



LIMPOPO

PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION

GRADE 12

Stanmorephysics.com

MATHEMATICS

TEST 1

MARCH 2026

Stanmorephysics.com

MARKS: 100

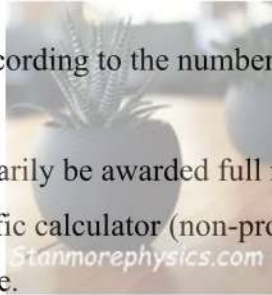
DURATION: 2 HOURS

This Question papers consists of 8 pages and 1 information sheet.

INSTRUCTIONS AND INFORMATION



1. This question paper consists of EIGHT questions.
2. Clearly show ALL calculations, diagrams, et cetera which you have used in determining the answers.
3. Number the answers correctly according to the numbering system used in the question paper.
4. ANSWER 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 to TWO decimal places, unless stated otherwise.
7. Diagrams are NOT necessarily drawn to scale.
8. Write neatly and legibly.



QUESTION 1

Solve for x

1.1 $x^2 - 2x + 1 > 0$ (3)

1.2 $2x - 1 = \sqrt{4 - 5x}$ (4)

[7]

QUESTION 2

2.1 Given the finite arithmetic sequence: $5 ; 1 ; -3 ; \dots ; -83 ; -87$

2.1.1 Write down the fourth term (T_4) of the sequence. (1)

2.1.2 Calculate the number of terms in the sequence. (3)

2.1.3 Calculate the sum of all the negative numbers in the sequence. (3)

2.2 The tenth and the seventeenth terms of an arithmetic sequence are 21 and 49 respectively

2.2.1 Determine the common difference of the sequence. (3)

2.2.2 Calculate: $T_1 + T_{18}$ (3)

2.3

Given: $\sum_{n=1}^m (4n - 19) = 1189$

2.3.1 Write down the first three terms of the series. (1)

2.3.2 Calculate the value of m . (4)

[18]

QUESTION 3

3.1 - 78; - 76; - 72; - 66; ... is a quadratic number pattern.

3.1.1 Write down the next two terms of the number pattern. (1)

3.1.2 Determine the n^{th} term of the number pattern in the form, $T_n = an^2 + bn + c$ (4)

3.2 Given: 5; 10; 20; ... a geometric sequence.

3.2.1 Determine the n^{th} term (1)

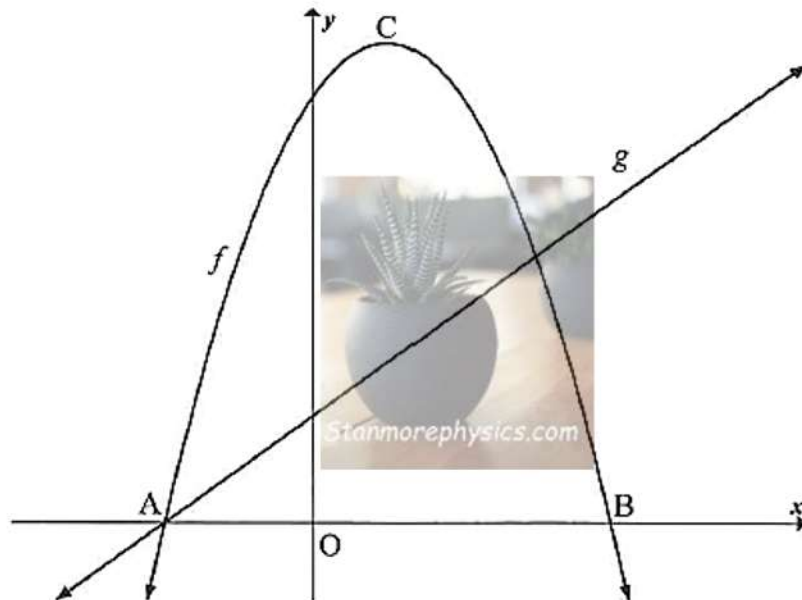
3.2.2 Calculate the sum of the first 18 terms. (2)

3.3 The first and second term of a geometric series is given as $(2x - 4)$ and $(4x^2 - 16)$ respectively. Determine the value(s) of x for which the series will converge. (4)

[12]

QUESTION 4

Sketched below are the graphs of $f(x) = -2x^2 + 4x + 16$ and $g(x) = 2x + 4$. A and B are the x -intercepts of f . C is the turning point of f .



