education

Department:
Education
North West Provincial Government
REPUBLIC OF SOUTH AFRICA

PROVINCIAL ASSESSMENT

GRADE 12

MATHEMATICS
QUARTERLY TEST
18 MARCH 2026

MARKS: 100

TIME: 2 hours

This question paper consists of 8 pages and 1 information sheet.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. This question paper consists of 6 questions.

2. Answer ALL the questions.

3. Clearly show ALL calculations, diagrams, graphs, etc. which you have used in determining your answers.

4. Answers only will NOT necessarily be awarded full marks.

5. You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.

6. If necessary, round off answers correct to TWO decimal places, unless stated otherwise.

7. Diagrams are NOT necessarily drawn to scale.

8. An information sheet with formulas is included at the end of the paper.

9. Write neatly and legibly.

QUESTION 1

1.1 Solve for x:

1.1.1 $(x+3)(x-2)=0$ (2)

1.1.2 $2x^2+5x-4=0$. (answers correct to TWO decimal places) (3)

1.1.3 $x^2-3x-40\leq 0$ (3)

1.1.4 $\left(\sqrt{\sqrt{18}+x}\right)\left(\sqrt{\sqrt{18}-x}\right)=x$ (5)

1.2 Solve for x and y simultaneously if: $(4x-1)^2+(y^2-9x)^2=0$ (6)

1.3 Simplify without using a calculator:

$$\frac{3^{x+1}.27^{x-2}}{9^{2(x-2)}}$$ (3)

[22]

QUESTION 2

2.1 The sequence 1 ; p ; 11; ... is a quadratic pattern. The first differences of the pattern is 4 ; q ;…

2.1.1 Show that $p=5$ and $q=6$. (3)

2.1.2 Hence, determine the n^{th} term of the pattern. (4)

2.1.3 Determine term number 100 of the pattern. (1)

2.2 Prove that $a+ar+ar^2+......(\text{to n terms})=\dfrac{a(1-r^n)}{1-r}$, $r\neq 1$. (4)

2.3 $x+3$ and x^2-9 are the first two terms of a geometric series. Calculate the values of x for which the series converges. (3)

2.4 Evaluate: $\sum_{k=3}^{20}(5k-4)$ (4)

[19]

QUESTION 3

3.1 Consider : $g(x)=\dfrac{-2}{x+4}-3$

3.1.1 Write down equations of asymptotes of *g*. (2)

3.1.2 Calculate the *x* – intercept of *g*. (2)

3.1.3 Sketch the graph of *g*, clearly show all intercepts with axes as well as the asymptotes of the graph. (4)

3.1.4 Write down the coordinates of the point of intersection between axes of symmetries of g. (2)

3.2 Consider : $h(x)=4^x$.

3.2.1 Determine the equation of h^{-1}, the inverse of *h* in the form $y = \ldots$. (2)

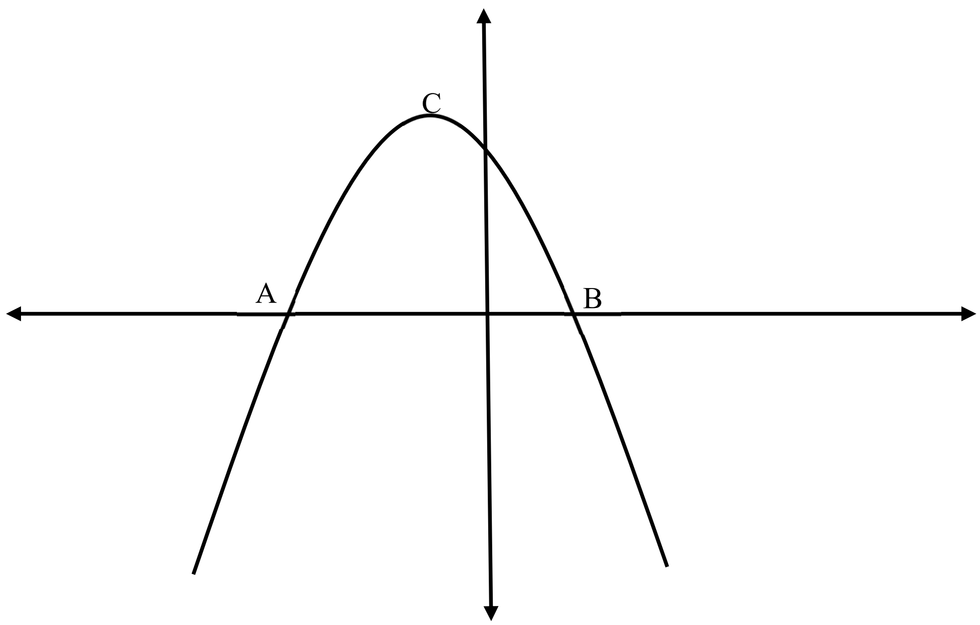
3.2.2 Write down the domain of h^{-1}. (1)

3.2.3 Point D$(x\ ;\ 5)$ lies on h^{-1}, Calculate the value of the *y* coordinate of the image of D when reflected about a line $y=x$. (2)

[15]

QUESTION 4

In the diagram below, the graph of $f(x) = (4-2x)(x+4)$ is drawn. A and B are the x – intercepts of f, and C is the turning point.



