KAPSABET BOYS TRIAL 1 2025 MARKING SCHEME

MATHS PAPER 1 MS

1. $p^2 = \frac{x + 2w}{4x + 3R}$ M1

$4p^2x + 3p^2R = x + 2w$

$4p^2x - x = 2w - 3p^2R$

$X(4p^2 - 1) = 2W - 3p^2R$ M1

$X = \frac{2w - 3p^2R}{4p^2 - 1}$ A1

2. $p = av^2 + bv^3 : 4a + 8b = -20$ M1

$9a - 27b = 135$

$36a + 72b = -180$

$36a - 108b = 540$

$180b = -720$ M1

$B = -4$

$-20 = 4a + 32$

$4a = -52$

$a = -13$

$p = -13V^2 + 4V^3$ A1

3. $(1+2x)^7 = 1 + 7(I)^6(2x)^1 + 21(1)^5 + 35(1)^4(2x)^3$ B1

$= 1 + 14x + 84x^2 + 280x^3 + \_ \_ \_ \_$

$(1.02)^7 = (1 + 0.02)^7 = (1 + 2x)^7$

$2x = 0.02 \longrightarrow x = 0.01$

Subst $x = 0.01$

$(1.02)7 = 1 + 14(0.01) + 84(0.01)^2 + 280(0.01)^3$ M1

$= 1 + 0.14 + 0.0084 + 0.00028$

$= 1.14868$

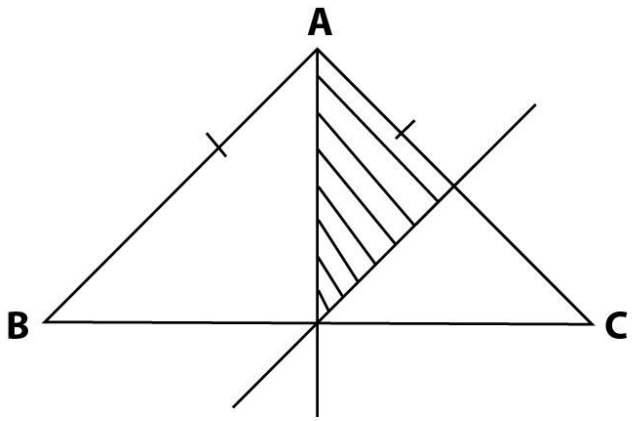
$= 1.1487$ (to 4d.p) A1

4. $\frac{\sqrt{2}-1}{4\sqrt{2} - 3} \times \frac{4\sqrt{2} + 3}{4\sqrt{2} + 3} = \frac{\sqrt{2}(4\sqrt{2}+3)-1(4\sqrt{2}+3)}{4\sqrt{2}(4\sqrt{2} + 3) - 3(4\sqrt{2} + 3)}$ M1

$= 8 + \frac{3\sqrt{2} - 4\sqrt{2} - 3}{32 + 12\sqrt{2} - 12\sqrt{2} - 9}$ A1

$= 5 - \frac{\sqrt{2}}{23}$ A1

5.



B1 locus between AB and BC

B1 locus between A and C

B1 Shaded Region

6. Max val of x 13.45min 13.35 B1

Max val of Y 4.35 min 4.25

Max vals of x $\frac{13.45}{4.25}$ = 3.164y

Min value of $\frac{x13.35}{Y\ 4.35}$ = 3.069

Actual value of $\frac{x13.4}{y\ 4.3}$ = 3.1163 B1

Absolute error = $\frac{3.1642 - 3.069}{2}$ = 0.04785

Percentage error = $\frac{0.04785 \times 100}{3.1163}$ = 1.5355% A1

7. $A^2 = \begin{pmatrix}1 & 2\\ 4 & 3\end{pmatrix}\begin{pmatrix}1 & 2\\ 4 & 3\end{pmatrix} = \begin{pmatrix}9 & 8\\ 16 & 17\end{pmatrix}$ M1

Let B be = $\begin{pmatrix}a & b\\ c & d\end{pmatrix}$

$\begin{pmatrix}9 & 8\\ 16 & 14\end{pmatrix} = \begin{pmatrix}1 & 2\\ 4 & 3\end{pmatrix} + \begin{pmatrix}a & b\\ c & d\end{pmatrix}$