- 4.1 Calculate the coordinates of A and B. (3)
- 4.2 Determine the coordinates of C, the turning points of f . (2)
- 4.3 Write down the range of f . (1)
- 4.4 The graph of $h(x) = f(x + p) + q$ has a maximum value of 15 at $x = 2$. Determine the values of p and q . (3)
- 4.5 Determine the equation of g^{-1} , the inverse of g , in the form $y = \dots$ (2)
- 4.6 For which value(s) of x will $g^{-1}(x) \cdot g(x) = 0$? (2)

[13]

QUESTION 5

Given the exponential function: $f(x) = 3^x$

5.1 Write down the range of f . (1)

5.2 Determine the equation of f^{-1} in the form $y = \dots$ (2)

5.3 The point $M(a; 2)$ lies on f^{-1} . Calculate the value of a . (2)

5.4 Sketch, in your answer book, the graphs of f and f^{-1} , showing clearly ALL intercepts with axes (include the second point on each graph). Draw and name the line of symmetry between the two graphs. (5)

5.5 Is f^{-1} a function? Justify your answer. (2)

[12]

QUESTION 6

6.1 If $\cos \theta = -\frac{5}{13}$ where $180^\circ < \theta < 360^\circ$, determine, **without using a calculator**, the value of:

6.1.1 $\sin^2 \theta$ (3)

6.1.2 $\cos (\theta - 135)$ (4)

6.2 Prove that $2\cos^2(45^\circ + 1) = 1 - \sin 2x$ (4)

6.3 Consider the expression: $\sin(A - B) - \sin(A + B)$

6.3.1 Prove that $\sin(A - B) - \sin(A + B) = -2\cos A \sin B$. (2)

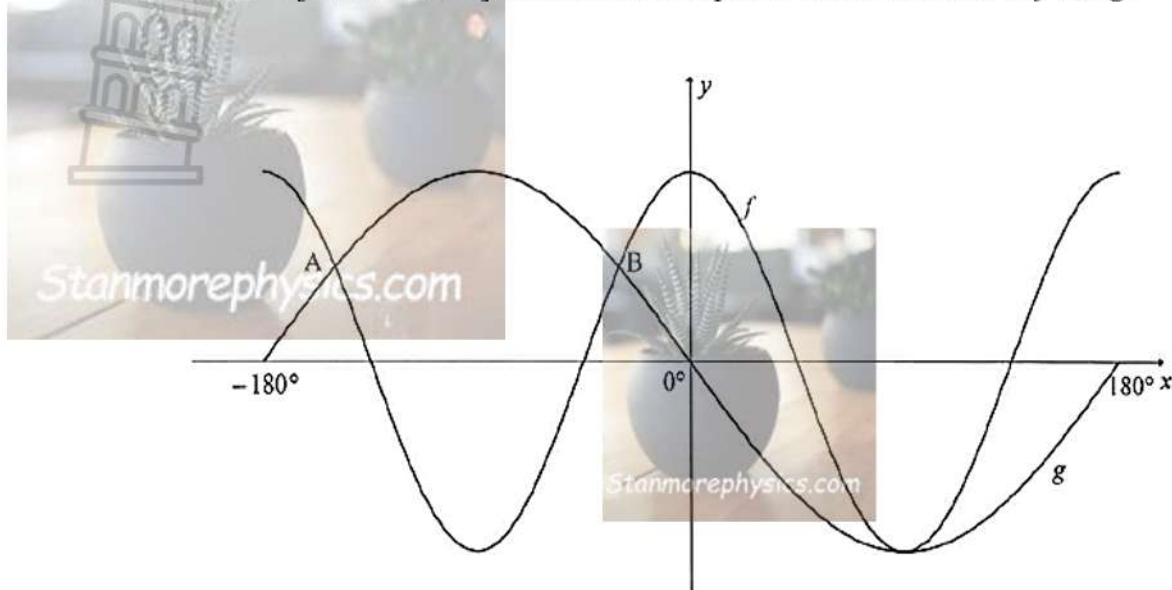
6.3.2 Simplify the following expression to a single term: $\sin 4x - \sin 10x$. (2)

6.3.3 Hence, determine the solution for $\sin 4x - \sin 10x = \sin 3x$ for $x \in [0^\circ; 30^\circ]$. (5)

[20]

QUESTION 7

In the diagram below, the graph of $f(x) = \cos 2x$ and $g(x) = -\sin x$ are drawn for the interval $x \in [-180^\circ; 180^\circ]$. A and B are two points of intersections of f and g .