4.1 Determine the coordinates of A and B. (2)

4.2 Sketch the graph of axis of symmetry of f. (2)

4.3 Determine the range of h, if $h(x) = -f(x-3)+1$ (3)

4.4 Calculate the values of k, for which a straight line $y = kx + 24$, will not intersect with the graph of f. (5)

[12]

QUESTION 5

5.1 Given : $\cos\alpha = k$, where $\alpha \in (0°\ ;\ 90°)$ express the following in terms of *k*:

5.1.1 $\sin(\alpha + 45°)$. (4)

5.1.2 $\tan\alpha$ (1)

5.2 Determine **WITHOUT USING A CALCULATOR** the value of the following trigonometric expression :

$$\frac{\sin(90° + \theta).\tan\theta}{\cos 300°.\sin(\theta - 360°)}$$ (5)

5.3 Prove the identity below:

$$2[\cos(x - 30°) - \cos(x + 30°)] = \frac{\sin 2x}{\cos x}$$ (5)

5.4 Given: $(2\cos x + 1)(\cos x - 4) = 0$

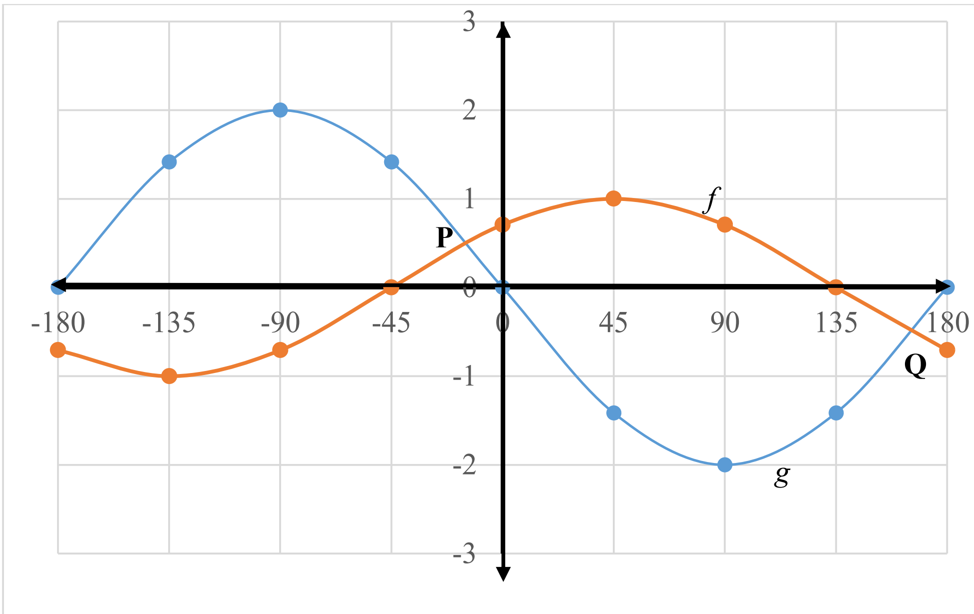
5.4.1 Give a reason why $\cos x = 4$ has no solution. (1)

5.4.2 Hence or otherwise determine the general solution of : $(2\cos x + 1)(\cos x - 4) = 0$ (3)

[19]

QUESTION 6

6.1 The graphs of $f(x)=\cos(x+b)$ and $g(x)=c\sin x$ where $x\in[-180°;180°]$ are drawn below.



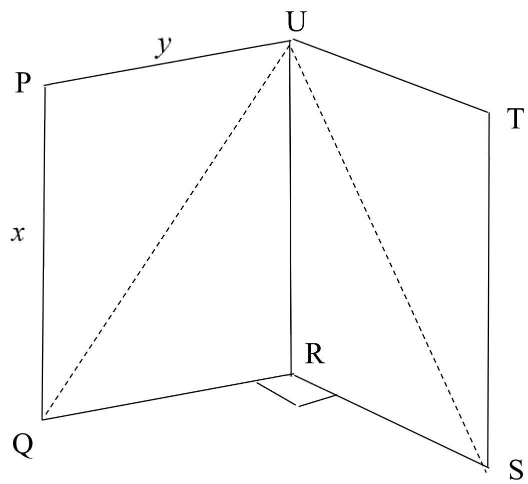
6.1.1 Write down the values of *b* and *c*. (2)

6.1.2 Given P(d ; 0.51) and Q(165,36°; e), write down the values of *d* and *e*. (2)

6.1.3 If the *y* axis is shifted 60° to the right, determine the new equation of *f*. (2)

6.1.4 For which values of *x* will ; $f(x)-g(x)<0$. (2)

6.2 The diagram below shows a rectangular greeting card that has length x and a breadth y. The card is opened so that the front page makes an angle of 90° with the back page.



Show that $\cos Q\hat{U}S = \dfrac{x^2}{x^2 + y^2}$ (5)

[13]

TOTAL 100

INFORMATION SHEET: MATHEMATICS GRADE 12

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

$A = P(1 + i.n)$ $A = P(1 - i.n)$ $A = P(1 - i)^n$ $A = P(1 + i)^n$

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

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

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

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

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

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

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

In ΔABC: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$ $a^2 = b^2 + c^2 - 2bc.\cos A$

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

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

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

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

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

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

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