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DEPARTMENT OF
EDUCATION

GRADE 12

MATHEMATICS
TEST 1
MARKING GUIDELINES
MARCH 2026

MARKS: 100

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	$x^2 - 2x + 1 > 0$ $(x - 1)(x - 1) > 0$ <i>Critical value</i> : $x = 1$ $x < 1$ 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 $x = -1$	✓ 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 ✓ $-4n + 9 = -87$ ✓ $-4n + 9 = -87$ ✓ $n = 24$ (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

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

Question 3		
3.1.1	$-58; -48$	✓ Both answers (1)
3.1.2	$T_n = an^2 + bn + c$ $2a = 2; \quad 3a + b = 2; \quad a + b + c = -78$ $a = 1; \quad 3(1) + b = 2; \quad 1 - 1 + c = -78$ $\qquad\qquad\qquad b = -1 \qquad\qquad c = -78$ $\therefore T_n = n^2 - n - 78$	✓ $a = 1$ ✓ $b = -1$ ✓ $c = -78$ ✓ answer (4)
3.2.1	$5; 10; 20; \dots T_n = a.r^{n-1}$ $T_n = (5)(2)^{n-1}$	✓ 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)

	$\sin^2\theta = 1 - \left(-\frac{5}{13}\right)^2$ $\sin^2\theta = \frac{144}{169}$	✓ substitution ✓ answer (3)
6.1.2	$\cos(\theta - 135^\circ)$ $= \cos\theta\cos135^\circ + \sin\theta\sin135^\circ$ $= \cos\theta(-\cos45^\circ) + \sin\theta(\sin45^\circ)$ $= \left(-\frac{5}{13}\right)\left(-\frac{\sqrt{2}}{2}\right) + \left(-\frac{12}{13}\right)\left(\frac{\sqrt{2}}{2}\right)$ $= -\frac{7\sqrt{2}}{26}$ <p style="text-align: center;">OR</p> $\left(-\frac{5}{13}\right)\left(-\frac{1}{\sqrt{2}}\right) + \left(-\frac{12}{13}\right)\left(\frac{1}{\sqrt{2}}\right)$ $= -\frac{7}{13\sqrt{2}}$	✓ expansion ✓ reduction ✓ substitution ✓ answer (4)
6.2	$LHS = 2\cos^2(45^\circ + x)$ $= 2\cos^2(45^\circ + x) + 1 - 1$ $= \cos[2(45^\circ + x)] + 1$ $= \cos(90^\circ + 2x) + 1$ $= (-\sin2x) + 1$ $= 1 - \sin2x$ <p>RHS</p> <p>OR</p> $LHS = 2\cos^2(45^\circ + x)$ $= 2(\cos(45^\circ + x))^2$ $= 2(\cos45^\circ\cos x - \sin45^\circ\sin x)^2$ $= 2\left(\frac{\sqrt{2}}{2}\cos x - \frac{\sqrt{2}}{2}\sin x\right)^2$ $= 2\left(\frac{1}{2}\cos^2 x - \sin x\cos x + \frac{1}{2}\sin^2 x\right)$ $= \cos^2 x - 2\sin x\cos x + \sin^2 x$ $= 1 - \sin2x$ $= RHS$	✓ +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	$\sin4x - \sin10x$ $= \sin(7x - 3x) - \sin(7x + 3x)$ $= -2\cos7x\sin3x$	✓ $7x - 3x$ & $7x + 3x$ ✓ answer (2)

	<p>OR</p> $\cos 2x = -\sin x$ $\sin(90^\circ - 2x) = -\sin x$ $90^\circ - 2x = 180^\circ + x + k \cdot 360^\circ \text{ or}$ $90^\circ - 2x = 360^\circ - x + k \cdot 360^\circ$ $x = -30^\circ + k \cdot 120^\circ \text{ or } x = -270^\circ + k \cdot 360^\circ$ $= -150^\circ \text{ or } x = -30^\circ \text{ or } x = 90^\circ$	<ul style="list-style-type: none"> ✓ co-function ✓ $90^\circ - 2x$ in quadrant 3 ✓ $90^\circ - 2x$ in quadrant 4 ✓ both general solutions ✓ -150° and -30° ✓ 90° <p style="text-align: right;">(6)</p>
7.3	$A(-150^\circ; 0,5) \quad B(-30^\circ; 0,5)$ $AB = -30^\circ - (-150^\circ)$ $AB = 120^\circ$	<ul style="list-style-type: none"> ✓ $AB = -30^\circ - (-150^\circ)$ ✓ answer <p style="text-align: right;">(2)</p>
		[10]
Question 8		
8.1.1	$\frac{AC}{20} = \cos 30^\circ$ $AC = 20 \cos 30^\circ$ $AC = 10\sqrt{3} = 17,32 \text{ units}$ <p>OR</p> $\frac{AC}{\sin 60^\circ} = \frac{20}{\sin 90^\circ}$ $\therefore AC = 20 \sin 60^\circ = 17,32 \text{ units}$	<ul style="list-style-type: none"> ✓ trig ratio ✓ answer <p style="text-align: right;">(2)</p>
8.1.2	$AB^2 = AC^2 + BC^2 - 2AC \cdot BC \cos \hat{C}$ $AB^2 = (10\sqrt{3})^2 + (8)^2 - 2(10\sqrt{3})(8) \cos 100^\circ$ $AB = 20,30 \text{ units}$	<ul style="list-style-type: none"> ✓ cosine formula ✓ substitution into cosine formula ✓ answer <p style="text-align: right;">(3)</p>
8.2	$\frac{\sin \hat{A}DB}{AB} = \frac{\sin \hat{A}BD}{AD}$ $\frac{\sin \hat{A}DB}{20,3} = \frac{\sin 73,4^\circ}{20}$ $\sin \hat{A}DB = \frac{\sin 73,4^\circ}{20}$ $\hat{A}DB = 76,58^\circ$	<ul style="list-style-type: none"> ✓ sine formula in $\triangle ABD$ ✓ substitution in the sine formula ✓ answer <p style="text-align: right;">(3)</p>
		[8]
		TOTAL: 100