

MARKING SCHEME

FORM 2 · MATHEMATICS MUAKICAN TERM 2 YEAR 2015

$$\begin{aligned}
 1. \quad & \frac{-12 \div 3 \times 4 - (-15)}{-5 \times 2 + -5} \\
 & = \frac{-16 + 15}{-10 - 5} \quad \checkmark \text{ M1} \\
 & = \frac{-1}{-15} \quad \checkmark \text{ M1} \\
 & = \frac{1}{15} \quad \checkmark \text{ A1}
 \end{aligned}$$

$$\begin{aligned}
 2. \quad & \frac{\frac{2}{5} \div \frac{1}{2} \times \frac{4}{9} - \frac{11}{10}}{\frac{1}{8} - \frac{1}{6} \times \frac{3}{8}} \\
 & = \frac{\frac{2}{5} \div \frac{1}{2} \times \frac{4}{9} - \frac{11}{10}}{\frac{1}{8} - \frac{1}{16}} \quad \checkmark \text{ M1} \\
 & = \frac{\frac{2 \times 9}{5 \cdot 2} - \frac{11}{10}}{\frac{1}{16}} \\
 & = \frac{7}{10} \times \frac{16}{1} \quad \checkmark \text{ A1} \\
 & = \frac{112}{10} \\
 & = 11\frac{1}{5} \quad \checkmark \text{ A1}
 \end{aligned}$$

3. $3y + 2x = 6$

$$y = -\frac{2}{3}x + 2$$

Gradient of $l_1 = \frac{3}{2}$ ✓ B_1

$$\frac{y-4}{x-3} = \frac{3}{2} \quad \checkmark \quad m_1$$

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

$$4y - 8 = 3x + 9$$

$$4y = 3x + 17 \quad \checkmark \quad A_1$$

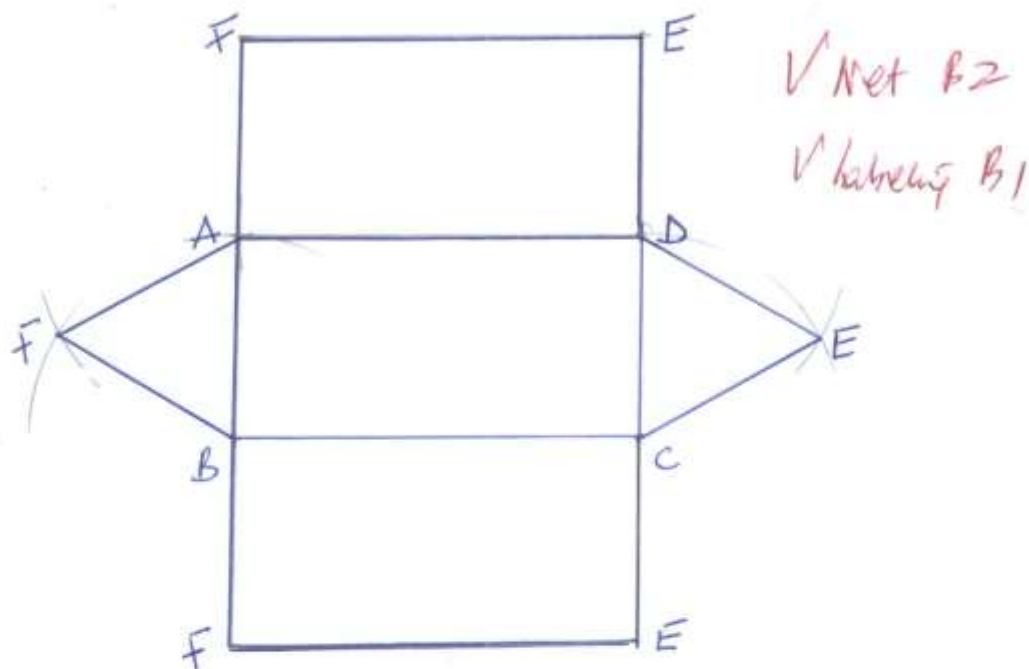
4.