7.1 Write down:

7.1.1 The period of f (1)

7.1.2 The amplitude of g (1)

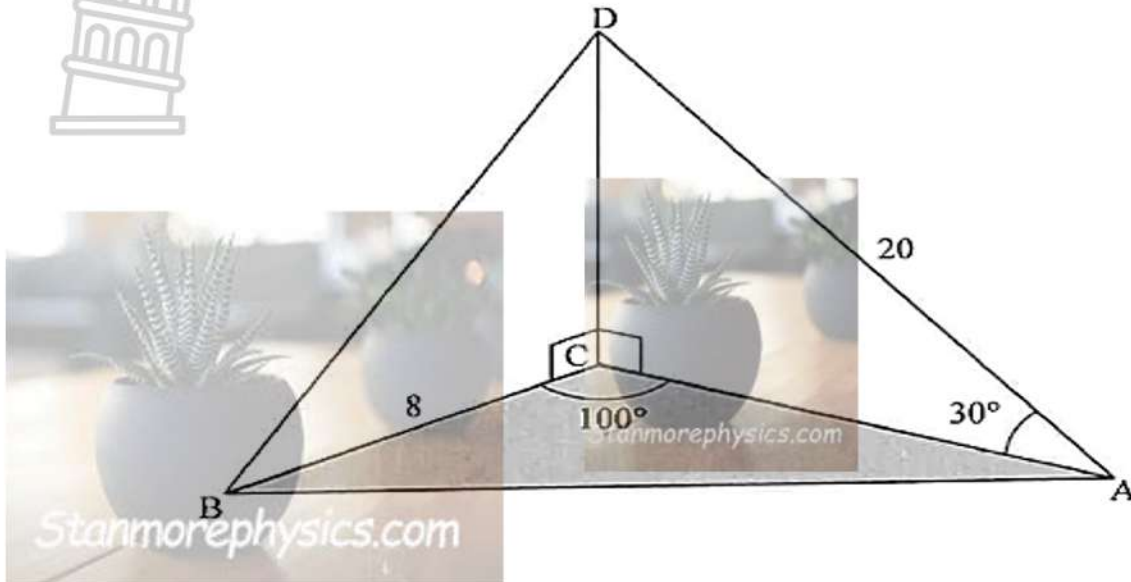
7.2 **Without using a calculator**, determine the value of x for which $\cos 2x = -\sin x$ in the interval $x \in [-180^\circ; 180^\circ]$. (6)

7.3 Use the graphs above to determine how many degrees apart are points A and B from each other? (2)

[10]

QUESTION 8

In the diagram, A, B and C are points in the same horizontal plane. D is a point directly above C, that is $DC \perp AC$ and $DC \perp BC$. It is given that $\hat{ACB} = 100^\circ$, $\hat{CAD} = 30^\circ$, $AD = 20$ units and $BC = 8$ units.



8.1 Calculate the length of:

8.1.1 AC (2)

8.1.2 AB (3)

8.2 If it is further given that $\hat{ABD} = 73,4^\circ$, calculate the size of $\hat{ADB}$. (3)

[8]

TOTAL: [100]

INFORMATION SHEET

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

$$A = P(1 + ni)$$

$$A = P(1 - ni)$$

$$A = (1 - i)^n$$

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

$$T_n = a + (n - 1)d$$

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

$$T_n = ar^{n-1}$$

$$S_n = \frac{a(r^n - 1)}{r - 1}; r \neq 1$$

$$S_\infty = \frac{a}{1 - r}; -1 < r < 1$$

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

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

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

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$M\left(\frac{x_2 + x_1}{2}, \frac{y_2 + y_1}{2}\right)$$

$$y = mx + c$$

$$y - y_1 = m(x - x_1)$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \tan \theta$$

