URANGA MATHS F3 2022
PAPER ONE TERM THREE MARKING SCHEME

1) $\frac{5}{2} - \frac{7}{5} = \frac{25-14}{10} = \frac{11}{10}$

$\frac{1}{6} + \frac{1}{3} = \frac{1}{2}$ || $\frac{11}{10} \times \frac{3}{1} = \frac{11}{5}$ — B1

$\frac{11}{5} \times \frac{5}{8} = \frac{11}{8}$ — B1

$\frac{11}{8} - \frac{11}{4} = \frac{11-22}{8} = -\frac{11}{8} = -1\frac{3}{8}$ — B1

03

2) $2(x+4) - 3(x-1) = 8 \times 12$ — M1

$2x + 8 - 3x + 3 = 96$ — M1

$-x = 85$ — A1

$x = -85$

03

3) sh.(2500 + 7500 + 12500) — M1

= sh. 22500 — A1

02

4) (10000 × 109.35) /= = sh. 1093500 — M1

sh. $\frac{1093500}{2}$ = SA 546750

$\frac{546750}{10.05} \times 1$ SA Rands — M1

= 54402.99 Rands — A1

03

5) a) Let the exterior angle be x. — M1

Interior angle = 5x.

$x + 5x = 180$

$6x = 180$, $x = 30°$ — A1

02

b) No. of sides

$= \frac{360}{30}$ — M1

= 12 sides. — A1

02

6) $(5^3)^{-x} \times 5^{2(x-2)} = 5^{2(x+2)}$ — M1

$-3x + 2(x-2) = 2(x+2)$ — M1

$-3x + 2x - 4 = 2x + 4$

$-3x = 8$

$x = -\frac{8}{3} = -2\frac{2}{3}$ — A1

03

7) $\vec{OA} = \begin{pmatrix} -3 \\ 5 \end{pmatrix}$, $\vec{OB} = \begin{pmatrix} 2 \\ -2 \end{pmatrix}$

$\vec{AB} = \vec{AO} + \vec{OB}$

$= -\begin{pmatrix} -3 \\ 5 \end{pmatrix} + \begin{pmatrix} 2 \\ -2 \end{pmatrix} = \begin{pmatrix} 5 \\ -7 \end{pmatrix}$ — M1

$|\vec{AB}| = \sqrt{5^2 + (-7)^2}$ — M1

$= \sqrt{74} = 8.602$ units. — A1

03

8). L.S.f $= \frac{12}{8} = \frac{3}{2}$ V.S.f $= \left(\frac{3}{2}\right)^3 = \frac{27}{8}$ — B1

$\frac{27}{8} = \frac{2 \text{ litres}}{V}$ — M1

$V = \left(\frac{2 \times 8}{27}\right)$ litres — A1

$= 0.5926$ litres

03

9). Num: $= (p - 2m)(p + 2m)$ — B1

either numerator or denominator factorised.

Den: $2m^2 - 6mp - mp + 3p^2$

$2m(m - 3p) - p(m - 3p)$

$(2m - p)(m - 3p)$

Hence $\frac{(p - 2m)(p + 2m)}{(2m - p)(m - 3p)}$ — M1

$= \frac{-1(p + 2m)}{m - 3p}$ — A1

03

10). The Acute angle.

$\tan A = \frac{Opp}{Adj} = \frac{7}{24}$

Hypotenus $= \sqrt{24^2 + 7^2} = \sqrt{625} = 25$ — B1

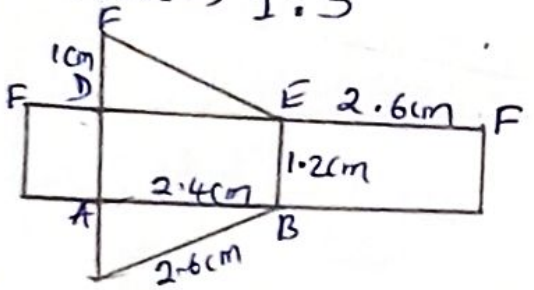
Cos A acute $= \frac{24}{25}$ — M1

Cos A reflex $= -\frac{24}{25}$ — A1

03

11)

a) Scale → 1 : 5



B1 B1 — 02

check for Correct conversions using the Student's scale

b)

$(5 \times 6) + (\frac{1}{2} \times 12 \times 5 \times 2) + (12 \times 6) + (13 \times 6)$ — M1

$30 + 60 + 72 + 78$

$= 240\ cm^2$ — A1

02

12) $\frac{1}{3}x - 4 \leq 7 + 2x$; $x - 12 \leq 21 + 6x$

$-12 - 21 \leq 6x - x$; $-33 \leq 5x$.

