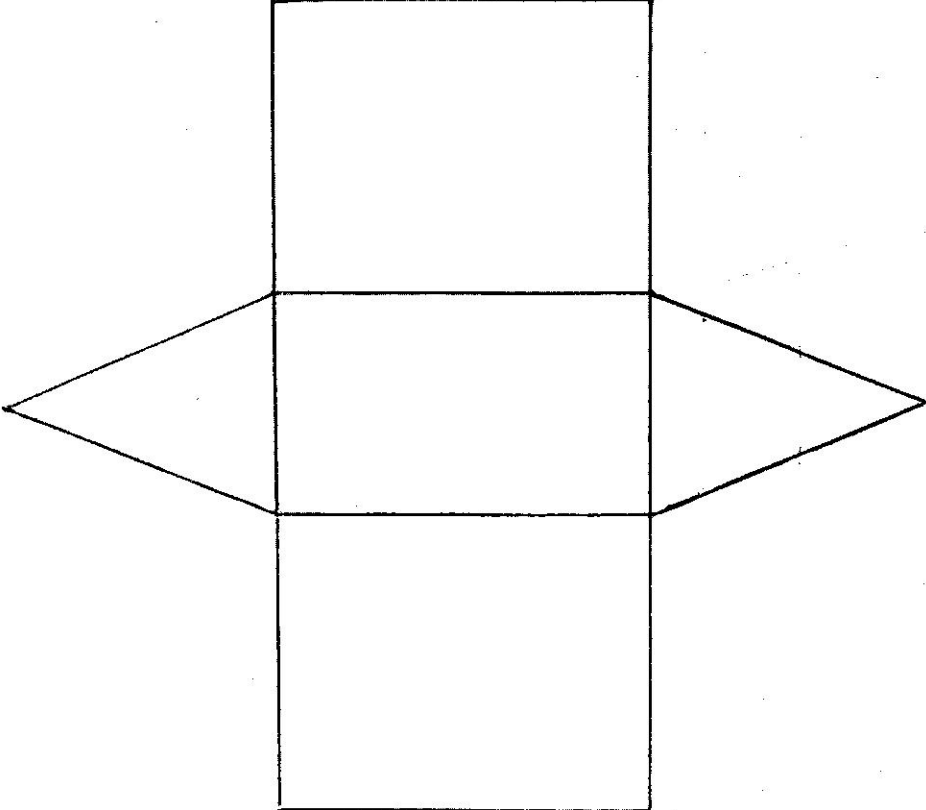
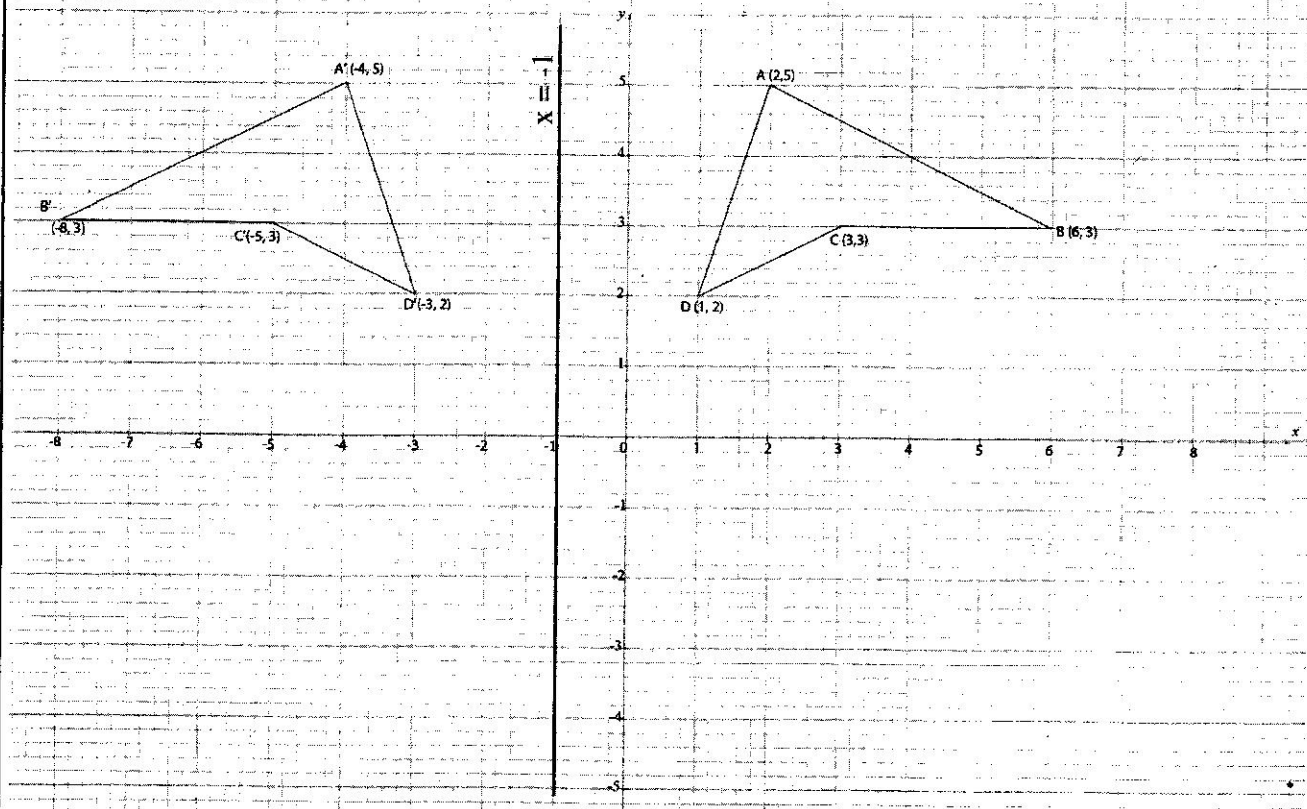


