

### 8.3 Mathematics Alt.B Paper 1 (122/1)

1. 
$$\frac{-3 \times +6 +^{-}2}{-4 + +5 -^{-}3} = \frac{-18 +^{-}2}{1+3} = -5$$

(3marks)

2.  $1890 = 2 \times 3 \times 3 \times 3 \times 5 \times 7$   
 $1008 = 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 7$   
Common prime factors  
3, 5, 7

(2marks)

3.  $0850h + 6h 30min = 1520h$   
 $1520h + 1h 45min = 1705h$   
 $1705h + 3h 15min = 2020h$   
 $2020h + 35min = 2055h$   
Time of arrival in 12h system  
 $2055 - 12 = 8.55pm$

(3marks)

4.  $(4.321 \times 10^{-1})^3 = 80.68 \times 10^{-3}$   
 $= 0.08068$

(3marks)

5.  $\pi r^2 \times 45 = 25000$   
 $r = \sqrt{\frac{25000}{\pi \times 45}}$   
 $= 13.29807601$   
 $= 13.3$

(3marks)

6.  $3x \leq 2x + 3$   
 $x \leq 3$   
 $2x + 3 < 4x + 5$   
 $-x < 1$   
 $x > -1$   
Integral values: 0, 1, 2, 3.

(3marks)

7.  $234 = 2 \times 3^2 \times 13$   
 $270 = 2 \times 3^2 \times 5$   
 $324 = 2^2 \times 3^4$   
 $\therefore$  HCF of 234, 270 & 324 =  $2 \times 3^2 = 18$   
Number of pieces  
 $\frac{234}{18} + \frac{270}{18} + \frac{324}{18} = 46$

(4marks)

8.

$$\frac{\frac{6}{5} - \frac{3}{8} \times \frac{3}{2} = \frac{6}{5} - \frac{9}{16}}{\frac{6}{7} \times \frac{3}{2} - \frac{3}{8} = \frac{9}{7} - \frac{3}{8}}$$

$$= \frac{\frac{51}{80}}{\frac{56}{51}}$$

$$= \frac{7}{10}$$

9.

$$h^2 = 6.5^2 - 2.5^2$$

$$h = \sqrt{6.5^2 - 2.5^2}$$

$$= \sqrt{36}$$

$$= 6$$

Height of pole  
 = 6 + 0.9  
 = 6.9m

(3marks)

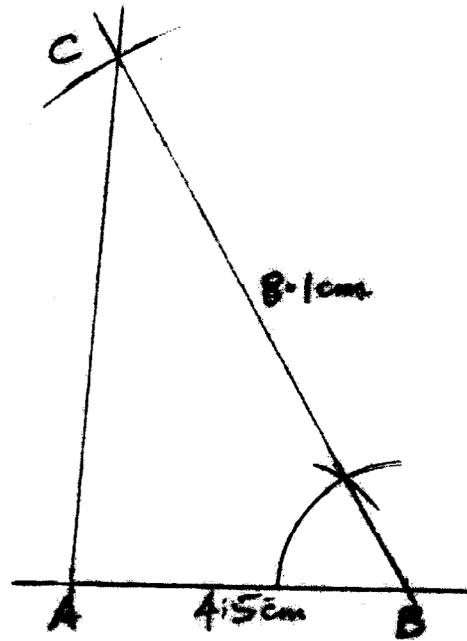
10.

