Mathematics

Form two

TERM 3 2023

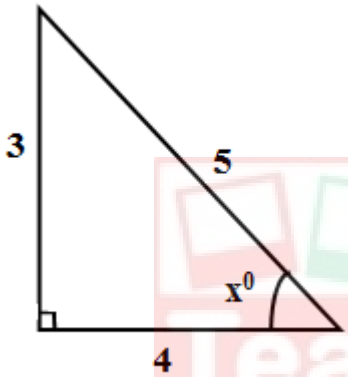
OPENER

EXAM

Marking scheme

NO	WORKING	MARKS	REMARKS
1.	$\frac{1}{0.325} = \frac{1}{3.25 \times 10^{-1}}$ $= 0.3077 \times 10 = 3.077$ $\sqrt[3]{0.000125} = 0.05$ $\frac{\sqrt[3]{0.000125}}{0.325} = 0.05 \times 3.077$ $= 0.15385$	B1 M1 A1	
		3	
2.	$Area\ of\ the\ rhombus = 9 \times 9 \sin 60^0$ $= 70.1481cm^2$ $Area\ of\ the\ sector = \frac{60}{360} \times \frac{22}{7} \times 9^2$ $= 42.4286cm^2$ $Area\ of\ the\ shaded\ region = 70.1481cm^2 - 42.4286cm^2$ $= 27.72cm^2$	M1 M1 A1	
		3	
3.	$\frac{36 - 8 \times -4 - 15(-3)}{3 \times -3 + -8(6 - (-2))}$ **Numerator**: $36 - 8 \times -4 - 15(-3) = 113$ **Denominator**: $3 \times -3 + -8(6 - 2)) = -41$ **Quotient**: $\frac{113}{-41} = -2\frac{31}{41}$	B1 B1 A1	
		3	
4.	$\frac{2y^2 - 3xy - 2x^2}{4y^2 - x^2}$		

	Numerator: $2y^2 - 3xy - 2x^2 = (2y + x)(y - 2x)$ **Denominator**: $4y^2 - x^2 = (2y + x)(2x - y)$ **Quotient**: $\frac{(2y + x)(y - 2x)}{(2y + x)(2y - x)} = \frac{(y - 2x)}{(2y - x)}$	B1 B1 A1	
		3	
5.	$commission = \frac{20}{100} \times £\,30\,000$ $= £\,6000$ $Balance = £\,30\,000 - £\,6000$ $= £\,24\,000$ $Balance\ in\ Kshs = 24\,000 \times 70.50$ $= kshs\ 1\,692\,000$ $Remaining\ amount = kshs\ 1\,692\,000 - kshs\ 900\,000$ $= kshs\ 792\,000$	M1 M1 A1	
		3	
6.	$Number\ formed = 7532$ $\frac{7532}{X} = 1076$ $X = 7$	B1 M1 A1	
		4	
7.	2 | 24 | 27 | 30 | 50 2 | 12 | 27 | 15 | 25 2 | 6 | 27 | 15 | 25 3 | 3 | 27 | 15 | 25 3 | 1 | 9 | 5 | 25 3 | 1 | 3 | 5 | 25 5 | 1 | 1 | 5 | 25 5 | 1 | 1 | 1 | 5 1 | 1 | 1 | 1 $LCM = 2^3 \times 3^3 \times 5^2 = 5400$ seconds $= \frac{5400}{3600} = 1.5$hrs $5.00\text{pm} + 1\text{hr}\ 30\ \text{min} = 6.30\text{pm}$	M1 M1 A1	
		3	
8.	$3 < 13 - 2x$ $2x < 10$		

	$x < 5$ $12 + 5x \geq 7$ $5x \geq -5$ $x \geq -1$ $-1 \leq x < 5$ Integral values: $-1, 0, 1, 2, 3, 4$	B1 B1 B1	
		3	
9.	$\cos x = \frac{4}{5}$  $\tan x = \frac{3}{4}$ $\sin x = \frac{3}{5}$ $\tan x - \sin x = \frac{3}{4} - \frac{3}{5}$ $= \frac{3}{20} = 0.15$	 B1 M1 A1	
		3	
10.	$PQ = OQ - OP$ $OQ = OQ + OP = \begin{pmatrix} 4 \\ -3 \end{pmatrix} + \begin{pmatrix} 2 \\ 5 \end{pmatrix}$ $= \begin{pmatrix} 6 \\ 2 \end{pmatrix}$ $Q(6, 2)$	 M1 M1 A1	
		3	
11.	**Number** | **Log**		

	0.256 → $\bar{1}.4082$ 14.7 → $1.1673+$ 0.5735 → $\mathbf{0.5735}$ 8.6 → 0.9345 38.5 → $1.5855+$ 2.5200 → $\mathbf{2.5200-}$ $\mathbf{\bar{2}.0555}$ $\frac{\bar{2}.0555}{3}=\frac{\bar{3}+1.0555}{3}$ $=\bar{1}.3518$ 0.2248 → 0.2248	M1 M1 M1 A1	For all logs Adding and subtracting Diving by 3
		3	
12.	$VSF=\frac{343}{216}$ $LSF=\sqrt[3]{\frac{343}{216}}=\frac{7}{6}$ $ASF=\left(\frac{7}{6}\right)^2=\frac{49}{36}$ *Curved surface area of the larger cone* $=\frac{49}{36}\times 840=1143.33cm^2$	B1 M1 M1 A1	
		3	
13.	*mass of the mixture* $=800g+1500g=2300g$ *volume of salt* $=\frac{800}{2.2}=363.64cm^3$ *volume of sand* $=\frac{1500}{3.2}=468.75cm^3$ *density of the mixture* $=\frac{2300g}{832.39}$ $=2.76g/cm^3$ or 2760 kg/m^3	M1 M1 A1	
		3	
14.	$4^{3y-4x}=64$		

	$2^{2(3y-4x)} = 2^6$ $2^{6y-8x} = 2^6$ $6y - 8x = 6 \quad (i)$ $3^y \div 9^x = 1$ $3^y \div 3^{2x} = 3^0$ $y - 2x = 0 \quad (ii)$ *Solving* (i)*and* (ii)*simultaneously* $x = 1.5$ $y = 3$	M1 M1 A1	
		3	
15.	$3x + 2y = 12$ $\underline{4x - 2y = 2}$ $7x = 14$ $x = 2$ $y = 3$	M1 M1 A1	
		3	
16.	$r = 17.36666\ldots$ $10r = 173.6666\ldots$ $100r = 1736.6666\ldots$ $100r - 10r = 1736.6666\ldots 173.6666\ldots$ $90r = 1563$ $r = 17\frac{11}{30}$	M1 M1 A1	
		3	

17.	(a) $m = \frac{6--2}{-3-5} = \frac{8}{-8} = -1$ $m = -1, (5, -2)$ $\frac{y--2}{x-5} = -1$ $y + 2 = -x + 5$ $y + x = 3$ (b) (i) $m = -1\ (0,3)(x, y)$ $\frac{y-3}{x-0} = -1$ $y - 3 = x$ $y = x + 3$ (ii) $y + x = 3$ (i) $y = x + 3$ (ii) Solving (i) and (ii) simultaneously $x + 3 + x = 3$ $x = 0\ and\ y = 3$ $The\ point\ is\ (0,3)$ (c) $m = -\frac{1}{2}\ (0, 3)$ $\frac{y-3}{x-0} = -1$ $y - 3 = -x$ $y = -x + 3$ $0 = -x + 3$ $x = 3$	M1 M1 A1 M1 A1 M1 M1 A1 M1 A1	
		10	