5.1.3 Mathematics Alternative B (122/1)

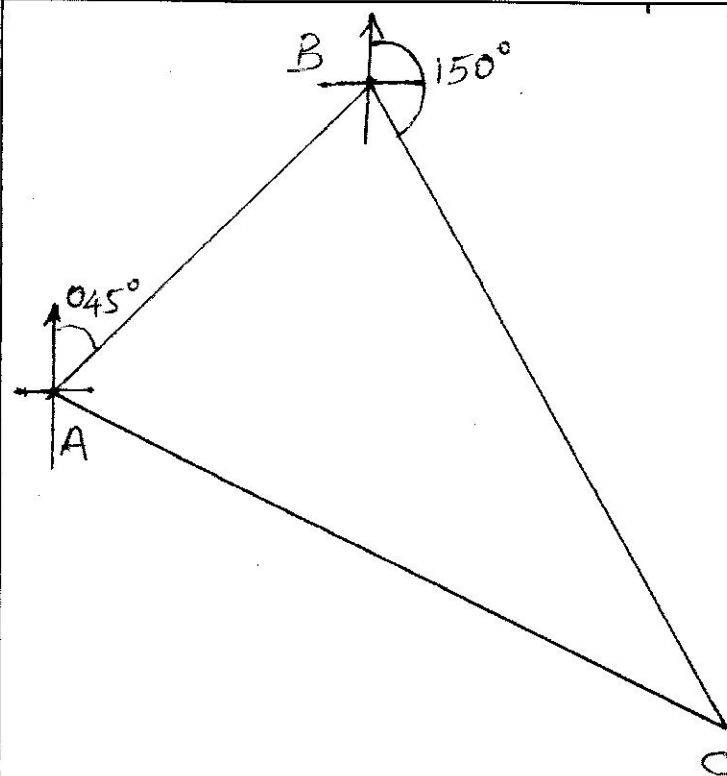
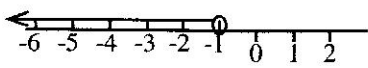
1.	$\frac{a^2 - b^2}{a^2 + ab - a - b} = \frac{(a + b)(a - b)}{a(a + b) - 1(a + b)}$ $= \frac{(a + b)(a - b)}{(a - 1)(a + b)}$ $= \frac{a - b}{a - 1}$	M1 M1 A1	
		3	
2.	Auma: Barua: Chiku = 2:3:5 Total profit = $\frac{105000}{7} \times 10$ $= 150000$	B1 M1 A1	
		3	
3.	$6561 = 3^8$ $3^{2y} = 3^8$ $2y = 8$ $y = 4$	B1 M1 A1	
		3	
4.	Hypotenuse = $\sqrt{7^2 + 5^2}$ $= \sqrt{74}$ $\sin \theta = \frac{5}{\sqrt{74}}$ or = 0.5812	M1 A1	or Alternative
		2	
5.	Density in $\text{g/cm}^3 = \frac{30}{64}$ Density in $\text{kg/m}^3 = \frac{\frac{30}{1000}}{\frac{64}{100}}$ $= 468.75 \text{ kg/m}^3$	M1 M1 A1	
		3	
6.	(a) $40 = 2^3 \times 5$; $56 = 2^3 \times 7$; $64 = 2^6$ Greatest length of pieces = $2^3 = 8$ (b) $(40 \div 8) + (56 \div 8) + (64 \div 8)$ $= 20$	M1 A1 M1 A1	
		4	
7.	Length of minor arc $= \frac{81}{360} \times 31.24$ $= 7.029$ Length of major arc $= 31.24 - 7.029$ $= 24.211$	M1 M1 A1	ALTERNATIVE Angle of major sector $= 360^\circ - 81^\circ$ $= 279^\circ$ Length of major arc $= \frac{279^\circ}{360^\circ} \times 31.24$ $= 24.211$
		3	