No.	Log
2.5	0.3979 <sub>+</sub>
0.064	$\bar{2}.8062$
8.1	$\bar{1}.2041$
	0.9085
0.1405	$\bar{2}.2956 \times \frac{1}{2}$ $\bar{1}.1478$

$$= 0.1405$$

(3marks)

11.



$$\angle CBA = 86 \pm 1^\circ$$

(3marks)

12. Linear scale factor =  $\sqrt{\frac{16}{25}} = \frac{4}{5}$

Volume scale factor =  $\left(\frac{4}{5}\right)^3$

$\therefore$  Volume of smaller cylinder =  $\frac{64}{125} \times 800 = 409.6 \text{ cm}^3$

(4marks)

13.  $x^2 + 8x - 384 = 0$   
 $(x + 24)(x - 16) = 0$   
 $x = -24$  or  $x = 16$

(3marks)

14. Sum of angles of regular polygon  
 $(2n - 4) 90 = 1620$   
 $2n - 4 = 18$   
 $n = 11$

(2marks)

15.  $p = 3 + q$   
 $(3+q)^2 - q^2 = 21$   
 $9 + 6q + q^2 - q^2 = 21$   
 $q = 2$   
 $p = 5$

(4marks)

$$16. \quad \text{Area of sector} = \frac{120^\circ}{360^\circ} \times 3^2 \times \pi$$

$$= 9.42$$

$$\text{Area of rhombus} = \frac{1}{2} \times 3^2 \times 2 \times \sin 120$$

$$= 7.79$$

$$\text{Area of shaded region} = 9.42 - 7.79$$

$$= 1.63$$

(4marks)

$$17. \quad (a) \quad 800000 - 500000 = 300000$$

$$48000 + \frac{3}{100} \times 300000 = 57000$$

$$(b) \quad 780000 - 48000 = 300000$$

$$30000 \times \frac{100}{3} + 500000 = 1500000$$

$$(c) \quad \frac{40}{100} \times \frac{3}{100} \times (2500000 - 500000) = 24000$$

$$24000 + 48000 = 72000$$

(10marks)

$$18. \quad (a) \quad (i) \quad \frac{y-5}{x-0} = 2$$

$$y = 2x + 5$$

$$(ii) \quad \text{Gradient of } L_2$$

$$m_1 \times m_2 = -1$$

$$2 \times m_2 = -1$$

$$m_2 = -\frac{1}{2}$$

Equation of  $L_2$

$$\frac{y}{x+2.5} = -\frac{1}{2}$$

$$y = -\frac{1}{2}x - \frac{5}{4}$$

$$(iii) \quad \text{Equation of } L_3$$

$$\frac{y-2}{x-1} = -\frac{1}{2}$$

$$y = -\frac{1}{2}x + 2\frac{1}{2}$$

b) At intersection of  $L_1$  and  $L_3$

$$2x + 5 = -\frac{1}{2}x + 2\frac{1}{2}$$

$$2\frac{1}{2}x = -2\frac{1}{2}$$

$$x = -1$$

$$y = 2(-1) + 5 = 3$$

Coordinates of point of intersection = (-1,3)

(10marks)

19. a) Nehema's fraction:

$$1 - \left(\frac{1}{3} + \frac{2}{5}\right) = 1 - \frac{11}{15} = \frac{4}{15}$$

Amount Nehema got

$$\frac{4}{15} \times 750000 = 200000$$

b) Profit realized after taxation:

