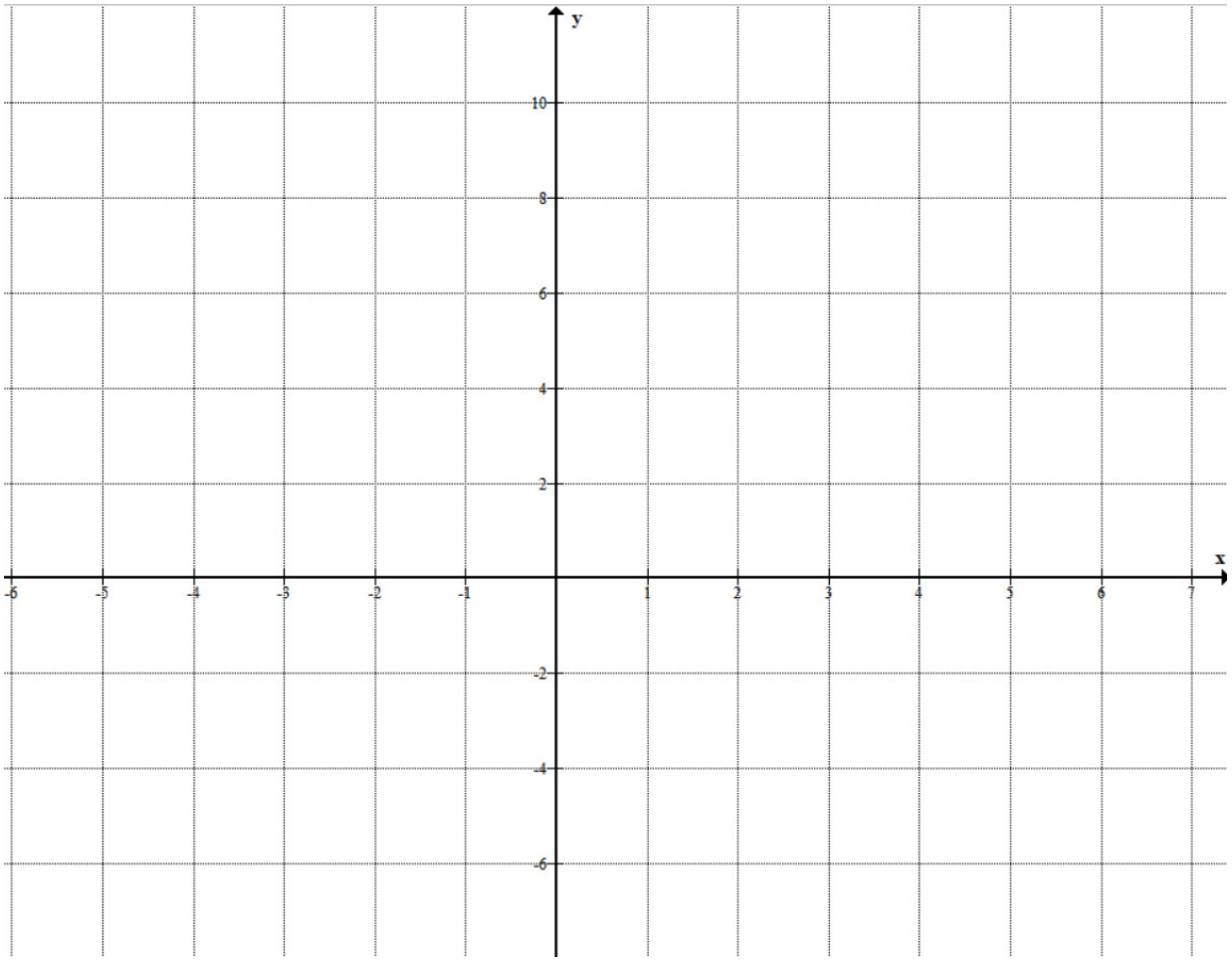
8.1 Calculate the area of ΔPQR (2)