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

$$\text{In } \triangle ABC: \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

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

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

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

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

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

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

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

$$\sin 2\alpha = 2\sin \alpha \cos \alpha$$

$$\bar{x} = \frac{\sum x}{n}$$

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

$$P(A) = \frac{n(A)}{n(S)}$$

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

$$\hat{y} = a + bx$$

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



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MARKING GUIDELINES

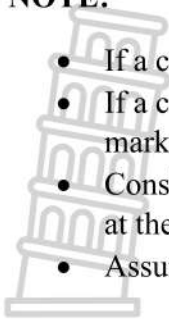
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These marking guidelines consists of 11 pages

NOTE:

- If a candidate answers a question **TWICE**, only mark the **FIRST** attempt.
- If a candidate crossed out an attempt of a question and not redone the question, mark the crossed-out version.
- Consistent accuracy applies in ALL aspects of the marking guidelines. Stop marking at the second calculation error.
- Assuming answers/values to solve a problem is **NOT** acceptable.



Question 1

1.1.1 $x^2 - 2x + 1 > 0$
 $(x - 1)(x - 1) > 0$
 Critical value : $x = 1$
 $x < 1$ or $x > 1$

OR

$\therefore x \in \mathbb{R}, x \neq 1$

✓ factors
 ✓✓ correct notation
 (Accuracy)

✓✓ $x \in \mathbb{R}, x \neq 1$
 (Accuracy)

(3)

1.1.2 $2x - 1 = \sqrt{4 - 5x}$
 $(2x - 1)^2 = (\sqrt{4 - 5x})^2$
 $4x^2 - 4x + 1 + 5x - 4 = 0$
 $4x^2 + x - 3 = 0$

$(4x - 3)(x + 1) = 0$ or $x = \frac{-1 \pm \sqrt{(1)^2 - 4(4)(-3)}}{2(4)}$

$\therefore x = \frac{3}{4}$ or $x \neq -1$

✓ squaring both sides
 ✓ standard form

✓ factors
 ✓ answers with selection

(4)

[7]

Question 2

2.1.1 $T_4 = -7$

✓ -7

(1)

2.1.2 $T_n = a + (n - 1)d$
 $-87 = 5 + (n - 1)(-4)$
 $-87 = 5 - 4n + 4$
 $4n = 96$
 $n = 24$

OR

$-4n + 9 = -87$
 $-4n = -96$
 $n = 24$

✓ $a = 5$ and $d = -4$
 ✓ $-87 = 5 + (n - 1)(-4)$

✓ $n = 24$

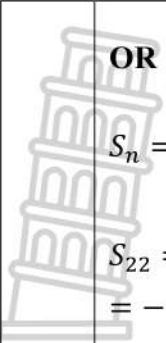
OR

✓ $-4n + 9$
 ✓ $-4n + 9 = -87$
 ✓ $n = 24$

(3)

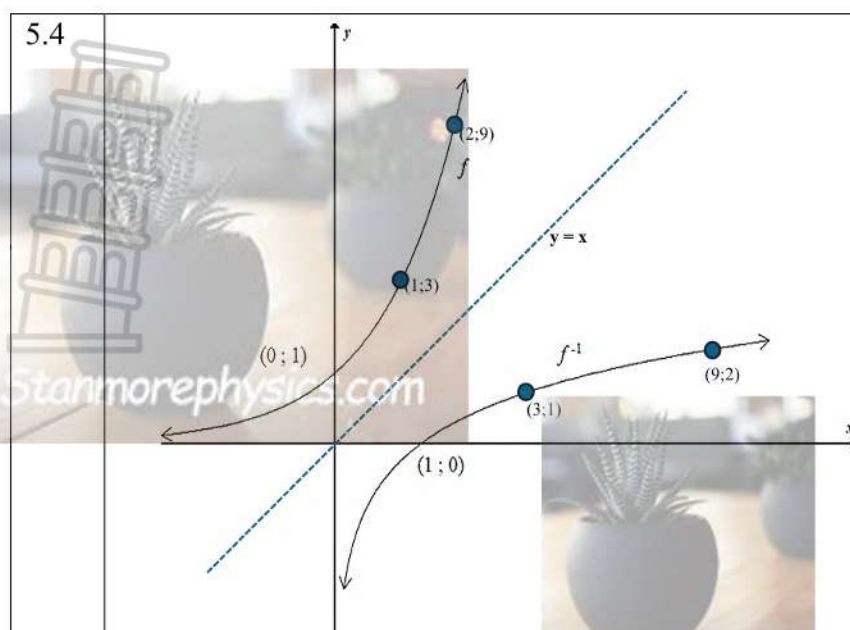
2.1.3 $-3 ; -7 ; \dots ; -87$
 $S_n = \frac{n}{2}[a + T_n]$
 $S_{22} = \frac{22}{2}[-3 - 87]$
 $S_{22} = -990$

