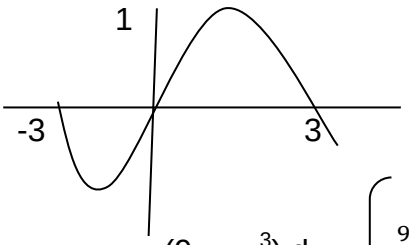
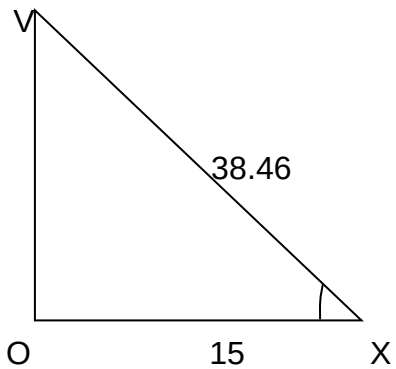
KAKAMEGA NORTH SUBCOUNTY JOINT EXAMINATIONS

KCSE Trial Exam 2018

MATHEMATICS PAPER 2
MARKING SCHEME

1.	$\frac{5}{1000} \times \frac{49}{10000} \times \frac{39}{10} \times \frac{\cancel{1000}}{\cancel{325}} \times \frac{10000}{5} \times \frac{100}{\cancel{6}\ 2}$ $= \frac{\sqrt{490}}{10} = 7$	B1 M1 M1 A1
2.	$(3x^2)^\circ \left(\frac{1}{3X}\right)^6 + (3x^2)^1 \left(\frac{1}{3X}\right)^5 + (3x^2)^2 \left(\frac{1}{3X}\right)^4 + (3x^2)^3 \left(\frac{1}{3X}\right)^3 +$ $(3x^2)^4 \left(\frac{1}{3X}\right)^2 + (3x^2)^5 \left(\frac{1}{3X}\right)^1 + (3x^2)^6 \left(\frac{1}{3X}\right)^\circ$ $9x^4 \times \frac{1}{81x} \times 15 = \frac{5}{3}$	B1 M1 A1
3.	$\frac{2}{2\sqrt{6}\ \sqrt{3}} \quad \frac{\sqrt{6} - \sqrt{3}}{\sqrt{6}\ \ \sqrt{3}} = \frac{2\sqrt{6} - 2\sqrt{3}}{3}$ $\frac{5}{\sqrt{7} - \sqrt{5}} \quad \frac{\sqrt{7} + \sqrt{5}}{\sqrt{7} + \sqrt{5}} = \frac{5\sqrt{7} + 5\sqrt{5}}{2}$ $\frac{2\sqrt{6} - 2\sqrt{3}}{3} - \frac{5\sqrt{7} + 5\sqrt{5}}{2}$ $= \frac{4\sqrt{6} - 4\sqrt{3} - 15\sqrt{7} - 15\sqrt{5}}{6}$	M1 M1 A1
4.	$\frac{\text{Tan } 45 - \cos 30}{-\sin 30 + (-\cos 60)}$ $\frac{\frac{1 - \sqrt{3}}{2}}{-\frac{1}{4}} = 2\sqrt{3} - 2$	B1 M1 A1
5.	$(a - b)^2 = (\sqrt{b^2 + c^2})^2$ $a^2 - 2ab + b^2 = b^2 + c^2$ $c^2 = a^2 - 2ab$	 M1 M1