$\begin{pmatrix}\end{pmatrix}\ \begin{pmatrix}\end{pmatrix}\ \begin{pmatrix}\end{pmatrix}$

a + 1 = 9 a = 8

b + 2 = 8 b = 6 M1

c + 4 = 16 c = 12

d + 3 = 17 d = 14

B $\begin{pmatrix}8 & 6\\ 12 & 14\end{pmatrix}$ A1

8. a) 6 x R = 4.8 x 5 M1

$XR = \frac{4.8 \times 5}{6}$

$= 4$ A1

b) $QT^2 = 18 \times 8 = 144$ M1

Qt = 12cm A1

9. $(2-1)^2 + (5 - K)^2 = 10$

$1 - 25 - 10K + 1K^2 = 10$

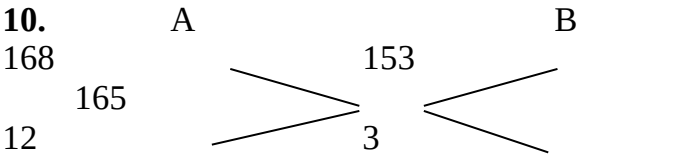
$K^2 - 10K + 16 = 0$

$(K-2)(K - 8) = 0$

$K = 2$ or 8

Centre (1,2) and (1,8)

10.



M1

4:1 A1

Alt: Method

$\frac{168A + 153B}{A + B} = 165$ M1

$3A = 12B$

$\frac{A}{B} = \frac{12}{3} = \frac{4}{1}$

A:B 4:1 A1

11. $\frac{\text{Log } 5x - 4}{x + 2} = \text{Log } 3$ M1

$\frac{5x - 4}{x + 2} = 3$ M1

$5x - 4 = 3x + 6$

$2x = 10$

$x = 5$ A1

12. (a) $\frac{1}{3.25} \times 10$

$= 0.3077 \times 10 = 3.077$ B1

(b) 0.05×3.077 M1

$= 0.1539$ A1

13.

14. $\sin(3\theta - 50^o) = \cos(2\theta + 10^o)$

$3\theta - 50 + 2\theta + 10^o - 90^o$

$5\theta - 40^o = 90^o$

$5\theta = 130^o$

$\theta = 26^o$

15. $4.5L = 4.5 \times 10^3 cm^3$

$9m^3 = 9 \times 10cm^3$

v.s.f 4.5×10^3 : 90×10^6

1 : 2000
l.s.f 3√1 : 3√2000
1 : 12.6
90cm = x
h= 90 x 12.6
1134cm

16.

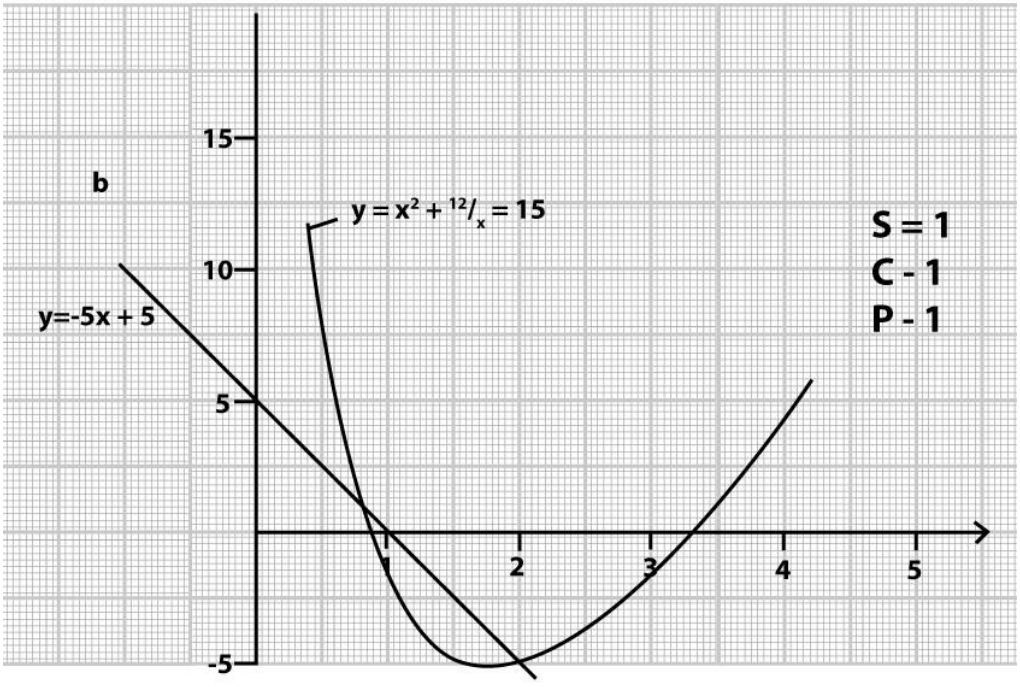
PR: RQ = 3:4
PS : SR = 5: -2
PQ = 8CM
RS = $^{2}/_{7}$ PQ

= $^{2}/_{7}$ x 8

= 2.29cm

17. a)