✓ $n = 22$
 ✓ $a = -3$
 ✓ answer

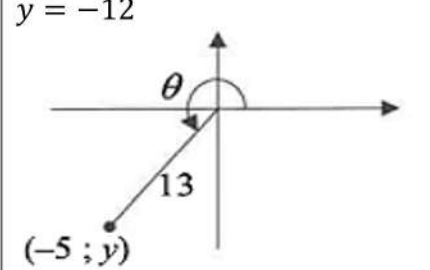
	OR $S_n = \frac{n}{2} [2a + (n - 1)d]$ $S_{22} = \frac{22}{2} [2(-3) + (22 - 1)(-4)]$ $= -990$	✓ $n = 22$ ✓ $a = -3$ ✓ answer
	OR All negative terms can be written down and added to get the answer of -990 OR $Sum = S_{24} - (5 + 1)$ $= \frac{24}{2} [5 - 87] - 6$ $= -990$	✓ $a = -3$ ✓ ✓ answer ✓ $\frac{24}{2} [5 - 87]$ ✓ -6 ✓ answer (3)
2.2.1	$a + 9d = 21$ $a + 16d = 49$ $\therefore -7d = -28$ $d = 4$	✓ $a + 9d = 21$ ✓ $a + 16d = 49$ ✓ value of d (3)
2.2.2	$a + 9(4) = 21$ $a = -15$ $T_{18} = T_{17} + 4$ $= 49 + 4$ $T_{18} = 53$ $\therefore T_1 + T_{18}$ $= -15 + 53$ $= 38$	✓ $a = -15$ ✓ $a = -15$ ✓ answer (3)
2.3.1	$T_1 = 4(1) - 19 = -15$ $T_2 = 4(2) - 19 = -11$ $T_3 = 4(3) - 19 = -7$	✓ all three terms (1)
2.3.2	$S_n = \frac{n}{2} [2a + (n - 1)d]$ $S_m = \frac{m}{2} [2(-15) + 4(m - 1)]$ $1189 = \frac{m}{2} [-30 + 4m - 4]$ $0 = 2m^2 - 17m - 1189$ $(2m + 41)(m - 29) = 0$ $\therefore m = 29 \quad \text{or} \quad m \neq -\frac{41}{2}$	✓ substitution and = 1189 ✓ standard form ✓ Factors ✓ answer (4)
		[18]