$-6.6 \leq x$ — B1

$7 + 2x \leq 4 + \frac{1}{2}x$.

$28 + 8x \leq 16 + x$.

$7x \leq -12$, $x \leq -1.714$

$-6.6 \leq x \leq -1.714$ — B1

Integral values — B1

$-6, -5, -4, -3, -2$.

03

13). Total length = (80 + 20)m
= 100m — M1

Speed = $\frac{800m}{5 seconds}$ = $\left(\frac{800}{1000} \times \frac{3600}{5}\right)$ Km/h. — M1

= 576 Km/h. — A1

03

14). Volume = $\left(\frac{22000}{5}\right)cm^3$ — M1

= 4400 cm^3 — A1

$\frac{22}{7} \times r^2 \times 14 = 4400 cm^3$. — M1

$r^2 = \left(\frac{4400 \times 7}{22 \times 14}\right)cm^2$ = 100 cm^2

r = 10cm — A1

04

15). $\frac{1}{2.456 \times 10^{1}}$ = 0.4072×10^{-1}

= 0.04072 — B1

4.346^2 = 18.8877 — B1

0.04072 + 18.8877 = 18.92842 — M1

$\sqrt{18.93}$ = 4.351 — A1

04

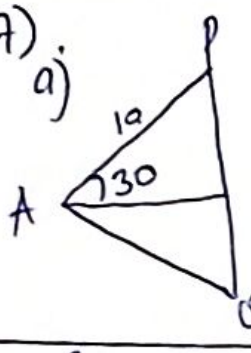
16). $y = (5+6)(-3-2)^2$ — M1

$y = 11(-5)^2$

$y = 275$ — A1

02

17) a)



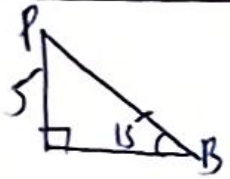
$\sin 30 = \frac{0.5\ PQ}{10}$ ——— M1

$PQ = \frac{10 \sin 30}{0.5}$

$= 10\,cm.$ ——— A1

02

b)



$\sin 15 = \frac{5}{PB}$ ——— M1

$PB = \frac{5}{\sin 15}$

$= 19.32\,cm$ ——— A1

02

c) $\left(\frac{60}{360} \times 3.142 \times 10 \times 10\right) - \left(\frac{1}{2} \times 10 \times 10 \times \sin 60\right)$ M1

$52.3667 - 43.3013$

$= 9.0654\,cm^2$ ——— A1

02

d) $\left(\frac{30}{360} \times 3.142 \times 19.32 \times 19.32\right) - \left(\frac{1}{2} \times 19.32 \times 19.32 \times \sin 30\right)$ M1

$97.7325 - 93.3156$

$= 4.4169$ A1

Shaded area

$= (43.3013 + 93.3156) - (9.0654 + 4.4169)$ M1

$= 136.6169 - 13.4823$

$= 123.1346\,cm^2$ A1

04

18).

a) Distance covered by the matatu in 50 minutes

$= (90 \times \frac{50}{60})$ km

$= 75$ km. — B1

Distance covered by the Nissan in 20 minutes

$= (120 \times \frac{20}{60})$ km

$= 40$ km. — B1

Relative distance

$= (75 - 40)$ km

$= 35$ km. — B1

Relative speed $= (120 - 90)$ km/h

$= 30$ km.

Relative time $= \frac{35}{30}$ hours. — M1

Distance from A

$= 40 + (120 \times \frac{35}{30})$ km. $= 180$ km — M1 A1

OR. $75 + 90 \times \frac{35}{30} = 180$ km.

