Education and Sport Development

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GRADE 10

MATHEMATICS PAPER 2

MID – YEAR EXAMINATION 2019

MEMORANDUM

MARKS: 75

This memorandum consists of 6 pages

Question 1

1.1	$PQ = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ $= \sqrt{(7-6)^2 + (4-6)^2}$ $= \sqrt{5}$	✓ formula ✓ substitution ✓ answer (3)
1.2	$\left(\frac{6+x}{2}; \frac{6+y}{2}\right) = \left(\frac{7}{2}; \frac{7}{2}\right)$ $\frac{6+x}{2} = \frac{7}{2}$ $\frac{6+y}{2} = \frac{7}{2}$ $x = 1$ $y = 1$ S(1; 1)	✓ $\frac{6+x}{2} = \frac{7}{2}$ ✓ $\frac{6+y}{2} = \frac{7}{2}$ ✓ answer (3)
1.3	$PR = \sqrt{(x_P - x_Q)^2 + (y_P - y_Q)^2}$ $= \sqrt{(7-0)^2 + (4-3)^2}$ $= \sqrt{50}$ $= 5\sqrt{2}$ $= 7.07$ $QS = \sqrt{(x_S - x_Q)^2 + (y_S - y_Q)^2}$ $= \sqrt{(1-6)^2 + (1-6)^2}$ $= \sqrt{50}$ $= 5\sqrt{2}$ $= 7.07$ $\therefore PR = QS$	✓ substitution ✓ answer ✓ substitution ✓ answer ✓ conclusion (5)
1.4	$m_{QR} = \frac{6-3}{6-0}$ $= \frac{1}{2}$ $m_{RS} = \frac{3-1}{0-1}$ $= -2$ $m_{RS} \times m_{QR}$ $= -2 \times \frac{1}{2}$ $= -1$	✓ substitution ✓ $m_{QR} = \frac{1}{2}$ ✓ $m_{RS} = -2$ ✓ $\frac{1}{2} \times -2$

	$m_{RS} \times m_{QR} = -1$ $\therefore QR \perp RS$	✓ $m_{RS} \times m_{QR} = -1$ (5)
1.5	Rectangle The diagonals are equal and one of the interior angles is equal to 90°	✓ Rectangle ✓ reason
1.6	$\cos \hat{RSQ} = \frac{\sqrt{5}}{5\sqrt{2}}$ $\hat{RSQ} = 71.57°$	✓✓ $\cos \hat{RSQ} = \frac{\sqrt{5}}{5\sqrt{2}}$ ✓ answer (3)

Question 2

2.1.1	$= \frac{1}{2}\sin 112.4^\circ$ $= 0.46$	✓ substitution ✓ answer (2)
2.1.2	$= \text{cosec}(112,4^\circ + 48,6^\circ)$ $= \frac{1}{\sin(112,4^\circ + 48,6^\circ)}$ $= 3.07$	✓ substitution ✓ reciprocal ✓ answer (3)
2.1.3	$= 2\cos\left(\frac{112,4^\circ + 48,6^\circ}{2}\right)$ $= 0,33$	✓ substitution ✓ answer (2)
2.1.4	$= \tan\left(\frac{112.4^\circ}{3}\right)$ $= 0,77$	✓ substitution ✓ answer (2)
2.2.1	$\tan\theta = 2,736$ $\theta = 69,92$	✓ answer (1)
2.2.2	$3\sin(3\theta - 60^0) = 0,531$ $\sin(3\theta - 60^0) = 0,177$ $3\theta = 10,195^0 + 60^0$ $3\theta = 70,195^0$ $\theta = 23,40^0$	✓ division by 3 ✓ simplification ✓ answer (3)