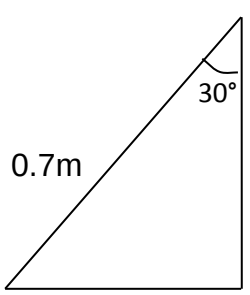
	$c = \pm \sqrt{a^2 + 2ab}$	A1
6.	$AB = \begin{pmatrix} K & 4 \\ 3 & 2 \end{pmatrix} \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix} = \begin{pmatrix} 12 + K & 2K + 16 \\ 9 & 14 \end{pmatrix}$	M1
	$14(12 + K) - 9(2K + 16) = 4$	M1
	$\begin{pmatrix} 5 & 0 \\ 0 & 1 \end{pmatrix} \begin{pmatrix} 2 & 3 & 3 \\ 0 & 2 & 4 \end{pmatrix} = \begin{matrix} A' & B' & C' \\ \begin{pmatrix} 10 & 15 & 15 \\ 0 & 2 & 4 \end{pmatrix} \end{matrix}$	A1
7.a.	$x^2 + y^2 + 2x - 3y = 13$	M1
	$x^2 + 2x + 12 + y^2 - 3y + (\frac{3}{2})^2 = 13 + 1 + \frac{9}{4}$	
	Centre = $(-1, \frac{3}{2})$	A1
	$\sqrt{(-1)\ 2 + (\frac{3}{2})^2} = 1.8028$	
b.	$(-1, \frac{3}{2})$ $(3, 2)$	
	$\sqrt{(-1 - 3)^2 + (\frac{3}{2} - 2)^2} = \sqrt{16 + \frac{1}{4}} = 4.031 \times 2$	M1
	$= 8.062$	A1
8.	$x + y + 2 = 9$	
	$y = \frac{1}{2}(x + z)$	
	$x = \frac{1}{2} z$	M1
	$\frac{1}{2} z + \frac{1}{4} z + \frac{1}{2} z + z = 9$	
	$z = 4$	M1
	$x = 2,\ y = 3$	
	The number is 234	A1
9.	$Y = \frac{\beta}{xn} \Longrightarrow 12 = \beta \Longrightarrow \beta = 12 \times 2^n$	M1
	$3 = \frac{\beta}{4n} \Longrightarrow \beta = 3 \times 4^n$	
	$12 \times 2n = 3 \times 4n \Longrightarrow 4 \times 2^n = 4^n \Longrightarrow n = 2$	M1 A1
	$\beta = 12 \times 4 = 48$	A1

10.	$x(9 - x^2) = 0$ $x = 0, -3$ or 3	B1
		
	$(9x - x^3)\,dx = \left[\frac{9}{2}x^2 - \frac{x}{4}^4\right]_{-3}^{0}$	M1
	$= -20\frac{1}{4}$	
	$\left[\frac{9}{2}x^2 - \frac{x}{4}^4\right]_{0}^{3}$	M1
	$= 20\frac{1}{4}$	
	Area $= 20\frac{1}{4} + 20\frac{1}{4}$	
	$= 40\frac{1}{2}$	A1
11.	$18^2 + v^2 = (12 + r)^2$	M1
	$180 = 24r$	M1
	$R = 7.5$cm	A1
12.	$VX = \sqrt{40^2 - 11^2} = 38.46$	B1
		
	$\cos\theta = \frac{15}{38.46} = 0.3900$	M1

	$\theta = 67.04$	A1
13.	$2\begin{pmatrix} 3 \\ -2 \\ 3 \end{pmatrix} - 3\begin{pmatrix} 2 \\ -4 \\ -3 \end{pmatrix} = \begin{pmatrix} 0 \\ 8 \\ 15 \end{pmatrix}$ $\sqrt{8^2 + 15^2}$ = 17 units	M1 M1 A1
14.	$\pm$ 2 $\sqrt{25x^2}$ x $\sqrt{9}$ = $\pm$ 2 (10x) (3) = $\pm$ 45 x	 M1 A1
15.	$5.42 = 8.82 + 9.22 - 2(8.8)(9.2)\cos A$ Should use cosine rule to find any angle A = 34.83° $\frac{5.4}{\text{Sin } 34.84} = 2r$ r = 4.72 = 5cm	 B1 M1 A1
16.	(i) < ABC = 66° (ii) < BCA = 33°	A1 A1
	SECTION II	
17.	Tax p.a = 28, 800 720 + 7,920 Sh 37,440 4512 x 2 = 9024 4512 x 3 = 13536 4*x* = 14880 *x* = 3720 (4512) x 2 + 3720 = K£ 12744 p.a $\frac{115}{100}$ x (*x*) - 366 = 12744 *x* = K£ 11400 ⟶ basic salary $\frac{11400 \times 20}{12}$ = Sh 19,000 p.m. Net salary per month	 M1 A1 M1 M1 A1 M1 M1 M1 M1

