

	MARKING GUIDE MATH 456/2	Comments
1.	$\sqrt{243} - \sqrt{108} + \sqrt{75}$ $\sqrt{3 \times 81} - \sqrt{3 \times 36} + \sqrt{3 \times 25}$ $9\sqrt{3} - 6\sqrt{3} + 5\sqrt{3}$ $(9 - 6 + 5)\sqrt{3}$ $8\sqrt{3}$	my my B1 A1 4
2.	Let A be (x, y) $\frac{x+5}{2} = 2$ $x = -2$ also $\frac{y+5}{2} = 3$ $y = 1$ $\therefore A(-2, 1)$	my A1 A1 B1 4
3.	$gf(x) = g\left(\frac{1}{x}\right)$ $= \frac{2}{\frac{1}{x}} - 1$ $gf(x) = 0$ $\frac{2}{x} - 1 = 0$ $\frac{2}{x} = 1$ $x = 2$	my A1 my A1 4

4

$$3.61 = \left(\frac{100-5}{100}\right)^2 \times P$$

$$P = \frac{3.61}{0.95^2}$$

$$P = 4 \text{ millions}$$

MY ^{for 100-5}
A1 95

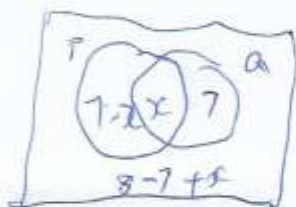
MY
A1

(4)

5

$$n(P) = n(P' \cap Q) = 7 \quad n(Q') = 8$$

$$n(U) = 20$$



$$7 + 7 + 1 + x = 20$$

$$x = 20 - 15$$

$$x = 5$$

$$n(P \cap Q) = 2$$

B1 correct venn
A1
A1

MY
A1

B1 (4)

6

$$MSE = \frac{54}{24} = \frac{9}{4}$$

$$LSF = \frac{3}{2}$$

$$VSP = \frac{27}{8}$$

$$\frac{27}{8} = \frac{V}{144}$$

$$V = \frac{27}{8} \times 144$$

$$V = 486 \text{ cm}^3$$

B1
B1
B1

B1 (4)

7.



$$\theta = \tan^{-1}\left(\frac{12}{8}\right)$$

$$\theta = 56.3^\circ$$

$$\text{Volume} = \frac{1}{3} \times 8 \times 6 \times 12$$

$$= 192 \text{ cm}^3$$

my

A1

my

A1

(4)

8



$$AB = AO + OB$$

$$= \begin{pmatrix} 2 \\ -4 \end{pmatrix} + \begin{pmatrix} 7 \\ -7 \end{pmatrix}$$

$$= \begin{pmatrix} 9 \\ 3 \end{pmatrix}$$

$$OX = OA + AX$$

$$\begin{pmatrix} -2 \\ 4 \end{pmatrix} + \frac{1}{3} \begin{pmatrix} 9 \\ 3 \end{pmatrix}$$

$$\begin{pmatrix} -2 \\ 4 \end{pmatrix} + \begin{pmatrix} 3 \\ 1 \end{pmatrix} = \begin{pmatrix} 1 \\ 5 \end{pmatrix}$$

my

A1

my

A1

(4)

9

$$y = a + \frac{b}{x} \quad (a, b \text{ are constants})$$

$$11 = a + \frac{b}{2} \Leftrightarrow 22 = 2a + b \quad \dots (i)$$

$$7 = a + \frac{b}{6} \Leftrightarrow 42 = 6a + b \quad \dots (ii)$$

$$\text{ii} - \text{i} \quad 20 = 4a \Leftrightarrow a = 5$$

$$b = 22 - 10 = 12$$

$$y = 5 + \frac{12}{x} = 8$$

B7

B7

my

A1

(4)

10

$$5 \text{ cm}^2 \rightarrow 7.2 \text{ km}^2$$

$$1 \text{ cm}^2 \rightarrow \frac{7.2 \text{ km}^2}{5}$$

$$1 \text{ cm}^2 \rightarrow 1.44 \text{ km}^2$$

$$1 \text{ cm} \rightarrow 1.2 \text{ km}$$

$$9 \text{ cm} \rightarrow 9 \times 1.2$$

$$= 10.8 \text{ km}$$

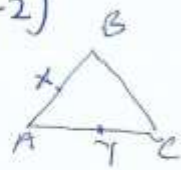
B
B
M
A
(4)

