

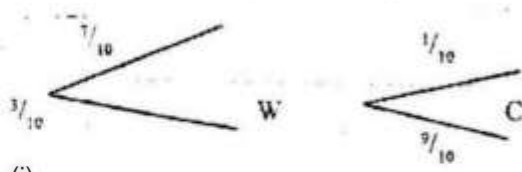


K.C.S.E 2002 MATHEMATICS PAPER 12 / MARKING SCHEME

SOLUTION	M.A.S	ALTERNATIVE METHOD
1. $\frac{+4 \times 4 - (20)}{-6 - (+6 + 3)} + (6) = \frac{4 \times 4 + 20}{-6 \times 2 - 6} = \frac{36}{-18}$	3 marks	
2. Either $(x + 4xy + 4y) - (x - 4xy + 4y)$ $4xy + kxy$ $8y$ or $\{(x + 2y) - (x - 2y)\} \{(x + 2y) + (x - 2y)\}$ (4×2) $8xy$	2 marks	
3. $Px - Py = xy$ $Px = xy + Py$ $Px = y(x + P)$ $y = \frac{Px}{x + P}$	2 marks	
4. $XY = OY - OX$ $= \begin{vmatrix} 3 & 2 \\ 2 & -1 \\ -2 & -3 \end{vmatrix} \cdot \begin{vmatrix} 1 \\ 1 \\ 1 \end{vmatrix}$ $= i + j + k$	2 marks	$xy = 1$ i i
5. $1 = 0.04072$ 24.56 $4.346 = 18.89$ $0.04072 + 18.89 = 18.9307$ $= 18.93$	3 marks	
6. $H = 12 \sin 60$ $= 10.39$ $AD = (12 \cos 60) \times 2 + 4$ $= 16$ $\text{Area} = \{1/2 \times (4 + 16) \times 10.39\}$ $= 103.9 \times 2$ $= 207.8 \text{ cm}^2$	MI AI 4 marks	
7. (a) Swiss francs $52 / 1.28 = 40.63$ (b) Kshs 40.63×45.21 1837	BI AI	
8. $X > 1$ $X < 4$ 	BI BI 3 marks	31
9. $P < -0.09 = 150\ 700$ $P = 150\ 700$ $\frac{0.09}{100} \times 150\ 700 = 135.63$	MI M;	

	SOLUTION	MARKS	ALTERNATIVE METHOD										
	<table border="1"> <tr> <td>Ne</td> <td>Ino</td> </tr> <tr> <td>150 700</td> <td>5.1781</td> </tr> <tr> <td>0.913</td> <td>19590x3</td> </tr> <tr> <td></td> <td>T.8770</td> </tr> <tr> <td>2.0x10°</td> <td>5.3011</td> </tr> </table>	Ne	Ino	150 700	5.1781	0.913	19590x3		T.8770	2.0x10°	5.3011	MI AI 4marks	
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10.	<p>(a) Making 3 equal length from B along BA and joining the last point Z to C Construction of angle at x equal to angle Z and identify D</p> <p>(b) Area of DABD = $\frac{1}{2} \times 2.7 \times 8$ = 183cm^2</p>	BI BI MI AI 4marks											
11.	<p>x-section area = $22(4-3) \text{cm}$</p> <p>Volume = $22 \times 7 \times 0.2 \text{cm}$ = em</p>	MI AI											
12.	<p>MY = $14 - 8 = 6 \text{CM}$ Therefore 4 (MQ) = 8×6 MQ = 12</p>	ML AI 2marks											
13.	<p>a) $x = N5) - T = 4$ $x = 21$ Therefore $\cos x = \frac{2}{5}$ $= \frac{25}{5}$</p> <p>b) $\tan(90 -) = 2$</p>	BI BI BI 3 marks											
14.	<p>$P = k + \frac{q}{10} = k + 1.5c \quad z = 15$ $20 = k + \frac{c}{125} \quad K + 125 = 25$ $P = 75 - 40 \quad c = -40 \quad K = 75$ 0.5</p>	MI MI AI 4 marks											
15.	<p>$(5 \times 220) + (3 \times 120) + (4 \times 180) + (12 \times 150)$ $6 + 3 + 4 + 2$ $\frac{2700}{70} = 180$</p>	MI ML MI 4marks											
16.	<p>$(i) \frac{dy}{dx} - 6x^2 + x + 4$ When $x = 3$ $\frac{dy}{dx} = 0 + 18 + 12 + 4 = 34$</p> <p>$(i) \int (3x^2 - 6x + 4) dx = x^3 - 3x^2 + 4x + C$ When $x = 3, y = 0$ $27 - 27 + 12 + C = 0$ $C = -12$ $y = x^3 - 3x^2 + 4x - 12$</p>	MI 4 marks											