Before taxation

$$\frac{36}{100} \times 750000 = 270000$$

After taxation

$$\frac{95}{100} \times 270000 = 256500$$

c) Amount to be shared after each received 20000

$$= 256500 - 60000$$

$$= 196500$$

Ratio of sharing

$$\text{Amani: Furaha: Nehema} = \frac{1}{3} : \frac{2}{5} : \frac{4}{15}$$

$$= 5:6:4$$

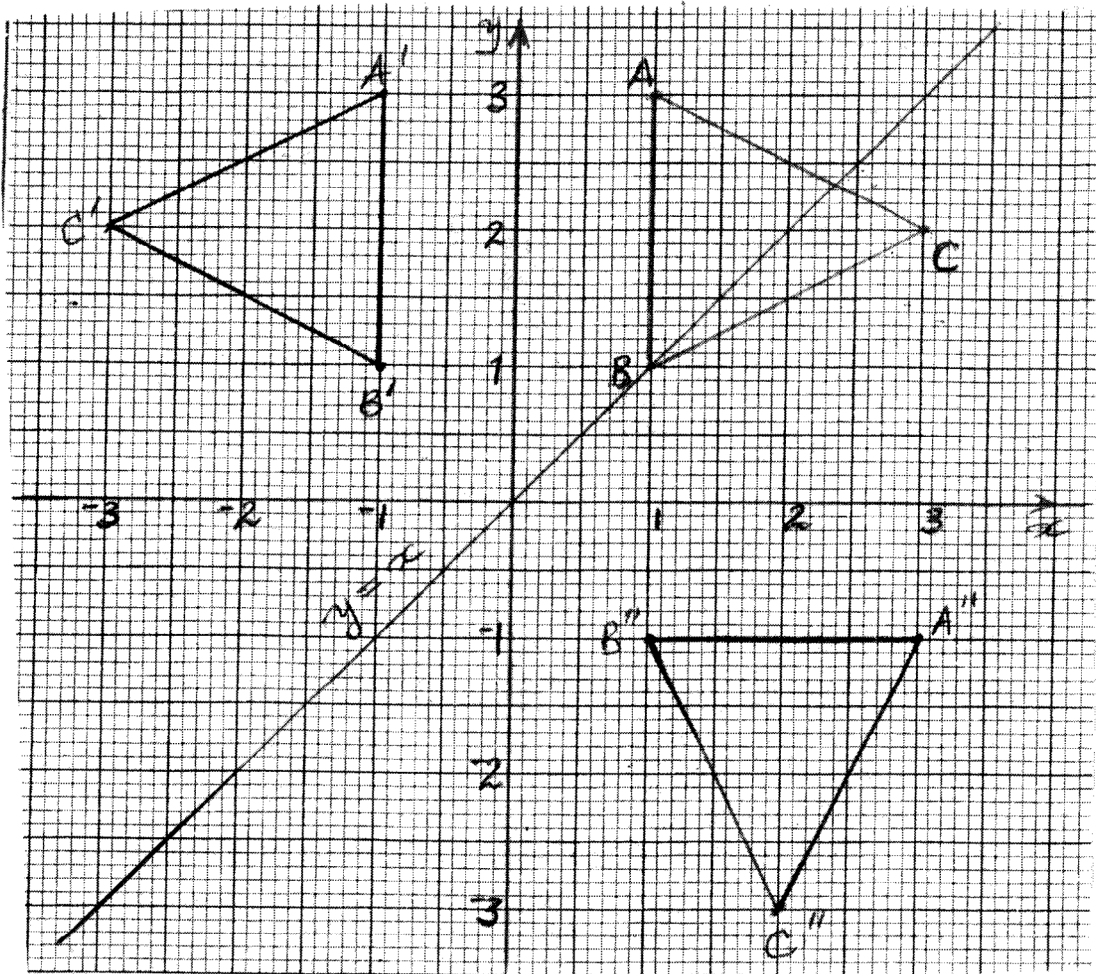
Furaha's share more than Nehema's

$$196500 \left(\frac{6-4}{15}\right) = 26200$$

(10marks)

20.

(a) and (b)



$$(c) \begin{pmatrix} a & b \\ c & d \end{pmatrix} \begin{pmatrix} 1 & 1 & 3 \\ 3 & 1 & 2 \end{pmatrix} = \begin{pmatrix} 3 & 1 & 2 \\ -1 & -1 & -3 \end{pmatrix}$$