06

b) $\frac{35}{30}$ hours $= 1$ hour 10 minutes

0800 hrs
0110 hrs
+ 0050 hrs
1000 hrs

$= 10.00$ am — M1 A1

02

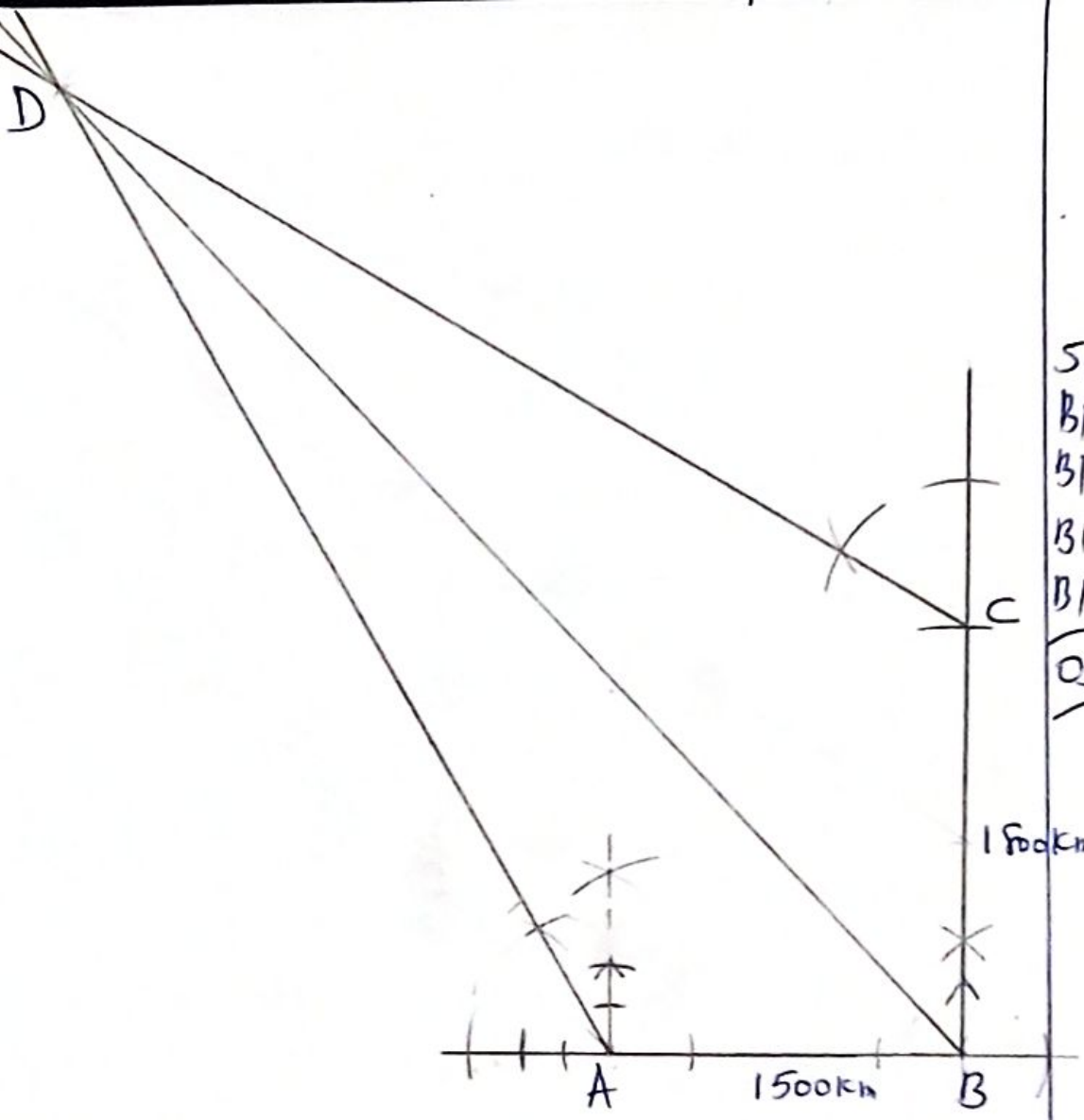
c) $\frac{240}{90}$ hours $= 2$ hours 40 minutes. — B1

0800 hrs
0240 hrs
1040 hrs

$= 10.40$ am — B1

02

19).