Question 3		
3.1.1	$-58; -48$	✓ Both answers (1)
3.1.2	$T_n = an^2 + bn + c$ $2a = 2; \quad 3a + b = 2; \quad a + b + c = -78$ $a = 1; \quad 3(1) + b = 2; \quad 1 - 1 + c = -78$ $b = -1 \quad c = -78$ $\therefore T_n = n^2 - n - 78$	✓ $a = 1$ ✓ $b = -1$ ✓ $c = -78$ ✓ answer (4)
3.2.1	$5; 10; 20; \dots T_n = a \cdot r^{n-1}$ $T_n = (5)(2)^{n-1}$	✓ answer (1)
3.2.2	$S_n = \frac{a(r^n - 1)}{r - 1}$ $S_{18} = \frac{5[(2)^{18} - 1]}{2 - 1}$ $S_{18} = 1310715$	✓ substitution into the correct formula ✓ answer (2)
3.3	$r = \frac{(2x + 4)(2x - 4)}{2x - 4} = 2x + 4$ Converge: $-1 < r < 1$ $-1 < 2x + 4 < 1$ $-5 < 2x < -3$ $-\frac{5}{2} < x < -\frac{3}{2}$	✓ $r = 2x + 4$ ✓ $-1 < r < 1$ ✓ substitution ✓ answer (4)
		[12]
Question 4		
4.1	$-2x^2 + 4x + 16 = 0$ $x^2 - 2x - 8 = 0$ $(x - 4)(x + 2) = 0$ $x = 4$ or $x = -2$ $\therefore A(-2; 0)$ and $B(4; 0)$	✓ factors ✓ $x = -2$ ✓ $x = 4$ (3)
4.2	$f(x) = -2x^2 + 4x + 16$ $-\frac{b}{2a} = -\frac{-4}{-2(2)} = 1$ $f(1) = -2(1)^2 + 4(1) + 16 = 18$ $\therefore C(1; 18)$	✓ 1 ✓ 18 (2)
4.3	$y \leq 18$ OR $y \in (-\infty; 18]$	✓ $y \leq 18$ OR ✓ $y \in (-\infty; 18]$ (1)

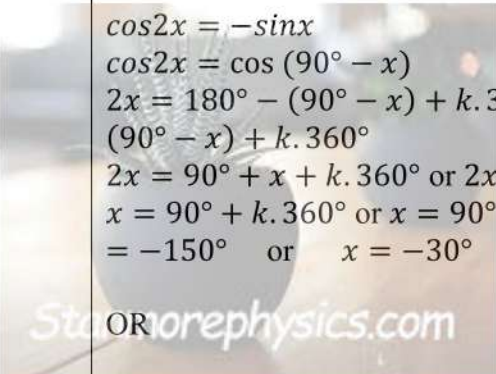
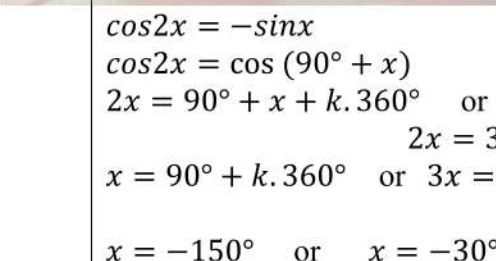
4.4	TP (1 ; 18) for f TP (2 ; 15) for h $\therefore p = -1 \quad q = -3$	✓ TP (2 ; 15) for h ✓ $p = -1$ ✓ $q = -3$ (3)
4.5	$y = 2x + 4$ $x = 2y + 4$ $\therefore y = \frac{1}{2}x - 2$	✓ swop x and y ✓ $y = \frac{1}{2}x - 2$ (2)
4.6	$g(x) = 0$ or $g^{-1}(x) = 0$ $x = 4$ or $x = -2$ (product 0 at x -intercepts)	✓ $x = 4$ ✓ $x = -2$ (2)
		[13]
Question 5		
5.1	$y > 0$ OR $y \in (0 ; \infty)$	✓ answer OR ✓ answer (1)
5.2	$f: y = 3^x$ $f^{-1}: x = 3^y$ $y = \log_3 x$	✓ $x = 3^y$ ✓ equation (2)
5.3	$y = \log_3 x$ $2 = \log_3 a$ $a = 3^2 = 9$	✓ correct subst into correct formula ($a ; 2$) ✓ answer (2)

5.4		For f ✓ shape ✓ y-intercept & a point ✓ axis of symmetry/ $y=x$ For f^{-1} ✓ shape ✓ x-intercept & a point (5)
5.5	Yes. The vertical line test cuts f^{-1} once OR Yes. For every x – value there is a unique y – value OR Yes. f is a one-to-one function	✓ yes (2) ✓ valid reason OR ✓ yes ✓ valid reason (2) OR ✓ yes ✓ valid reason (2)
		[12]