No	log
3.521	0.5467
0.8921	1.9504 ⁺
	0.4971
795.3	2.9005 ⁻
	3.5966 ÷ 4
7.929×10^{-1}	1.8992

All logs ✓ QMS
✓ operation 1ml

Accuracy 1

5.



6. ~~OD =~~ $OD = \sqrt{15^2 - 12^2}$ ✓ M1
 $= \sqrt{81} = 9$

Area of $\triangle ADC = \frac{1}{2} \times 30 \times 9$ ✓ M1
 $= 135 \text{ cm}^2$

Area of kite $= 2 \times 135 \text{ cm}^2$ ✓ AT
 $= 270 \text{ cm}^2$

7. Let the no. of 50 notes be x & 100 notes be y .

$$50x + 100y = 700 \Leftrightarrow x + 2y = 14 \quad \text{--- (1.)} \quad \left. \begin{array}{l} \text{Both true } \checkmark \\ \text{M1} \end{array} \right\}$$

$$x + y = 11$$

$$\begin{array}{r} x + 2y = 14 \\ x + y = 11 \\ \hline \end{array} \quad \checkmark \text{ Attempt to solve M1}$$

$$\begin{array}{r} y = 3 \\ \Rightarrow x = 8 \end{array} \quad \left. \begin{array}{l} \text{Both } \checkmark \text{ A1} \end{array} \right\}$$

8. $\frac{AE}{EC} = \frac{ED}{BE} = \frac{1}{5}$, ~~BE = 5ED~~

$$\frac{DE}{12 - DE} = \frac{1}{5} \quad \checkmark \text{ M1}$$

$$\begin{aligned} 5DE &= 12 - DE \\ 6DE &= 12 \quad \checkmark \text{ M1} \end{aligned}$$

$$\therefore DE = \frac{12}{6} = 2 \text{ cm. } \checkmark \text{ A1}$$

9. $\cos(x+60^\circ) = \cos 2x$

$$x + 60 + 2x = 90^\circ \quad \checkmark \text{ M1}$$

$$3x = 30^\circ$$

$$\therefore x = 10^\circ \quad \checkmark \text{ A1}$$

$$\begin{aligned} \tan(x+60^\circ) &= \tan 70^\circ \\ &= 2.747 \quad \checkmark \text{ B1} \end{aligned}$$

10. Commission on Sh100,000 = $\frac{2.4}{100} \times 100000$ ✓ B1
 = 2400

Commission on Sh180,000 = $\frac{1.5}{100} \times 180000$ ✓ B1
 = 2700

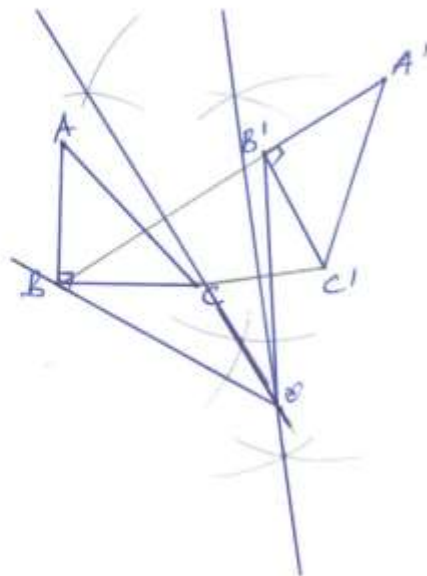
Total Commission = 2400 + 2700 = Sh5100 ✓ B1

11. $y = 180^\circ - 130^\circ = 50^\circ$ ✓ B1

$z = 83^\circ + 50^\circ = 133^\circ$ ✓ B1

$x = 180^\circ - 133^\circ = 47^\circ$ ✓ B1

13.