8.	(a) $\angle CAD = 40^\circ$ alternate \angle s (b) $\angle DBC = 40^\circ$ $\therefore \angle TBD = 180^\circ - 40^\circ$ $= 140^\circ$	B1 M1 A1 3	\angle s subtended by same chord are equal
9.		B1 B1 B1 3	3 faces accurately drawn
10.	$100x = 13.333\dots$ $\underline{10x = 1.333\dots}$ $90x = 12$ $x = \frac{12}{90} = \frac{2}{15}$	M1 M1 A1 3	

11.



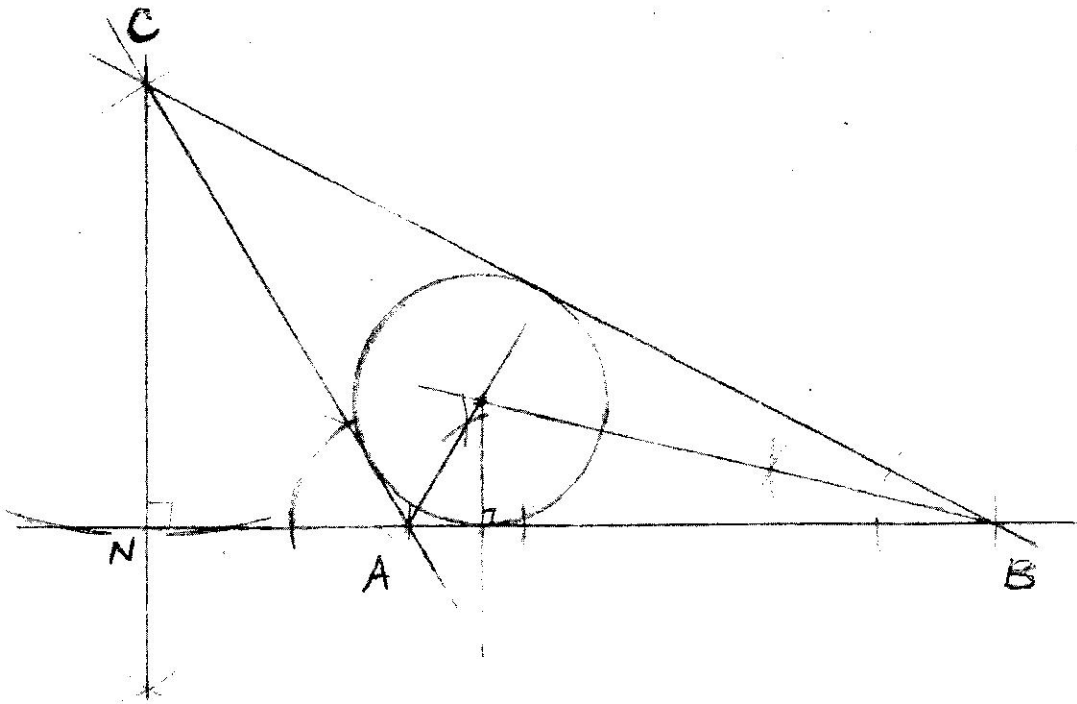
	$x = -1 \checkmark$ drawn image $A'B'C'D'$ \checkmark drawn $A'B'C'D'$ is oppositely congruent to $ABCD$	B1 B1 B1 3	
12.	Total surface area $= \frac{22}{7} \times 3.5^2 + \frac{22}{7} \times 3.5 \times 9$ $= \frac{22}{7} \times 3.5(3.5 + 9)$ $= 137.5 \text{ cm}$	M1 M1 A1 3	