Question 6

6.1.1	$y^2 = \sqrt{(13)^2 - (-5)^2}$ [Pythagoras] $y = -12$  $\sin^2 \theta$ $= \left(-\frac{12}{13} \right)^2$ $= \frac{144}{169}$ OR $\sin^2 \theta = 1 - \cos^2 \theta$	✓ $y = -12$ ✓ substitution ✓ answer (3) ✓ square identity
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	$\sin^2 \theta = 1 - \left(-\frac{5}{13}\right)^2$ $\sin^2 \theta = \frac{144}{169}$	✓ substitution ✓ answer (3)
6.1.2	$\cos(\theta - 135^\circ)$ $= \cos \theta \cos 135^\circ + \sin \theta \sin 135^\circ$ $= \cos \theta (-\cos 45^\circ) + \sin \theta (\sin 45^\circ)$ $= \left(-\frac{5}{13}\right)\left(-\frac{\sqrt{2}}{2}\right) + \left(-\frac{12}{13}\right)\left(\frac{\sqrt{2}}{2}\right)$ $= -\frac{7\sqrt{2}}{26}$ OR $\left(-\frac{5}{13}\right)\left(-\frac{1}{\sqrt{2}}\right) + \left(-\frac{12}{13}\right)\left(\frac{1}{\sqrt{2}}\right)$ $= -\frac{7}{13\sqrt{2}}$ 	✓ expansion ✓ reduction ✓ substitution ✓ answer (4)
6.2	$LHS = 2\cos^2(45^\circ + x)$ $= 2\cos^2(45^\circ + x) + 1 - 1$ $= \cos[2(45^\circ + x)] + 1$ $= \cos(90^\circ + 2x) + 1$ $= (-\sin 2x) + 1$ $= 1 - \sin 2x$ RHS OR $LHS = 2\cos^2(45^\circ + x)$ $= 2(\cos(45^\circ + x))^2$ $= 2(\cos 45^\circ \cos x - \sin 45^\circ \sin x)^2$ $= 2\left(\frac{\sqrt{2}}{2}\cos x - \frac{\sqrt{2}}{2}\sin x\right)^2$ $= 2\left(\frac{1}{2}\cos^2 x - \sin x \cos x + \frac{1}{2}\sin^2 x\right)$ $= \cos^2 x - 2\sin x \cos x + \sin^2 x$ $= 1 - \sin 2x$ $= RHS$	✓ +1 - 1 ✓ double angle ✓ simplify ✓ reduction ✓ compound expansion ✓ subst special angle ✓ simplification ✓ square identity (4)
6.3.1	$LHS = \sin(A - B) - \sin(A + B)$ $= \sin A \cos B - \cos A \sin B - (\sin A \cos B + \cos A \sin B)$ $= \sin A \cos B - \cos A \sin B - \sin A \cos B - \cos A \sin B$ $= -2\cos A \sin B$ $= RHS$	✓ $\sin A \cos B - \cos A \sin B$ ✓ $-\sin A \cos B - \cos A \sin B$ (2)
6.3.2	$\sin 4x - \sin 10x$ $= \sin(7x - 3x) - \sin(7x + 3x)$ $= -2\cos 7x \sin 3x$	✓ $7x - 3x$ & $7x + 3x$ ✓ answer (2)