	19000 – (1200 + 2400 + 1500) = sh.13900	A1

18.	< 60 △ABC Bisect AB Shading Arc CQ Shading Bisecting <C Shading	B1 B1 B1 B1 B1 B1 B1 B1
	Area = $\frac{36}{360} \times \frac{22}{7} \times \frac{0.5}{3.5} \times 3.5$	M1
	= $3.85cm^2$	A1

19.		
a.	$\frac{45}{360} \times 2 \times \frac{22}{7} \times 0.7 = 0.55$ m	M1M1 A1
b.i.	 Cos 30 = AB / 0.7 AB = 0.7 cos θ AB = 0.6062M	M1 M1 A1
ii.	120 + 110 = 230° $\frac{230}{360} \times \frac{22}{7} \times (0.7 \cos 60)^2$ $= 0.246M^2$	B1 M1 M1 A1
20.		
	a. both = x ; HBP = 15 – x : cholesterol = 25 – x 15 – x + 25 – x + x = 30 x = 10 = 15 – 10 = 5	B1 M1 M1 A1
	P(HBP) = $\frac{5}{40} = \frac{1}{8}$	M1 A1
	b. P(CHOL) = 25 – 10 = $\frac{15}{40} = \frac{3}{8}$	M1 A1
	c. P(BOTH) = $\frac{10}{40} = \frac{1}{4}$	M1 A1

	d. P(EITHER HBP or CHOL) = $\frac{1}{8} + \frac{3}{8} + \frac{4}{8} = \frac{1}{2}$	
21.a.	$\frac{3^{4}}{3^{2x}} \Longrightarrow 4 - 2x$ $\frac{3^{2x}}{3^{2x+1}} \Longrightarrow 2x - 2x - 1$ $4x - 2x = 1 \qquad 2x = 5 \qquad x = \frac{5}{2}$	M1 A1
b.	$(3^{2})^{5/7} = 3^{5}$ $\frac{81}{243} = \frac{1}{3}$	M1 A1
c.	$\frac{729\ (1 - \frac{1}{3})^{10}}{1 - \frac{1}{3}}$ $\frac{729\ (0.9999)}{\frac{2}{3}} = 1093.5$	M1 M1 A1
d.	For the AP a = 9 d = 8 n = 20 $\frac{20}{2}[18 - 8 \times 19]$ $10\ (-134) = -1340$	B1 M1 A1
22.	Log (y – x) = blox + log A	B1

X	1	1.5	2	2.5	3	3.5	4
Y	7.54	9.33	11.00	12.59	14.12	19.90	27.23
y-x	6.54	7.83	9.00	10.09	11.12	16.40	23.23
Log (y-x)	0.82	0.89	0.95	1.00	1.05	1.21	1.37
Log (x)	0	0.18	0.30	0.40	0.48	0.54	0.60

B1

B1

B1

b.	Graph P1 Log a = 0.8 A = 6.310 1.05 - 0.8 0.48 – 0	L1 S1 M1 A1 A1

	= 0.5208 $y = x + 6.310x^{0.5208}$	B1
23.		

marks	f	c.f
0 - 9	6	6
10 – 19	8	14
20 – 29	12	26
30 – 39	9	35
40 – 49	7	42
50 – 59	5	47
60 - 69	3	50

B1

Curve B2

i. Median
½ x 50 = 25 ⟶ 28 B1

ii. Q3; ¾ x 50 = 37.5 ⟶ 42
Q; ¼ x 50 = 12.5 ⟶ 17 B1

$\frac{42 - 17}{2} = 12.5$ A1

iii. $\frac{20}{50} \times 100 = 40\%$ M1A1

iv. $\frac{35}{100} \times 50 = 17.5 \longrightarrow 22$ M1

v. $\frac{65}{100} \times 50 = 32.5 \longrightarrow 36$

36 - 22 = 14 A1

24.a.
5x + 8y > 800 B1
x + y ≤ 250 B1
x ≤ 200
x ≤ 50 B1
y ≤ 2x B1

b. Graph
Each correct drawing + correct shading for each B4

c. 85 seats y = 165 seats B1B1