✓ Bisectors B1

✓ Meeting at O B1

∠ of reflection = $-53^\circ \pm 1^\circ$ ✓ B1

12. $A \cdot S \cdot F = \frac{12}{108} = \frac{1}{9}$

$k \cdot S \cdot F = \frac{1}{3} \cdot \checkmark B_1$

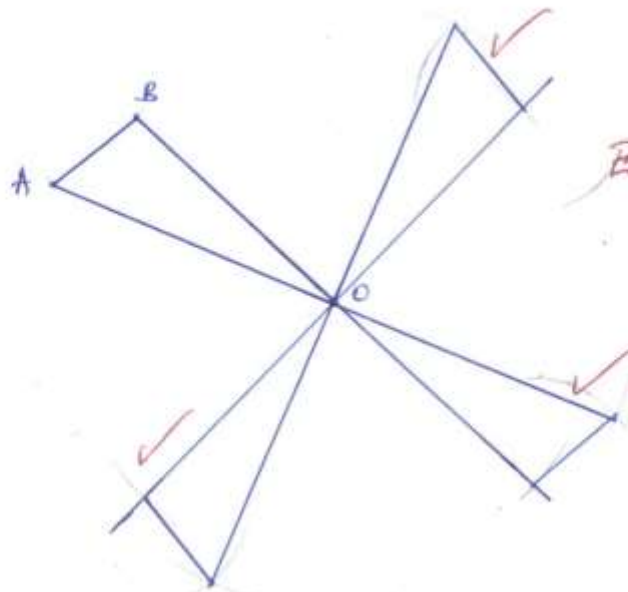
$V \cdot S \cdot F = \left(\frac{1}{3}\right)^3 = \frac{1}{27}$

$\frac{V_s}{V_r} = \frac{1}{27} \cdot \checkmark M_1$

$\frac{V_s}{810} = \frac{1}{27}$

$V_s = \frac{1}{27} \times 810$
 $= 30 \text{ cm}^3 \cdot \checkmark A_1$

14.



Each part V & V angle
 $\checkmark B_1$

total 3

$$15. \text{Vol. of tank} = 2.4 \times 2.8 \times 3 \times 1000 \text{ L} \quad \checkmark \text{ M1} \\ = 20160 \text{ L.}$$

$$\text{Vol. of water} = 20160 - 3600 = 16560 \text{ L} \quad \checkmark \text{ M1}$$

$$\text{Time} = \frac{16560}{0.5} = 33120 \text{ s.} \quad \checkmark \text{ M1}$$

$$= \frac{33120}{3600} = 9 \text{ hr } 12 \text{ min.} \quad \checkmark \text{ A1}$$