X	1	1.5	3	3.5	4
Y	-2	-4.75	-2	0.6	4



(I) $1.15 \leq x \leq 2.75$ B2

(II) $y = 2^2 + {}^{12}/_{x} - 15$

$y = x^2 + {}^{12}/_{x} - 5x + 20$ M1

$y = -5x + 5$

X	0	1
y	5	0

M1

$x = 2$ or $0.8\pm$ A1

18. (a) 1st three terms are a, ar, ar^2 M1

Product a x ar x $ar^2 = 64$

$a^3r^3 = 64$ A1

$r^3 = {}^{64}/_{a^3}$

$r = {}^{4}/_{a}$

sum $a + ar + ar^2 = 14$

but $R = {}^{4}/_{a}$

$(a + a)\ 4/a) + a\ (4/a)2 = 14$ M1

$A + 4 + 16/q - 14$

$a^2 - 10a + 16 = 0$

$a^2 - 2a - 8a + 16 = 0$ M2

$a(a-2) - 8(a - 2) = 0$ A1

$a = 8$ or $a = 2$

when $a = 2$, $r = 2$ when $a = 8$, $r = ½$ B1

for $a = 2$: Sequence 2, 4, 8, 16

For $a = 8$: Sequence 8,4,2,1 A1

50^{th}term are ar^{49} and ar^{49} M1

$2(2)^{49}$ and $8(½)^{49}$

Product $2(2)^{49}$ x $8(½)^{49}$ A1

= 16

19. a) (i) Taxable income 38892 + 2108 – Shs. 41,000 M1A1

(ii) 10164 x ${}^{10}/_{100}$ = 1016.40

9576 x ${}^{15}/_{100}$ = 1436.40 M1

9576 x ${}^{20}/_{200}$ = 1915.21

9576 x ${}^{25}/_{100}$ = 2394.00 M1

Rem 2108 x 30/100 = 632.40 M1

7394.40 M1

Less relief 1162.00

Kshs. 6232.40 A1

(b) Total deductions		41,000	
	15,000		
Basic solar	26,000		M1

$^{5}/_{100}$ x 26000 = 1300 + payee

1300 + 6232.40 = 7532.40 M1

Net pay 41000 = 7532.40

Kshs 33,476.60 A1

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20. Let A = 62

Marks	**f**	**x**	**D=x-A**	**fd**	**d^2**	**fd^2**
45-49	3	47	-15	-45	225	675
50-54	9	52	-10	-90	100	900
55-59	13	57	-5	-65	25	325
60-64	15	62	0	0	0	0
65-69	5	67	25	25	25	125
70-74	4	72	40	40	100	400
75-79	1	77	15	15	225	225
	F = 50			Efd - 120		=2650

B1 d value

B1 fd^2ratio

B1 -

(i) Mean $\bar{x} = A + \frac{Efd}{Ef}$

$62 + -\frac{120}{50}$ M1

$= 62 - 2.4 = 59.6$ A1

b) $v = \frac{Efd^2}{Ef} - \left(\frac{Efd}{Ef}\right)^2$ M1

$= \frac{2560}{50} - \left(\frac{120}{50}\right)^2 = 53 - 5.76$ M1A1

c) $s.d = \sqrt{\frac{Efd^2}{Ef} - \left(\frac{Efd}{Ef}\right)^2}$ M1

$\sqrt{47.24}$

= 6.873 A1

10

21.