13.	 <p>(a) AB accurately drawn BC accurately drawn</p> <p>(b) distance from A to C = 10.2×10 = 102 km</p>	<p>B1 B1</p> <p>M1 A1</p> <p>4</p>	<p>AC = 10.2 ± 0.1 cm</p>
14.	<p>(a) height = $\sqrt{13^2 - 5^2}$ = 12 cm</p> <p>(b) volume = $\frac{1}{3} \times 8 \times 6 \times 12$ = 192 cm³</p>	<p>M1 A1</p> <p>M1 A1</p> <p>4</p>	
15.	<p>$-5x - 3 > 2x + 4$ $-5x - 2x - 3 > 4$ $-7x > 7$ $x < -1$</p> 	<p>B1</p> <p>B1</p> <p>2</p>	

16.	Time at stop B $8.00 + \frac{12}{4}h = 11.00$ Time taken to C from B $11.45 - 11.30 = 15 \text{ minutes}$ Distance = $12 + \frac{15}{60} \times 72$ $= 30 \text{ km}$	B1 B1 M1 A1 4	
17.	a) Area to be painted $2(15 \times 3 + 9 \times 3) - (2 \times 2.2 \times 3 + 1.5 \times 1.5 \times 6)$ $= 117.3 \text{ m}^2$ b) No. of tins required $= \frac{117.3}{4 \times 2.5}$ $= 11.73$ $\approx 12 \text{ tins}$ c) Total cost: $12 \times 1700 + (2000 + 30 \times 117.3)$ $= \text{Sh } 25919$	M1 M1 M1 A1 M1 A1 B1 M1 M1 A1 10	area of walls area of doors and windows difference cost of paint sum of cost of paint, standing charge and labour

18.	<p>a) $2 \times \frac{1}{2} \times 5 \times 5 \sin 150^\circ$ $= 12.5 \text{ cm}^2$</p> <p>b) (i) $\frac{\frac{1}{2}BD}{5} = \sin 75^\circ$ $BD = 9.7$</p> <p>(ii) Area of $\triangle BCD$ $S = \frac{1}{2}(9.7 + 16 + 16) = 20.85$ $A = \sqrt{20.85(20.85 - 9.7)(20.85 - 16)^2}$ $= \sqrt{20.85 \times 11.15 \times (4.85)^2}$ $= 73.95$</p> <p>c) Area of kite ABCD $\frac{1}{2} \times 12.5 + 73.95$ $= 80.2 \text{ cm}^2$</p>	M1 A1 M1 A1 B1 M1 A1 M1 M1 A1 10	
19.	<p>a) odd numbers after x $x + 2, x + 4, x + 6$ $x + (x + 2) + (x + 4) + (x + 6) = 120$ $4x = 120 - 12$ $x = 27$ \therefore odd numbers: 27, 29, 31, 33</p> <p>b) (i) $3p + 2m = 1180$ $2p + m = 680$</p> <p>$3p + 2m = 1180$ (i) $2p + m = 680$ (ii)</p> <p>$3p + 2m = 1180$ (i) $4p + 2m = 1360$ (iii) $p = 180$</p> <p>substitute $p = 180$ in (ii) $2 \times 180 + m = 680$ $m = 320$ $p + m = 180 + 320 = 500$</p> <p>(ii) $180 \times 1.1 + 320 \times 0.95$ $198 + 304 = 502$</p>	B1 M1 A1 B1 B1 M1 A1 B1 M1 A1 10	 for $3p + 2m = 1180$ or $2p + m = 680$ or equivalent for $p = 180$ and $m = 320$

20.	a) (i) 10:800 1:80 height of door on photograph: $= \frac{240}{80}$ $= 3 \text{ cm}$	B1	or equivalent
		M1	
		A1	
	(ii) L.S.F = 1:80 A.S.F = 1:6400 \therefore Actual area of the window $= \frac{1.4 \times 6400}{10\,000}$ $= 0.896 \text{ m}^2$	B1	
		M1	
		A1	
	b) (i) Volume scale factor $= (\sqrt{16})^3 : (\sqrt{49})^3$ $= 64 : 343$	M1	
		A1	
		(ii) Volume of bigger cuboid $= \frac{128}{64} \times 343$ $= 686 \text{ cm}^3$	
	A1		
10			



a) construction of 120°
completion of Δ

B1
B1

b) (i) identifying centre of circle
 \perp from centre to at least one side
completing circle radius 1.7 ± 0.1