11

$$AC = \begin{pmatrix} 8 \\ 2 \end{pmatrix} \quad BC = \begin{pmatrix} 4 \\ -2 \end{pmatrix}$$

$$\vec{AB} = AC + CB$$

$$\vec{AB} = \begin{pmatrix} 8 \\ 2 \end{pmatrix} + \begin{pmatrix} -4 \\ 2 \end{pmatrix}$$



$$\begin{pmatrix} 4 \\ 4 \end{pmatrix}$$

$$AX = \frac{1}{2} AB$$

$$\vec{AX} = \frac{1}{2} \begin{pmatrix} 4 \\ 4 \end{pmatrix}$$

$$= \begin{pmatrix} 2 \\ 2 \end{pmatrix}$$

$$XC = XA + AC$$

$$\vec{XC} = -\begin{pmatrix} 2 \\ 2 \end{pmatrix} + \begin{pmatrix} 8 \\ 2 \end{pmatrix}$$

$$= \begin{pmatrix} 6 \\ 0 \end{pmatrix}$$

$$AY = \frac{1}{2} AC$$

$$= \frac{1}{2} \begin{pmatrix} 8 \\ 2 \end{pmatrix}$$

$$= \begin{pmatrix} 4 \\ 1 \end{pmatrix}$$

$$|XC| = \sqrt{6^2 + 0^2}$$

$$= 6$$

$$\vec{XY} = \vec{XA} + \vec{AY} = \begin{pmatrix} -2 \\ 1 \end{pmatrix} + \begin{pmatrix} 4 \\ 1 \end{pmatrix} = \begin{pmatrix} 2 \\ 2 \end{pmatrix}$$

$$BC = 2XY \Rightarrow BC \parallel XY$$

M
A
M
A
M
A
M
A
M
A
B
B
/12

$$12 \quad f(x) = 2x + 5, \quad g(x) = \log_{10} x$$

$$(a) \quad f^{-1}(x)$$

$$\text{let } y = 2x + 5$$

$$x = \frac{y - 5}{2}$$

$$\therefore f^{-1}(x) = \frac{x - 5}{2}$$

$$(b) \quad f^{-1}(12) = \frac{12 - 5}{2}$$

$$= 3.5$$

$$(c) \quad gf(x)$$

$$= g(2x + 5)$$

$$= \log_{10} 2x + 5$$

$$(d) \quad gf(x) = 1$$

$$\log_{10} 2x + 5 = 1$$

$$\therefore \log_{10} 2x + 5 = \log_{10} 10$$

$$2x + 5 = 10$$

$$2x = 5$$

$$x = 2.5$$

$$(e) \quad fg(1) = f(\log_{10} 1)$$

$$= f(0)$$

$$= 0 + 5$$

$$= 5$$

~~Q~~

A

Q

M

A

M

A

Q

Q

for $\log_{10} 10$

M

A

M

A

12

13 (i) Time taken by Saloon Car to overtake bus

$$10.15 - (7.15 + 1.30)$$

$$= 10.15$$

$$- 8.45$$

$$\hline 1.30$$

The bus' time

$$10.15 - 7.15$$

$$3 \text{ hrs.}$$

Distance from A to meeting point

$$d = s \times T$$

$$= 75 \times 3$$

$$= 225 \text{ km.}$$

Saloon car's speed

$$s = \frac{D}{T}$$

$$= \frac{225}{1.30}$$

$$= 225 \div 1\frac{1}{2}$$

$$= 225 \times \frac{2}{3}$$

$$= 150 \text{ km/h}^{-1}$$

Bus' time for the journey

$$t = \frac{D}{s}$$

$$t = \frac{300}{75} = 4 \text{ hrs}$$

Saloon's time for the journey

$$t = \frac{300}{150} = 2 \text{ hrs}$$

Difference in time of arrival

$$4 \text{ hr} - (2 + 1\frac{1}{2})$$

$$= \frac{1}{2} \text{ hr or } 30 \text{ min.}$$

UGANDA NATIONAL EXAMINATIONS BOARD

(To be fastened together with other answers to paper)