B / 1	1	2	3	4
	5			
	2	3	4	5
	6			
2	3	4	5	6
3	7			
4	4	5	6	7

B3

5	8
6	5 6 7 8
	9
	6 7 8 9
	10
	7 8 9 10
	11

(a) P = (x) = $^1/_6$ M1

(b) P(x and z) = p(x) x p(2) M1A1

$^1/_6$ x$^1/_6$ = $^1/_{36}$

(c) Event Y B1

(d) Event Z B1

(e) P(Y) = $^5/_{36}$ M1A

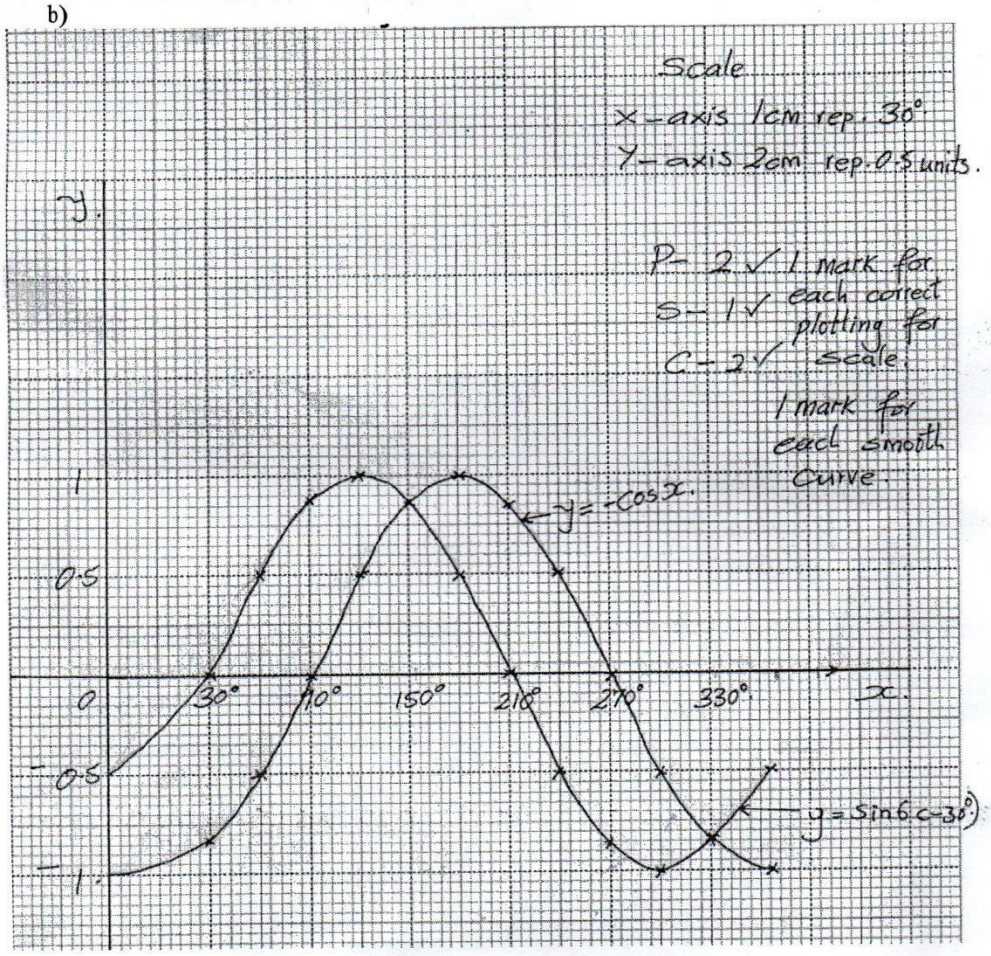
22.

a)

X	0°	30°	60°	90°	120°	150°	180°	210°	240°	270°	300°	330°	360°
-cos x	-1	-0.87	-0.5	0	0.5	0.87	1	0.87	0.5	0	-0.5	-0.87	-1
Sin (x - 30°)	-0.5	0	0.5	0.87	1	0.87	0.5	0	-0.5	-0.87	-1	-0.87	-0.5

Table ✓ 2 – 1 mark for every 6 correct values

b)



c) (Sin x-30) = -C0s x M1

Then X = 150 ^{0} B1

X = 330^0 B1

23.

(a) $<STQ = <PQS = 28^o$ B1

Angles in alternative segment. A1

(b) $<TQU = \frac{180 - 54}{2} = 63^o$ A1

Base angles of an isosleles triangle B1

(c) $<TQS = 63 - 28 = 35^o$ M1

$<TUQ$ is alternative to $<PQT = 63$ B1

(d) $<UOQ = 54 \times 2 = 108^o$

Angle subtended at the centre is twice that at the circumference by the same chord UQ B1

$\therefore$Reflex$<UOQ = 360 - 108^o$ A1

(e) $<TQR = <TSQ$

$= 180 - (28 + 35) = 117$ B1

Angles in alternative segment are equal A1

24. $C = n + {}^{1}/_{n}$

$C = kn + {}^{c}/_{n}$ M1

$135 = 2k + {}^{c}/_{2}$- (i)

$140 = 3k + {}^{c}/_{3}$- (ii) M1

$270 = 4k + c$ - - (i)

$420 = 9k + c$ + (ii)

$-150 = -5k$

$K = 30$

$270 = (4x30) + C$ M1

$270 = 120 + C$

$C = 150$ A1 correct value K & C

$\therefore C = 30n + {}^{150}/_{11}$ A1

b. $C = (30 \times 10) + {}^{150}/_{10}$ M1

$=$ Shs. 315

c. $756 = 30n + {}^{150}/_{n}$

$756n = 30n^2 + 150$ M1

$30n^2 = 756n + 150 = 0$

$15n^2 - 378n + 75 = 0$ $ac = 1125$ -375 and -3 M1

$15n^2 - 375n - 3n + 75 = 0$ $b = 378$

$15n(n - 25) - 3(n - 25)$

$(15n - 3)(n - 25) = 0$

$N = 25$ A1

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