$$16. \quad x + \frac{1}{3}x = 180^\circ \quad \checkmark \text{ B1}$$

$$\frac{4x}{3} = 180^\circ$$

$$x = 180 \times \frac{3}{4} = 135^\circ \quad \checkmark \text{ B1}$$

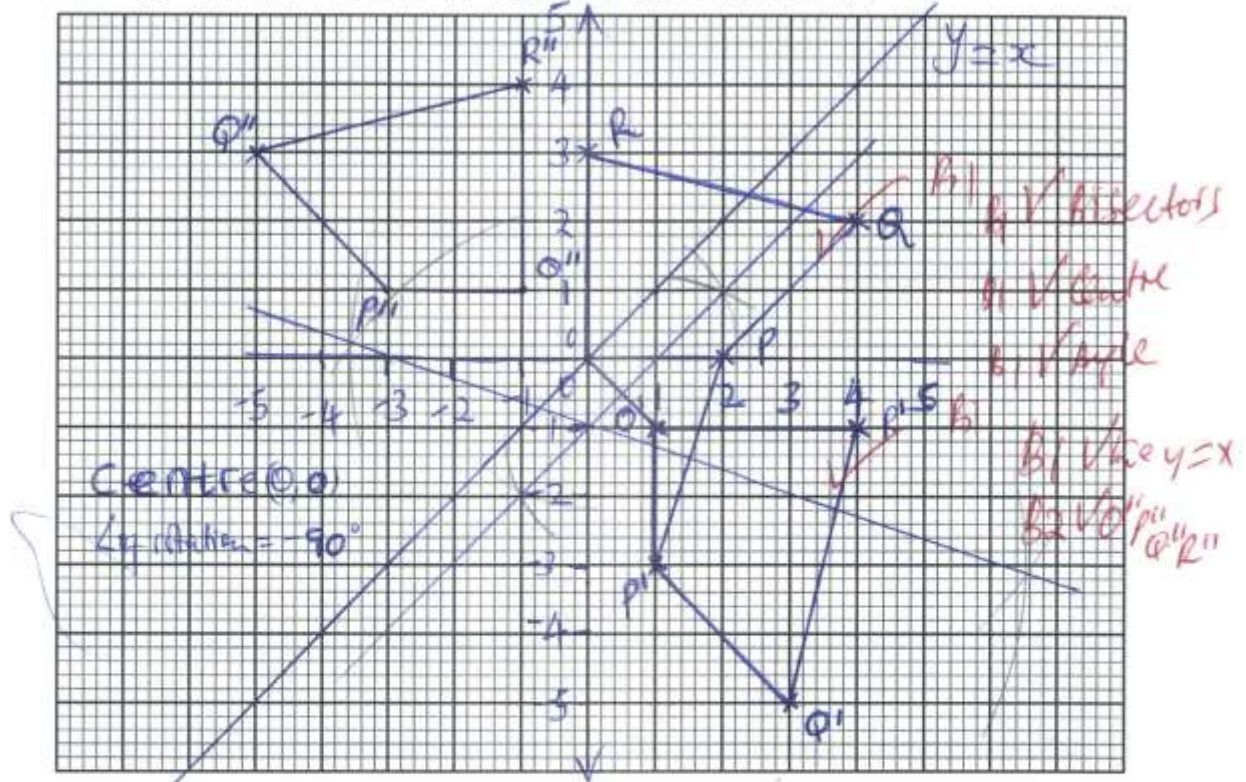
$$\text{Int. } \angle = \frac{135}{3} = 45^\circ.$$

$$\text{No. of sides} = \frac{360^\circ}{45^\circ} \quad \checkmark \text{ B1} \\ = 8.$$

SECTION II (50MKS)

Answer 5 questions only in this section

17. The vertices of quadrilateral OPQR are O (0, 0), P (2, 0), Q (4, 2) and R (0, 3). The vertices of its image under a rotation are O' (1, -1), P'(1, -3) Q'(3, -5) and R'(4, -1).



- (a) (i) On the grid provided, draw OPQR and its image O'P'Q'R' (2marks)
- (b) (ii) By construction, determine the centre and angle of rotation. (3marks)
- (c) On the same grid as (a) (i) above, draw O''P''Q''R'', the image of O'P'Q'R' under a reflection in the line $y = x$ (3marks)

(d) From the quadrilaterals drawn, state the pairs that are:

(i) Directly congruent; (2marks)
 Quadrilateral OPQR & O'P'Q'R' ✓ B2

(ii) Oppositely congruent (2marks)
 (i) Quadrilateral OPQR & O''P''Q''R'' ✓ B1
 (ii) " O'P'Q'R' & O''P''Q''R'' ✓ B1

$$\begin{aligned} 18. (a) \quad & 2000g + 15000b = 190000 \\ & 1000g + 15000(b-3) = 185000 \end{aligned} \quad \checkmark$$