Question 3

3.1.1	$x^2 + y^2 = r^2 \ldots\ldots\ldots pythagoras$ $x^2 + (5)^2 = 13^2$ $x^2 = 169 - 25$ $x^2 = 144$ $x = 12$	✓ substitution ✓ simplification ✓ answer (3)
3.1.2	$\tan\alpha = \frac{y}{x}$ $\tan\alpha = \frac{5}{12}$	✓ answer (1)
3.1.3	$\sin^2\alpha + \cos^2\alpha$ $= \left(\frac{12}{13}\right)^2 + \left(\frac{5}{13}\right)^2$ $=1$	✓ substitution ✓ answer (2)
3.1.4	$\sec\alpha = \frac{1}{\cos\alpha}$ $\sec = \frac{r}{x}$ $= \frac{13}{12}$	✓ $\sec = \frac{r}{x}$ ✓ answer (2)
3.2	$\frac{\cos ec20^\circ.\sin 20^\circ + \tan 45^\circ.\sec 60^\circ}{\cot 45^\circ.\sin 90^\circ}$ $= \frac{\frac{1}{\sin 20^\circ}.\sin 20^\circ + 1.2}{1.1}$ $= \frac{1+1.2}{1}$ 3	✓ $\frac{1}{\sin 20^0}$ ✓ 1 ✓ 2 ✓ 1 ✓ 1 ✓ answer (6)

Question 4

4.1.1	$\hat{O}_1 = 90^\circ$ diagonals bisect at 90°	✓ S ✓ R (2)
4.1.2	$\hat{L}_1 + \hat{O}_1 + \hat{LKM} = 180^\circ$ sum of angles of Δ $\hat{L}_1 = 180^\circ - (34^\circ + 90^\circ)$ $\hat{L}_1 = 56^0$	✓ S/R ✓answer (2)
4.1.3	$\hat{L}_1 = \hat{L}_2 = 56^\circ$ Diagonals bisect the angles $\hat{L}_1 + \hat{L}_2 = \hat{N}_1 + \hat{N}_2$ opp $\angle s$ of a rhombus $\hat{N}_1 + \hat{N}_2 = 56^\circ + 56^\circ$ $\therefore \hat{KNM} = 112^\circ$	✓ S/R ✓ S/R ✓ Substitution ✓ answer (4)
4.2.1	$\hat{ABF} = \hat{BFE} = 2x$ alt $\angle$s AB//BF $\hat{AFE} = x + 2x$ $\therefore \hat{AFE} = 3x$	✓ S/R ✓ S ✓ answer (3)
4.2.2	$\hat{BFE} = 2x$ proven above $\hat{AFE} + \hat{FEB} = 180$ $co-\text{int}\angle s$ AF//FEB $3x + 7x = 180^0$ $10x = 180^0$ $x = 18^0$ $\hat{SFA} = \hat{SAF} = 3x$ $\angle$s opp = sides $\therefore 3(18^\circ) = 54^\circ$ $\therefore 54^0 + 54^0 + y = 180^0$ sum of angles of ΔSAF $\therefore y = 180^0 - 108^0$ $= 72^0$	✓ S ✓ S/R ✓ simplification ✓ x – value ✓ S/R ✓ y – value (6)

5.1	$\hat{ABE} = \hat{FDC}$ $[alt\angle s; AB // DC]$
	BE = FD *given*
	AB = DC *opp sides of parm*
		✓ S/R
		✓ S/R
		✓S/R
		✓ conclusion

	$\therefore \Delta ABC \equiv \Delta CDF \ S;\ \angle;\ S$	(4)
5.2	$\hat{AEB} = \hat{DFC}$ proven above from congruency $\hat{AEB} + \hat{AEF} = 180 \quad \angle s \quad on \quad a \quad str.line$ $\hat{CFD} + \hat{CFE} = 180 \quad \angle s \quad on \quad a \quad st.line$ $\therefore \hat{AEF} = \hat{CFE} \quad (AEB = DFC)$ $\therefore AE//EF \quad [alt \quad \angle s =]$	✓ R ✓ R ✓ conclusion (3)
5.3	AE//FC proven above AE = FC $\Delta ABE \equiv CDF$ $\therefore$ AECF is a parm [Pair of opp sides = and//]	✓ R ✓ R ✓ conclusion (3)