$$a + 3b = 3$$

$$c + 3d = -1$$

$$a + b = 1$$

$$c + d = 1$$

$$2b = 2 \Rightarrow b = 1$$

$$2d = 0 \Rightarrow d = 0$$

$$a + 3 = 3 \Rightarrow a = 0$$

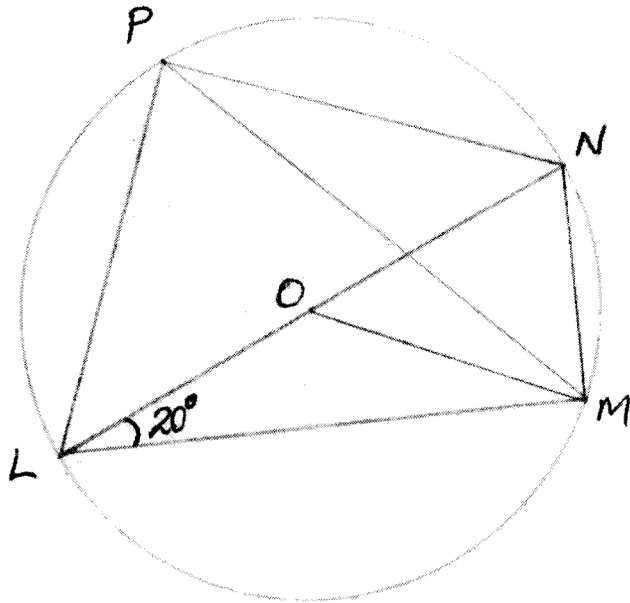
$$c = -1$$

$$\text{Matrix} \begin{pmatrix} a & b \\ c & d \end{pmatrix} = \begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix}$$

(d) Rotation of  $-90^\circ$  about point  $(0, 0)$

(10marks)

21.



- (a)  $\angle MPN = \angle MLN = 20^\circ$   
Angles subtended at the circumference by chord MN
- (b)  $\angle PLN = \frac{1}{2}(180^\circ - 90^\circ) = 45^\circ$   
Angle in semicircle equals  $90^\circ$  and base angles of isosceles triangle are equal.
- (c)  $\angle LPM = \angle LNM = 90^\circ - 20^\circ = 70^\circ$   
Complementary angles in a right angled triangle, angles subtended by chord LM equal to  $70^\circ$
- (d)  $\angle MNP = 180^\circ - (45^\circ + 20^\circ) = 115^\circ$   
Opposite angles of cyclic quadrilateral add up to  $180^\circ$
- (e)  $\angle PMO = 90^\circ - (45^\circ + 20^\circ) = 25^\circ$   
Base  $\angle$ s of isosceles triangle OLM =  $20^\circ$   
(i.e.  $\angle NMP = \angle PLM$ )  
and  $\angle$ s subtended by chord PN at circumference equal.

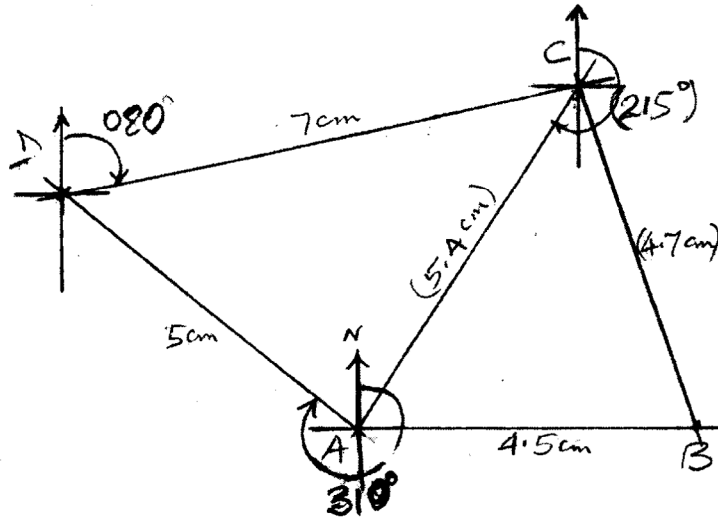
(10marks)

22. (a) i)  $AB = 12 \tan 40^\circ$   
 $= 10.07\text{cm}$
- ii)  $BD = 10.07 \tan 60^\circ$   
 $= 17.44 \text{ cm}$   
 $CD = 17.44 - 12 = 5.44 \text{ cm}$

(b)  $\angle CBE$   
 $CE = CD \tan 30$   
 $= 5.44 \tan 30 = 3.141$   
 $\therefore \angle CBE = \tan^{-1} \frac{3.141}{12}$   
 $= 14.67^\circ$

(10marks)

23.