B1 at least 2 mediators drawn
B1 at least 1 perpendicular drawn
B1

(ii) \perp from C to N
 $CN = 6.1 \pm 0.1$

B1
B1

c) area of $\Delta ABC = \frac{1}{2} \times 8 \times 6.1$

M1

area of circle = 3.142×1.7^2

M1

area of Δ outside the circle

$$= \frac{1}{2} \times 8 \times 6.1 - 3.142 \times 1.7^2$$

$$= 24.4 - 9.079202769$$

$$= 15.32079723$$

$$= 15.32$$

A1

10

22.	a) $3600 \times 22.07 + 4500 \times 107.93$	M1	√ conversions
	$= 565137$	M1	sum
		A1	
	b) (i) $2000 \times 80.89 + 5000 \times 11.60$	M1	√ conversions
	$= 219780$	M1	sum
		A1	or equivalent e.g. 35% used correctly
	(ii) $219780 \times \frac{65}{100}$	M1	
	$= 142857$		
	Balance: $219780 - 142857$	M1	
	$= 76923$		
Exchange: $= \frac{76923}{128.55}$	M1		
≈ 598	A1		
	10		

23.

a) (i) L_1 : when $y = 0$, $x = \frac{-3}{2}$

B1

(ii) L_1 : when $x = 0$, $y = 3$

B1

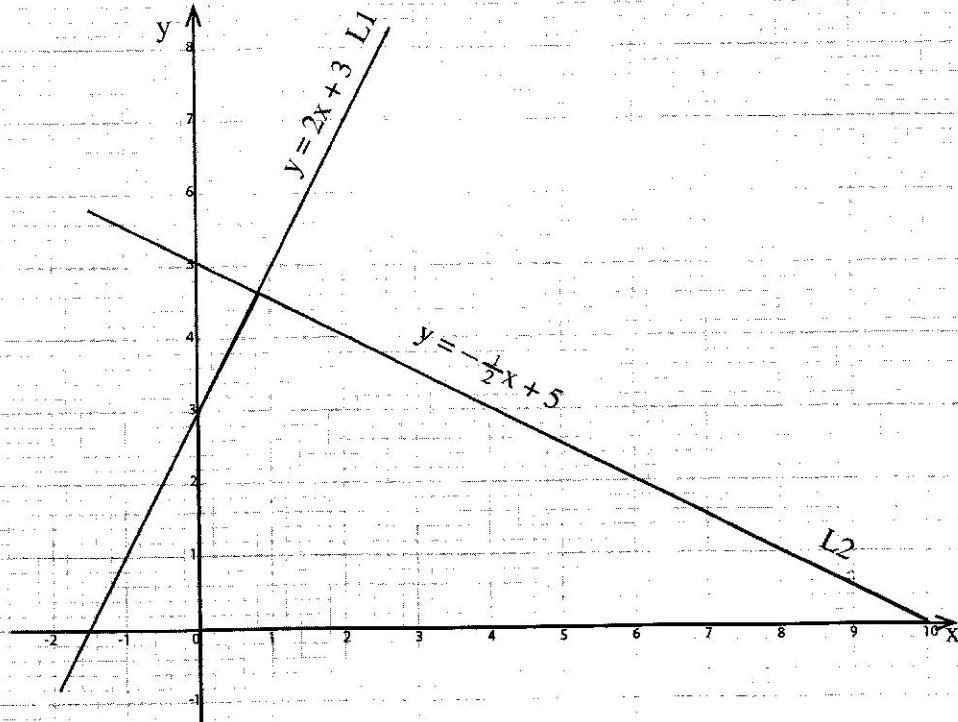
b) (i) L_2 : when $y = 4$, $x = 2$

B1

L_2 : when $x = -2$, $y = 6$

B1

c) (i)



Line L_1 drawn

B1

Line L_2 drawn

B1

(ii) value of x and y when $L_1 = L_2$
 $x = 0.8$, $y = 4.6$

B1

(iii) area of region bounded by L_1 , L_2 , and x -axis

$$\text{Area} = \frac{1}{2} \times 11.5 \times 4.6$$

$$= 26.45$$

M1

for 11.5 and 4.6

M1

A1

10

24.	a) $(3x + 1)2x = 6x^2 + 2x$	B1	
	b) (i) $(2x + 2)4x = 6x^2 + 2x + 36$	M1	
	$2x^2 + 6x - 36 = 0$	M1	
	$(2x + 12)(x - 3) = 0$	A1	
	$x = 3$		
	(ii) area of carpet		
	$= 3(3) + 1 + 2(3)$	M1	
	$= 10 \times 6 = 60\text{m}^2$	A1	
	c) Cost of carpet		
	$= 60 \times 1600$	M1	
$= 96000$			
Cost of labour			
$= 96000 \times 0.025$	M1		
$= 2400$			
Total cost			
$= 96000 + 2400$	M1		
$= 98400$	A1		
	10		