S1
B1
B1
B1
B1
05

b) i) Distance AD

15.6cm

(15.6x300)km

= 4680km ± 30km

M1
A1
02

ii) Distance CD

14.9cm

(14.9x300)km

= 4470km ± 30km

M1
A1
02

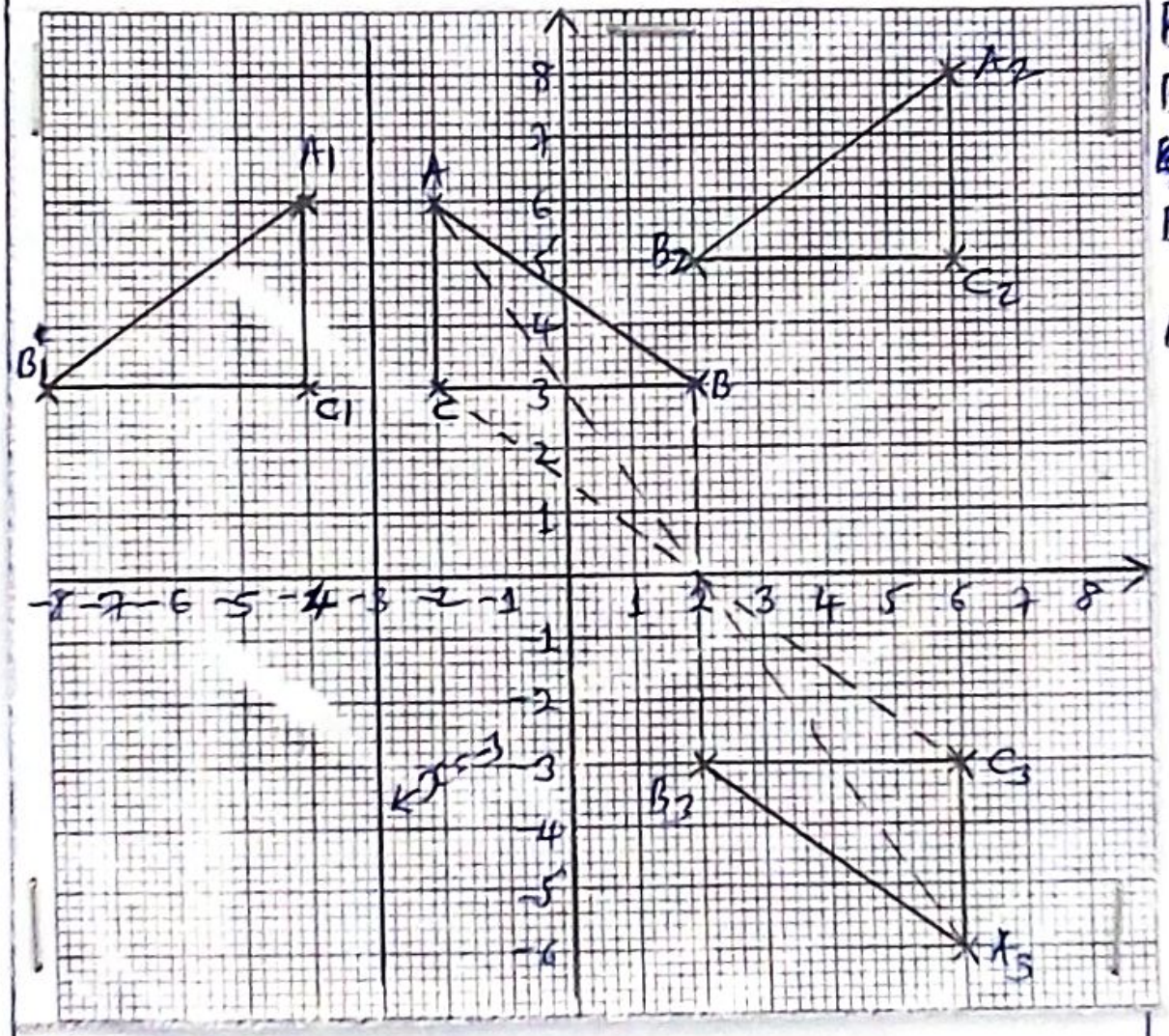
iii) Bearing of town D from B

317°

B1
01

20).