8.2 Calculate the length of PR (3)

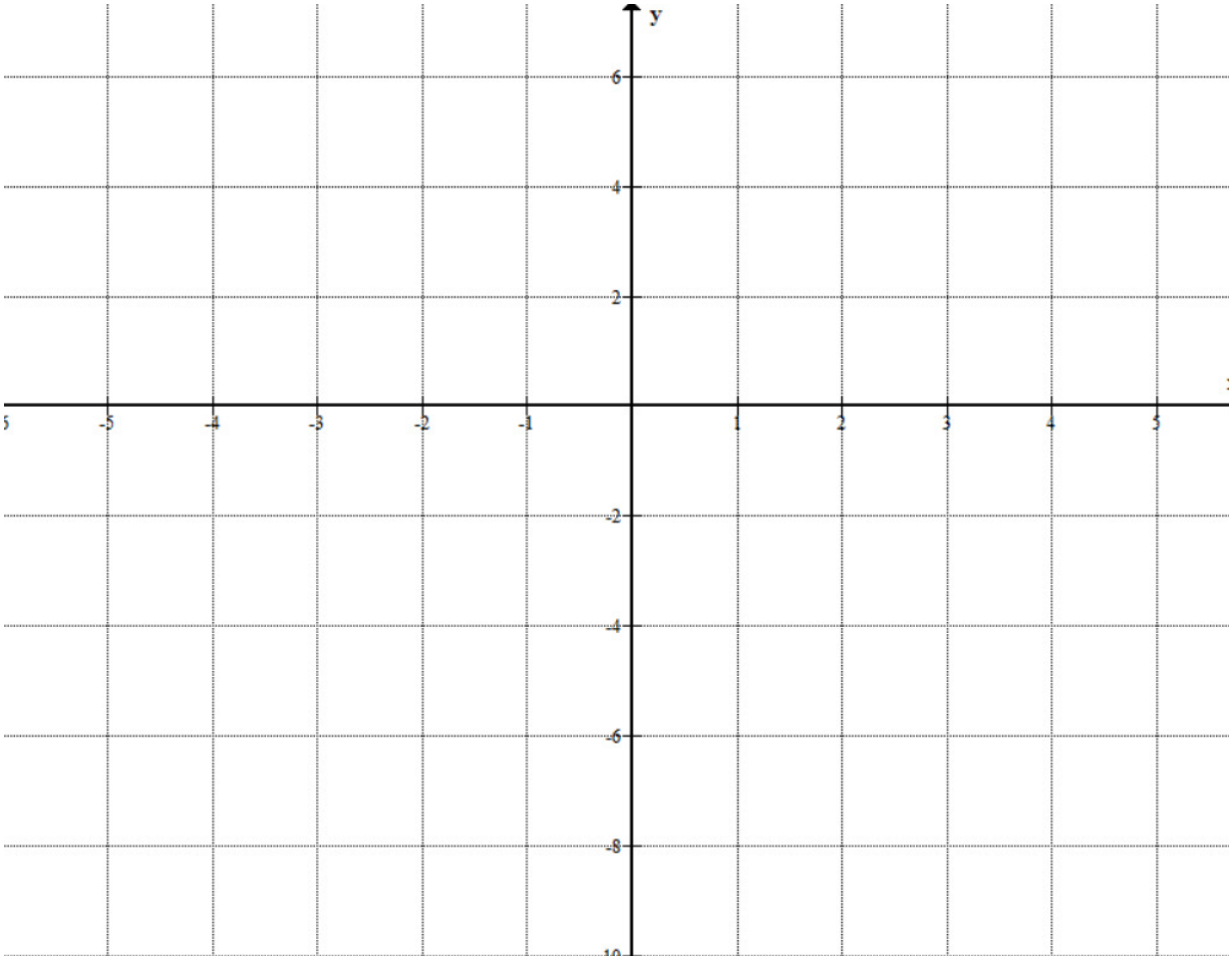
[5]

TOTAL 100

3.3



5.3



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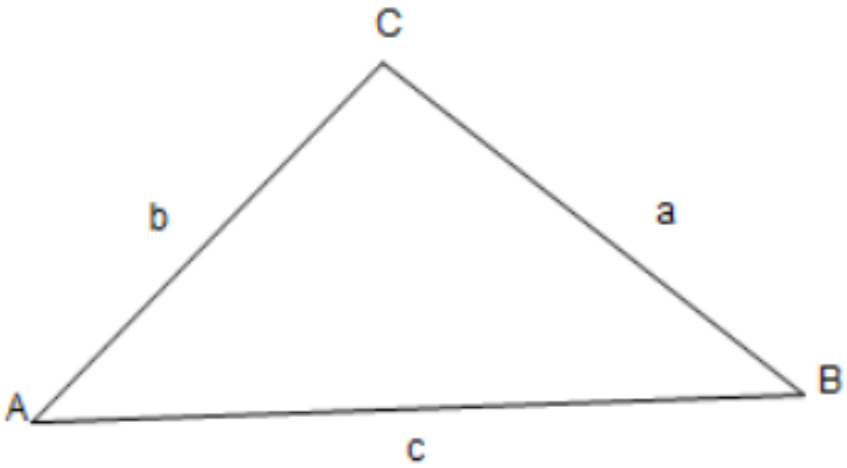

INFORMATION SHEET

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$A = P(1+ni) \qquad A = P(1-ni) \qquad A = P(1-i)^n \qquad A = P(1+i)^n$$

$$T_n = a + (n-1)d \qquad S_n = \frac{n}{2}[2a + (n-1)d]$$

$$T_n = ar^{n-1} \qquad S_n = \frac{a(r^n - 1)}{r-1} \; ; r \neq 1 \qquad S_\infty = \frac{a}{1-r} \; ; -1 < r < 1$$

$$F = \frac{x[(1+i)^n - 1]}{i} \qquad P = \frac{x[1-(1+i)^{-n}]}{i}$$

$$f'(x) = \lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$$

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \qquad M\left(\frac{x_1 + x_2}{2}; \frac{y_1 + y_2}{2}\right)$$

$$y = mx + c \qquad y - y_1 = m(x - x_1) \qquad m = \frac{y_2 - y_1}{x_2 - x_1} \qquad m = \tan\theta$$

$$(x-a)^2 + (y-b)^2 = r^2$$

In ΔABC: $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

$$a^2 = b^2 + c^2 - 2bc.\cos A$$

$$\text{area } \Delta ABC = \frac{1}{2}ab.\sin C$$

$$\sin(\alpha + \beta) = \sin\alpha.\cos\beta + \cos\alpha.\sin\beta \qquad \sin(\alpha - \beta) = \sin\alpha.\cos\beta - \cos\alpha.\sin\beta$$

$$\cos(\alpha + \beta) = \cos\alpha.\cos\beta - \sin\alpha.\sin\beta \qquad \cos(\alpha - \beta) = \cos\alpha.\cos\beta + \sin\alpha.\sin\beta$$

$$\cos 2\alpha = \begin{cases} \cos^2\alpha - \sin^2\alpha \\ 1 - 2\sin^2\alpha \\ 2\cos^2\alpha - 1 \end{cases} \qquad \sin 2\alpha = 2\sin\alpha.\cos\alpha$$

$$\bar{x} = \frac{\sum x}{n} \qquad \sigma^2 = \frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n}$$

$$P(A) = \frac{n(A)}{n(S)} \qquad P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

$$\hat{y} = a + bx \qquad b = \frac{\sum(x - \bar{x})(y - \bar{y})}{\sum(x - \bar{x})^2}$$