$$2g + 15b = 190 \quad \checkmark$$

$$1g + 15b = 230 \quad \checkmark$$

$$2g = 40 \quad \checkmark$$

$$g = 20 \quad \checkmark$$

$$b = 10 \quad \checkmark$$

∴ no. of goats = 20
no. of bulls = 10

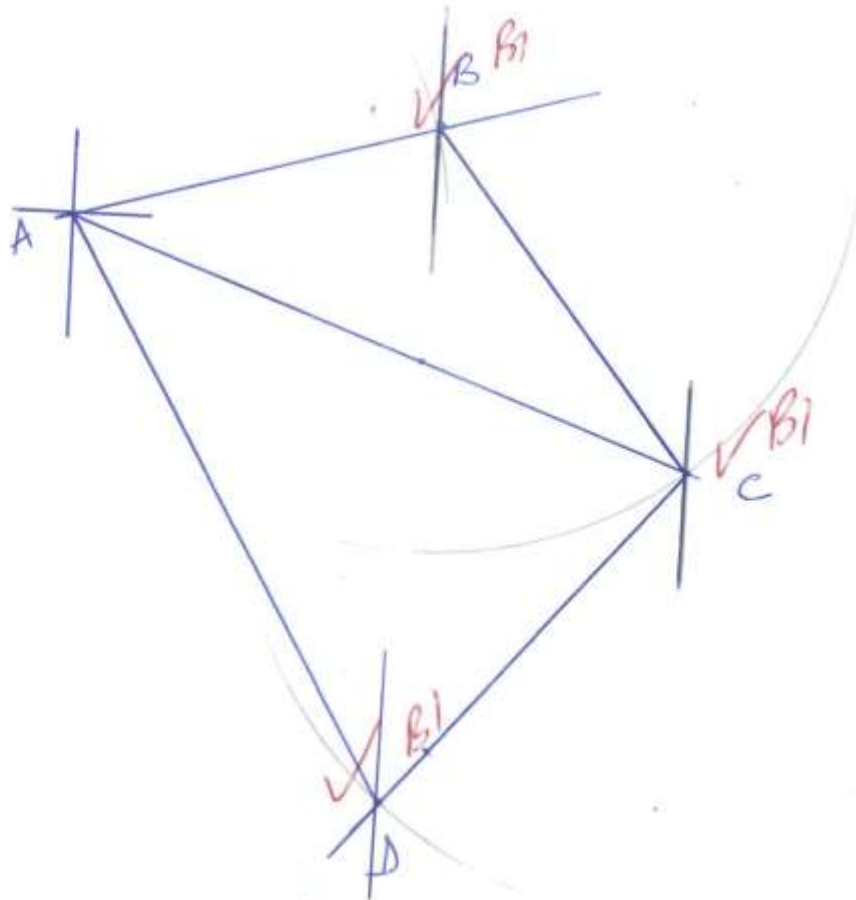
$$\begin{aligned} (b) \quad \text{Profit from goats} &= \frac{25}{100} \times 2000 \times 20 \quad \checkmark \\ &= 10,000 \end{aligned}$$

$$\begin{aligned} \text{Profit from bulls} &= \frac{30}{100} \times 15000 \times 10 \quad \checkmark \\ &= 45,000 \end{aligned}$$

$$\begin{aligned} \text{Total profit} &= 10000 + 45000 \quad \checkmark \\ &= \text{Sh } 55000 \quad \checkmark \end{aligned}$$

19 (a)

Scale $\sqrt{B1}$



(b) (i) $AC = 8.7 \times 50 = 435 \text{ km}$

(ii) Bearing of B from C = 320°

(iii) $AD = 8.8 \times 50 = 440 \text{ km}$

Bearing 330°

$$20. (i) \text{ Sales} = 360 \times 500 = 180,000 \quad \checkmark \text{ M}$$

$$\begin{aligned} \text{Commission} &= \frac{30}{100} \times 80,000 \\ &= 51,600 \quad \checkmark \text{ M} \end{aligned}$$

$$\begin{aligned} \text{Total earnings} &= 16,000 + 12,000 \\ &= 51,200 \quad \checkmark \text{ A1} \end{aligned}$$

$$(ii) \text{ Salary} = \frac{110}{100} \times 12,000 = 51,320 \quad \checkmark \text{ M}$$

$$13,200 + \text{Commission} = 17,600$$

$$\begin{aligned} \text{Commission} &= 17,600 - 13,200 \quad \checkmark \text{ M} \\ &= 4,400 \end{aligned}$$

$$\frac{120}{100} (x - 100,000) = 4,400 \quad \checkmark \text{ M}$$

$$\begin{aligned} (x - 100,000) &= \frac{4,400 \times 100}{120} \\ &= 22,000 \end{aligned}$$

$$\therefore x = \underline{\underline{51,200}} \quad \checkmark \text{ A1}$$

$$(iii) \text{ No. of cloudbays} = \frac{122,000}{500} \quad \checkmark \text{ M}$$