a)



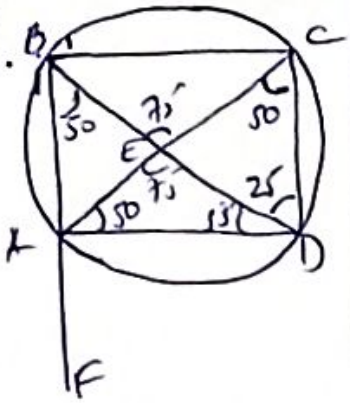
B1 △ABC
B1 mirror line x = −3
B1 A1B1C1
B1 A2B2C2
B1 A3B3C3

b)

i). Reflection on the line $y = 1$ B1 B1

ii). Enlargement, scale factor -1 and centre $(2, 0)$ B1 B1 B1

21).



i) $\angle ABC = 100°$ B1

Opposite angles in a cyclic quadrilateral add upto 180°. B1

ii) $\angle DEC = 105°$ B1

→ Angles in a straight line add up to 180° B1

→ Angles at a point add upto 360°

iii) $\angle ABD = 50$ B1

Angles subtended by the same chord/arc at the circumference are equal B1 B1

iv) $\angle DAF = 105°$ B1

Angles in a straight line add upto 180° B1 B1

10

22). a)

class (kgs)	f	x	fx	cf
37-39	4	38	152	4
40-42	6	(41)	246	10
43-45	(9)	(44)	396	19
46-48	15	47	705	34
49-51	10	(50)	500	44
52-54	6	(53)	318	50
	$\sum f = 50$		$\sum fx = 2317$	

B1 → f = 9 B1 → x B1 → fx. B1 → fx total

b) Modal class = 46-48 B1 modal class

c) Mean mass $= \frac{\sum fx}{\sum f} = \frac{2317}{50}$ M1

$= 46.34$ kg A1

d) Median mass.

$\frac{50}{2} = 25^{th}$

$45.5 + \frac{(25-19)}{15}3$

$45.5 - 11.2$

$= 46.7$ kg

B1 cf Column. M1 A1

23). a). $0-y=6$, $y=-6$ — M1

Coordinates $\rightarrow (0,-6)$ — A1 — 02

b) $x+y=8$, $y=8-x$

$x-y=6$, $y=x+6$

$8-x=x+6$ — M1 A1

$2x=2$, $x=1$

$y=8-1=7$.

Co-ordinates $=(1,7)$ — B1 — 03

c) $(0,0)$ $(1,7)$

$m=\left(\frac{7-0}{1-0}\right)=\frac{7}{1}=7$. — B1

$\frac{y-0}{x-0}=7$. — M1

$y=7x$ — A1 — 03

d) $x-0=6$

$x=6$

Coordinates $=(6,0)$ — B1 — 01

e) $x+0=8$

$x=8$

Coordinates $=(8,0)$ — B1 — 01

24) i) Initial Contribution per teacher.

$= \frac{144000}{x}$. B1

01

ii) Final Contribution.

$= \frac{144000}{x-5}$ OR $\frac{144000}{x} + 2400$ B1

01

iii) $\frac{144000}{x-5} = \frac{144000}{x} + 2400$ ——— M1

$\frac{60}{x-5} = \frac{60}{x} + 1$

$60x = 60(x-5) + x(x-5)$.

$60x = 60x - 300 + x^2 - 5x$.

$x^2 - 5x - 300 = 0$. ——— M1

$x^2 - 20x + 15x - 300 = 0$

$x(x-20) + 15(x-20) = 0$

$(x-20)(x+15) = 0$ ——— M1

$x - 20 = 0$ or $x + 15 = 0$ ——— A1

$x = 20$ $x = -15$ ——— B1

Therefore $x = 20$. ——— 05

2 | 300

2 | 150

3 | 75

5 | 25

5 | 5

| 1

$20 \cdot x_0$

iv) Initial $= \frac{144000}{20} = 7200$ /= } ——— B1

Final $= \frac{144000}{15} = 9600$ }

% increase $= \frac{9600 - 7200}{7200} \times 100$ ——— M1

$= 33.33\%$ ——— A1

03