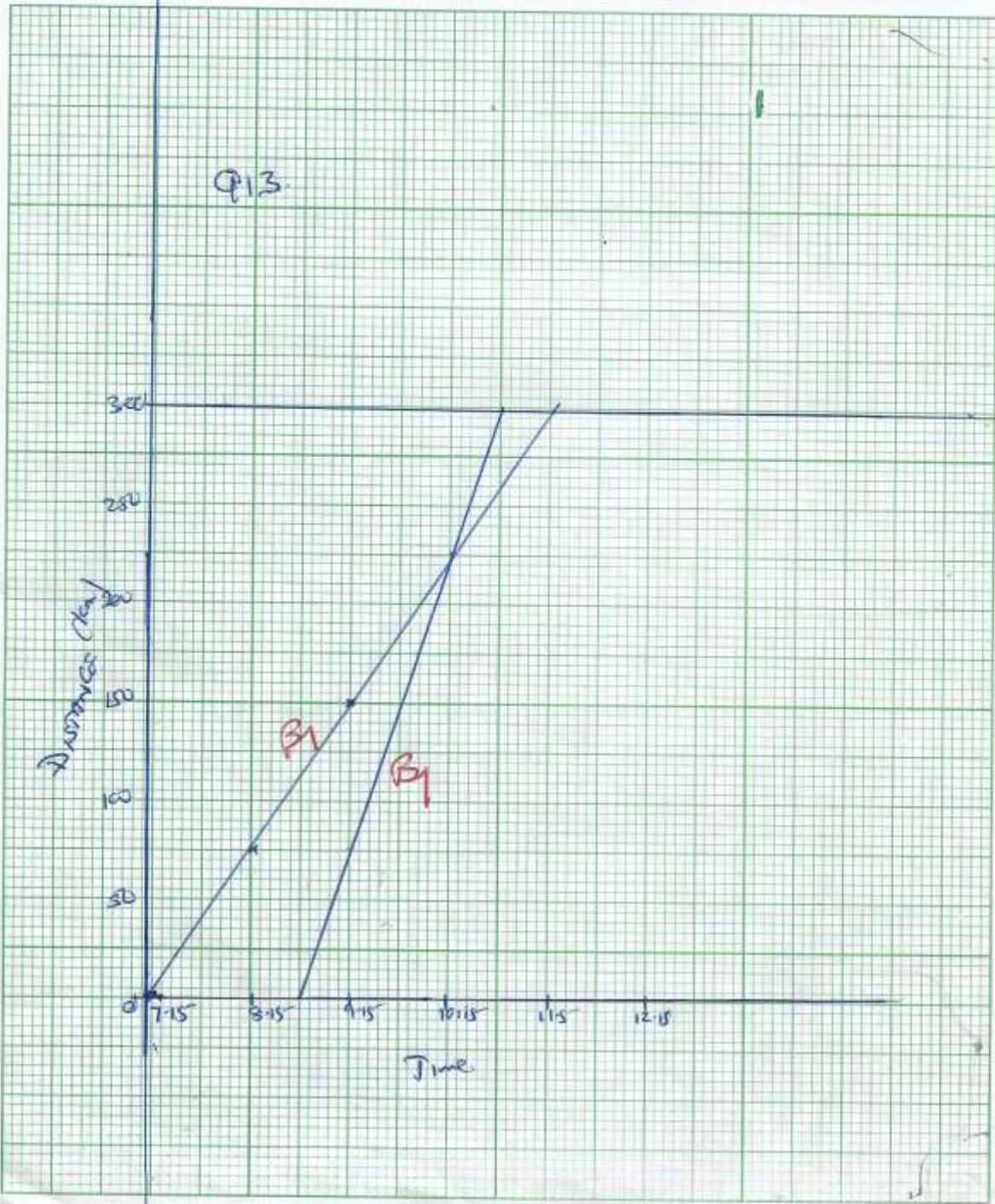
UCE

Candidate's Name

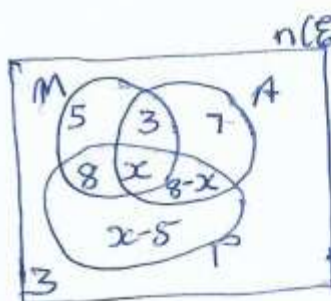
Signature

Subject Name Paper code

Random No.				
Personal Number				



14



$n(E) = 35$
 $n(A) = 18$
 $n(M) = 13$
 $n(P) = 18$
 $n(A \cap M \cap P) = 3$
 $n(A \cap P) = 8$
 $n(M \cap P) = 8$