$$= 244 \quad \checkmark \text{ A1}$$

22 (a) Total Cost of Importing 5 tonnes

$$= \frac{140}{100} \times 350 \times 5 + \frac{8}{10} \times 350 \times 5 \quad \checkmark \text{ M1}$$

$$= 2450 + 140 \quad \checkmark \text{ M1}$$

$$= 2590 \text{ dollars.} \quad \checkmark \text{ M1}$$

In Ksh = $2590 \times 82.40 \quad \checkmark \text{ M1}$

$$= 213416 \quad \checkmark \text{ A1}$$

(b) P of a 21% pvt. $\checkmark \text{ A1}$

$$= \frac{213416 \times 2}{5 \times 1000} \quad \checkmark \text{ M1}$$

$$= \text{Ksh } 85.37$$

$$\text{S.p} = \frac{125}{100} \times 85.37 \quad \checkmark \text{ M1}$$

$$= \text{Ksh } 106.70 \quad \checkmark \text{ A1}$$

$$(c) P = \frac{25}{100} \times \frac{213416}{5} \quad \checkmark \text{ M1}$$

$$= \text{Ksh } 10670.80 \quad \checkmark \text{ A1}$$

$$\begin{aligned}
 23. (a) \quad SR &= .5 \tan 33.9^\circ \text{ m} \\
 &= 3.360 \text{ m} \quad A1
 \end{aligned}$$

$$\begin{aligned}
 QR &= \frac{3.360}{\tan 48.2^\circ} \text{ m} \\
 &= 3.004 \text{ m} \quad A1
 \end{aligned}$$

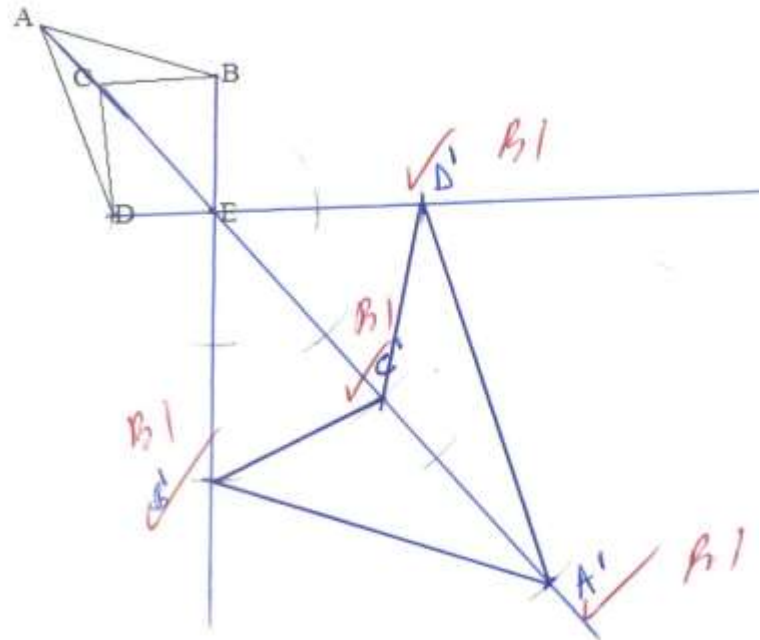
$$\begin{aligned}
 (b) \quad SP &= \frac{3.36}{\sin 33.9^\circ} \text{ m} \\
 &= 6.024 \quad A1
 \end{aligned}$$

$$\begin{aligned}
 SQ &= \frac{3.36}{\sin 48.2^\circ} \text{ m} \\
 &= 4.507 \text{ m} \quad A1
 \end{aligned}$$

$$\begin{aligned}
 (c) \quad \text{Length of wire} &= 4.507 + 6.024 \\
 &\approx 11 \text{ m} \quad \checkmark \quad B1
 \end{aligned}$$

$$\begin{aligned}
 \text{Total cost} &= 11 \times 233 + 1600 \\
 &= \$4163 \quad \checkmark \quad B1
 \end{aligned}$$

24. a) Construct the image of quadrilateral ABCD under enlargement scale factor -2 center of enlargement E.



b) A model of a freezer has a rectangular shutter measuring 4cm by 2cm. The area of the actual shutter of the freezer is 0.72m^2 .

i) Given that the actual freezer is 2.7m long, calculate the length of the model in centimeters.