(b) Perimeter,  $7 \text{ cm} + 4.5 \text{ cm} + 4.7 \text{ cm}$   
 $= 21.2 \text{ cm}$   
 Actual perimeter = 2120m

- (c) i)  $5.4 \pm 0.1 \text{ cm} \rightarrow 540 \text{ m}$   
 ii)  $215^\circ \pm 1^\circ$

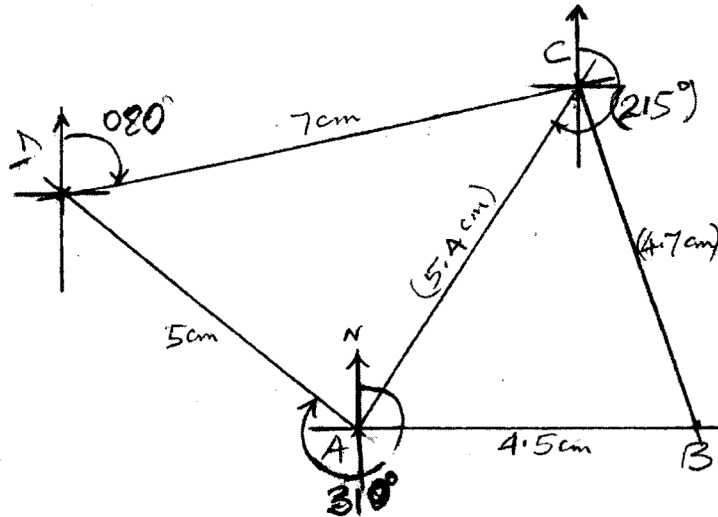
(10marks)



(b)  $\angle CBE$   
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(10marks)

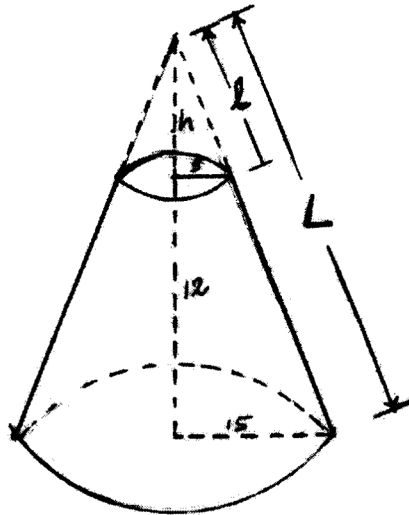
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(b) Perimeter,  $7 \text{ cm} + 4.5 \text{ cm} + 4.7 \text{ cm}$   
 $= 21.2 \text{ cm}$   
 Actual perimeter = 2120m

- (c) i)  $5.4 \pm 0.1 \text{ cm} \rightarrow 540 \text{ m}$   
 ii)  $215^\circ \pm 1^\circ$

(10marks)



a) Circular surface area

Larger circle  $15^2\pi$

Small circle  $5^2\pi$

Area of circular surface

$$(15^2 + 5^2)\pi = 785.5\text{cm}^2$$

(b)  $\frac{h}{5} = \frac{h+24}{15}$

$$15h = 5h + 120$$

$$10h + 120 \Rightarrow h = 12\text{cm}$$

(c) Slant height (l) of cut off cone

$$L = \sqrt{15^2 + 36} = 39$$

Curved area

$$\pi \times 15 \times 39 - \pi \times 4 \times 13 = \pi (585 - 65)$$

$$= 1633.84$$

$$= 1634$$

(10marks)