B_1 A-3
 B_1 A-8
 B_1 A-8-x
 B_1 3

Apples only.

$$18 - (3 + 8 + 8 - x)$$

$$7$$

B_1

Pineapples only

$$13 - (3 + 8 - x + 7)$$

$$13 - 18 + x$$

$$x - 5$$

B_1

Mangoes only

$$18 - (3 + 3 + 7)$$

$$5$$

B_1

So

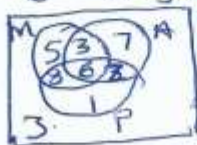
$$18 + 5 + 8 + x - 5 + 3 = 35$$

$$x = 35 - 29$$

$x = 6$ bought all the fruits

M_1

A_1



6 bought all the fruits

B_1

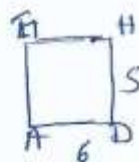
Pr(one type) = $\frac{5+7+1}{35}$

$$= \frac{13}{35}$$

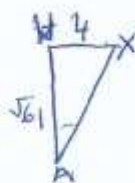
M_1

A_1

15 a) $AH = \sqrt{6^2 + 5^2}$
 $= \sqrt{36 + 25}$
 $= \sqrt{61}$
 $= 7.81$



a) $Ax = \sqrt{(\sqrt{61})^2 + 4^2}$
 $Ax = \sqrt{77}$
 $= 8.77$



my

A1

B1 right-angled #

my

A1

b) angle between Ax and AD is

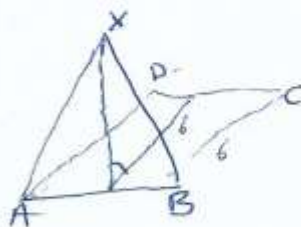
$\tan^{-1}\left(\frac{4}{7.81}\right)$
 $= 27.1^\circ$

B1 identify #

my

A1

c)



$\tan^{-1}\left(\frac{5}{6}\right)$
 $= 39.8^\circ$

B1 } identify
 B1 } less
 } find
 } angle

my

A1

R2

No	lg
23.5	1.3711
0.146	$\bar{1}.1644$
<hr/>	
	0.5355
8.3	0.9191
<hr/>	
	$\bar{1}.6164 \times \frac{1}{2}$
	$\frac{\bar{1} + \bar{1} + 1.6164}{2}$
$10^{-1} \times 6.430$	$\bar{1}.8082$
<hr/>	
	0.643

b)

$\log_{10} 2 = 0.3010$

$\log_{10} 2^{100} = \log_{10} (2 \times 100)$

$= \log_{10} 2 + \log_{10} 100$

$= 0.3010 + 2$

$= 2.3010$

$\log_{10} 0.2 = \log_{10} (2 \times 10^{-1})$

$= \bar{1}.3010$

$\log_{10} \sqrt[3]{0.2} = \log_{10} 0.2^{\frac{1}{3}}$

$\frac{1}{3} \times \bar{1}.3010$

$\frac{-1 + -2 + 2.3010}{3}$

$\bar{1}.7670$

B1 \Rightarrow all logs com

M11 \Rightarrow add

M1 \Rightarrow Subtract log

M1 \Rightarrow dividing by 2

A1

M1

A1

M1

A1

B1

M1

A1

$$17 \quad i) \quad I = 180 \times \frac{24}{100} \times 4$$

$$= 172.8 \text{ Million.}$$

$$ii) \quad 180 + 172.8 + \frac{2}{100} \times 180$$

$$= 180 + 172.8 + 3.6$$

$$= 356.4 \text{ million.}$$

$$iii) \quad \text{In 4 year} \rightarrow 4 \times 3 = 12 \text{ school term}$$

$$= \frac{356.4}{12}$$

$$= 29.7 \text{ Millions}$$

$$iv) \quad \frac{356.4}{180}$$

$$= 176.4$$

$$\frac{176.4}{180} \times 100$$

$$= 98\%$$

my

A1

B1 for 2% of 180

my

A1

B1

my

A1

my

A1

my

A1

12