Area of freezer = 8cm^2 (3mks)

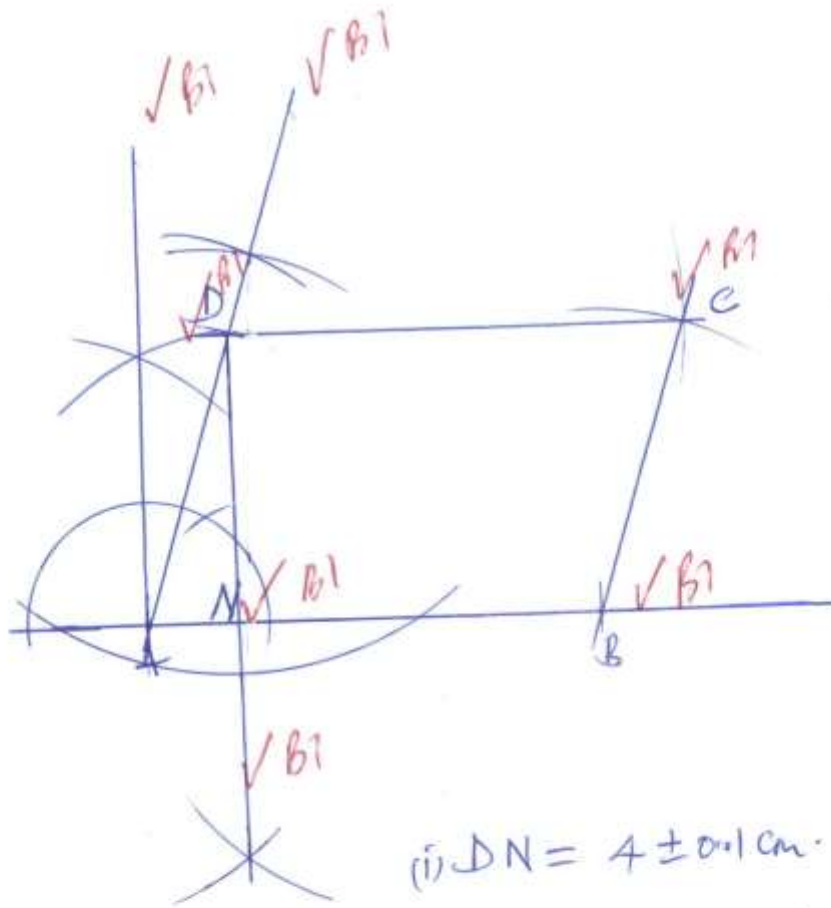
$$\begin{aligned} A \&F &= 8 : 7200 \\ &= 1 : 900 \\ k \cdot S \&F &= 1 : 30 \quad \checkmark \text{ B1} \end{aligned}$$

$$\begin{aligned} \frac{L}{2.7} &= \frac{1}{30} \quad \checkmark \text{ M1} \\ L &= \frac{2.7}{30} \\ &= \frac{270}{30} \quad \text{A1} \\ &= 9\text{cm} \end{aligned}$$

ii) Calculate the volume in m^3 of the actual freezer if the models volume is 12cm^3

$$\begin{aligned} V \cdot S \cdot F &= \left(\frac{1}{30}\right)^3 = \frac{1}{27000} \quad \checkmark \text{ B1} \quad (3\text{mks}) \\ \frac{12}{V} &= \frac{1}{27000} \quad \checkmark \text{ M1} \\ \Rightarrow V &= \frac{12 \times 27000}{1} \text{cm}^3 = 0.324 \text{M}^3 \quad \text{A1} \end{aligned}$$

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(i) $DN = 4 \pm 0.1 \text{ cm} \cdot \sqrt{B1}$

(ii) Area of $kgm = 6 \times 4 \text{ m}^2$
 $= 24 \text{ cm}^2 A1$