6.3.3	$\sin 4x - \sin 10x = \sin 3x$ $-2 \cos 7x \sin 3x = \sin 3x$ $2 \cos 7x \sin 3x + \sin 3x = 0$ $\sin 3x (2 \cos 7x + 1) = 0$ $\sin 3x = 0 \quad \text{or} \quad \cos 7x = -\frac{1}{2}$ $3x = 0^\circ \quad 7x = 120^\circ \quad \text{or} \quad 7x = 240^\circ$ $x = 0^\circ \quad x = 17,14^\circ \quad x = 34,29^\circ(\text{N/A})$	 ✓ substitution ✓ factorisation ✓ both equations ✓ answer ✓ answer	(5)
			[20]
Question 7			
7.1.1	180°	 ✓ answer	(1)
7.1.2	1	✓ answer	(1)
7.2	$1 - 2\sin^2 x = -\sin x$ $2\sin^2 x - \sin x - 1 = 0$ $(2\sin x + 1)(\sin x - 1) = 0$ $\sin x = -\frac{1}{2} \quad \text{or} \quad \sin x = 1$ Ref $\angle = 30^\circ \quad \text{ref } \angle = 90^\circ$ $x = 210^\circ + k.360^\circ \quad x = 90^\circ + k.360^\circ$ Or $x = 330^\circ + k.360^\circ$ $x = -150^\circ \quad \text{or} \quad x = -30^\circ \quad \text{or} \quad x = 90^\circ$ OR  $\cos 2x = -\sin x$ $\cos 2x = \cos (90^\circ - x)$ $2x = 180^\circ - (90^\circ - x) + k.360^\circ \quad \text{or} \quad 2x = 180^\circ + (90^\circ - x) + k.360^\circ$ $2x = 90^\circ + x + k.360^\circ \quad \text{or} \quad 2x = 270^\circ - x + k.360^\circ$ $x = 90^\circ + k.360^\circ \quad \text{or} \quad x = 90^\circ + k.120^\circ$ $= -150^\circ \quad \text{or} \quad x = -30^\circ \quad \text{or} \quad x = 90^\circ$  OR $\cos 2x = -\sin x$ $\cos 2x = \cos (90^\circ + x)$ $2x = 90^\circ + x + k.360^\circ \quad \text{or}$ $2x = 360^\circ - (90^\circ + x) + k.360^\circ$ $x = 90^\circ + k.360^\circ \quad \text{or} \quad 3x = 270^\circ + k.360^\circ$ $x = 90^\circ + k.120^\circ$ $x = -150^\circ \quad \text{or} \quad x = -30^\circ \quad \text{or} \quad x = 90^\circ$	 ✓ identity ✓ factors ✓ $\sin x = -\frac{1}{2}$ ✓ $\sin x = 1$ ✓ -150° and -30° (6) ✓ 90° ✓ co-function ✓ 2x in quadrant 2 ✓ 2x in quadrant 3 ✓ both general solutions ✓ -150° and -30° ✓ 90° (6) ✓ co-function ✓ 2x in quadrant 1 ✓ 2x in quadrant 4 ✓ both general solutions ✓ -150° and -30° ✓ 90° (6)	

	OR $\cos 2x = -\sin x$ $\sin(90^\circ - 2x) = -\sin x$ $90^\circ - 2x = 180^\circ + x + k \cdot 360^\circ \text{ or }$ $90^\circ - 2x = 360^\circ - x + k \cdot 360^\circ$ $x = -30^\circ + k \cdot 120^\circ \text{ or } x = -270^\circ + k \cdot 360^\circ$ $= -150^\circ \text{ or } x = -30^\circ \text{ or } x = 90^\circ$	✓ co-function ✓ $90^\circ - 2x$ in quadrant 3 ✓ $90^\circ - 2x$ in quadrant 4 ✓ both general solutions ✓ -150° and -30° ✓ 90° (6)
7.3	$A(-150^\circ; 0,5) \quad B(-30^\circ; 0,5)$ $AB = -30^\circ - (-150^\circ)$ $AB = 120^\circ$	✓ $AB = -30^\circ - (-150^\circ)$ ✓ answer (2)
[10]		
Question 8		
8.1.1	$\frac{AC}{20} = \cos 30^\circ$ $AC = 20 \cos 30^\circ$ $AC = 10\sqrt{3} = 17,32 \text{ units}$ OR $\frac{AC}{\sin 60^\circ} = \frac{20}{\sin 90^\circ}$ $\therefore AC = 20 \sin 60^\circ = 17,32 \text{ units}$	✓ trig ratio ✓ answer (2)
8.1.2	$AB^2 = AC^2 + BC^2 - 2AC \cdot BC \cos \hat{C}$ $AB^2 = (10\sqrt{3})^2 + (8)^2 - 2(10\sqrt{3})(8) \cos 100^\circ$ $AB = 20,30 \text{ units}$	✓ cosine formula ✓ substitution into cosine formula ✓ answer (3)
8.2	$\frac{\sin \hat{A}DB}{AB} = \frac{\sin \hat{A}BD}{AD}$ $\frac{\sin \hat{A}DB}{20,3} = \frac{\sin 73,4^\circ}{20}$ $\sin \hat{A}DB = \frac{\sin 73,4^\circ}{20}$ $\hat{A}DB = 76,58^\circ$	✓ sine formula in $\triangle ABD$ ✓ substitution in the sine formula ✓ answer (3)
[8]		
TOTAL: 100		