SOLUTION	MARKS	ALTERNATIVE METHOD
17. (a) $\text{O } 750,000 \times \frac{90}{100}$ $= 675,000$ (i) $675,000 (1.1^\circ = 898.425)$ $898.425 + 75,000 = 973\ 425$ (b) $675,000 (1.1^\circ = 816.750)$ $(1.1y = 1.21)$ $n = 0.0828$ 0.0414 $n = 2 \text{ years}$	MI A! MI AI MI AI 8 marks	
18. (a) $AC = \sqrt{82^2 + 62^2} = \sqrt{100} = 10$ $EC = \sqrt{(0.2 + 2.0)^2} = \sqrt{5} \times 100 = 10/\sqrt{5}$ $\text{O } \text{Sin } Q = \frac{8}{\sqrt{5}}$ $= 20.96^\circ$ (ii) $\text{Tan } x = \frac{8}{20}$ $x = 21.8^\circ$	BI MI, Ai MI AI Mi MI AI	
19. $\text{O } \begin{matrix} \text{HHH} & \text{HHT} & \text{HTH} & \text{HTT} \\ \text{TTT} & \text{TTH} & \text{THT} & \text{THT} \end{matrix}$ $\text{O } P(\text{at least two heads}) = \frac{4}{8}$ or $\frac{1}{2}$ (i) $P(\text{only one tail}) = \frac{3}{8}$ b)   (i) $\frac{(7 \times 5)}{60} - \frac{(3 \times 1)}{10} = \frac{35}{60} - \frac{3}{20} = \frac{35}{60} - \frac{9}{60} = \frac{26}{60} = \frac{13}{30}$ $\text{ii) } \frac{3}{10} \times \frac{9}{10} = \frac{27}{100}$	BI BI BI B BI BI MI AI BI 8 marks	

SOLUTION

MARKS

ALTERNATIVE METHOD

20.

a) Gradient = -1

$y = x + 7$

(b) $7 - x = (x - 1)^2 + 4$

$x^2 - 2x = 0$

$(x - 2)(x + 1) = 0$

$x = 2, y = 5$

$x = -1, y = 6$

cord

P(-1.8

$\frac{1}{2} \cdot (8+5) \cdot 3 - 2(x$

$= \frac{39}{2} - \frac{x^2 - x}{3}$

$= 19.5 - 82 + \frac{5}{5}$

$= 19.5 - 15$

$= 4.5$ or $4 \frac{1}{2}$

21. (a) Construction o

Completion of

(b) bisector off

Location of S,

(c) Consturcti

SQ constr

through R

T, T, = 4.7 ±

ICG

$2a + 3b = -4$

$5a + 3b = -1$

$a = 1, b = -2$

Therefore M

$\begin{pmatrix} 0 & 1 & -2 \\ 0 & 1 & 1 \end{pmatrix}$

$CY = (2, 1$

$\begin{pmatrix} 1 & -2 \\ 0 & 1 \end{pmatrix}$

23. $\frac{135\pi}{70}$

Area of sect

U

(1) $\frac{1}{2} \cdot r^2 \cdot \theta$

$\frac{3223}{3}$

Vie

BI

BI

MI

MI

(b) $\frac{1}{2} \cdot h \cdot r$ - area of $\frac{1}{2} \cdot W \cdot w$ face

$r = \frac{924 \times 7}{22 \times 28}$

$= 10.5$ cm

$h = (28 - 10.5) = 25.96$

MI

AI

8 marks

p	1.2	1.5	2.0	2.5	3.5	4.5
LogP	0.08	0.18	0.30	0.40	0.54	0.65

BI

R	1.58	2.25	3.39	4.74	7.86	11.5
logr	0.20	0.35	0.53	0.68	0.90	1.06

B2

Scale SI

Plotting PI

Line LI

$\log k = 0.05 = T.95$ BI

$K = 0.8913 \times 89$ BI

$N = \frac{2}{3} = 0.6667$

0.6667 ± 0.0200

8 marks

