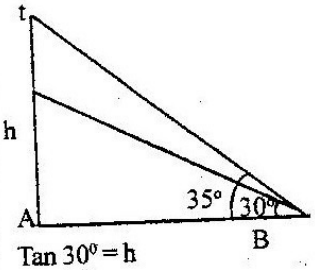
K.C.S.E 1998 MATHEMATICS PAPER 121/1 MARKING SCHEME

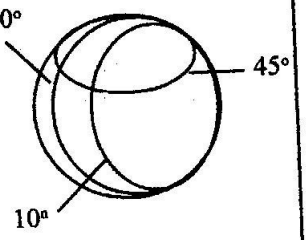
	SOLUTION	MARKS	ALTERNATIVE METHOD
1.	$100\sqrt{\frac{(0.0064)}{100}}$ $1000\left(\frac{0.08}{10}\right)$ ✓ 1000×0.008 $= 8$ ✓	M1 A1 2	
2.	$(a+b)(a-b)$ ✓ $(2557+2547)(2557-2547)$ ✓ 5104×10 51040 ✓	B1 M1 A1	
3.	$6a + 4b = 72$ ...(i) $2a + 3b = 3.4$ (ii) $6a + 4b = 7.2$ $6a + 9b = 10.2$ $5b = -3$ ✓ $b = \frac{3}{5}$ $\therefore 6a + \frac{4 \times 3}{5} = 7.2$ $6a = 4.8$ $a = 0.8$ One art book = 0.8 kg one Biology book = 0.6 kg ✓	M1 M1 A1 3	Forming inequalities Eliminating one variable Both answers correct
4.	(a) $\angle CDF = 110^\circ - 60^\circ = 50^\circ$	A1	Sum of two interior opposite angles add up to exterior angle. ALT. METHOD $(180-(60+(180-110)=(180-130)$
	(b) $\angle ABD = \angle BDE = 25^\circ$ ✓ Both reasoning given and ✓ Both reasoning given wrong - ow-1 One reason given (right or wrong) ow-1	B1 IF	(A0)

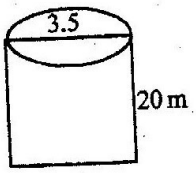
	SOLUTION	MARKS	ALTERNATIVE METHOD
5.	Commission $= \frac{2.4}{100} \times 100{,}000 + \frac{3.9}{100} \times 180{,}000$ $2400 + 70.20$ Sh. 5100 = Sh. 9420	M1	
6.	 $\text{Tan } 35^0 = \frac{(h+t)}{15}$ $h + t = 15 \tan 35^0$ 15×0.7002075 10.5031113 10.503 $\text{Tan } 30^0 = \frac{h}{15}$ $h = 15 \tan 30^0$ $h = 15 \times 0.5773502$ $= 8.660254$ $h = 8.611$ (c) 10.503 - 8.661 = 1.842m	B1 B1 B1 3	(Accept 8.66, 8.662) if log used (accept 1.84 1)
7.	$\begin{pmatrix} x & 0 \\ 5 & y \end{pmatrix}\begin{pmatrix} x & 0 \\ 5 & y \end{pmatrix}$ $\begin{bmatrix} x^2 & 0 \\ 5x + 5y & y^2 \end{bmatrix}$ $x^2 = 0 \quad 0 = 1 \quad 0\ 5x + 5y = 0$ $5x + 5y \quad y2 = 0 \quad 1$ if $x = 1, y = 1$ if $x = -1, y = 1$ if $x = -1, y = 1$ then $x = 1, y = -1$ $x = -1, y = 1$	B1 B1 M1 A1 4	
8.	$\log y = \log (10x^n)$ $= \log y = \log 10 + n \log x$ $n \log x = \log y - \log 10$ $n = \frac{\log y - \log 10}{\log x}$	M1 M1 A1	

	SOLUTION	MARKS	ALTERNATIVE METHOD
9.	$T = a + b\sqrt{S}$ or $T = b + a\sqrt{S}$ ✓ $a + b\sqrt{16} = 24$ $a + b\sqrt{36} = 32$ ✓ $a + 4b = 24$ $a + 2 \times -10 = 10$ $a + 6b = 32$ ✓ $a - 20 = 10$ $-2b = -8$ $b = 4$ $a = 30$ ✓	B1 B1 M1 A1	For substitution & elimination Both answers correct
10.	$S_{14} = \frac{15}{2}(2a + (n-1)d$ $= \frac{15}{2}(2 \times 30 + (14 \times -10)$ ✓ $\frac{15}{2}(60 - 140)$ -600 ✓	M1 A1 A1	(a) a, a + d, a + 3d, a + d $a + 2d = 10$ $a + 4d = -10$ $-2d = 20$ $d = -10$ $a + 2r - 10 = 10$ $a = 30$ ml 1st tan = 30 $d = -10$
11.	Volume = $\Pi r2h = \Pi 15 \times 15 \times 1.2$ ✓ 270Π ✓ (b) $\frac{1}{3}\Pi \times r \times 9 = 270\Pi$ ✓ $\frac{1}{3}\Pi \times r^2 = 270$ $r^2 = \frac{270 \times 3}{9} = 90$ $r = \sqrt{90} = 9.49$ ✓	M1 A1 M1 A1	
12.	cum.freq 3 11 30 44 50 ✓ $M = \frac{L1 + (n/2 - cfa)i}{f_m}$ $8 + \frac{(25 - 11)}{19} \times 4 = 10.947$ ✓	B1 A1 3	$mdn = L + \frac{(n - 1 - fc)i}{fm}$ ml $7.5 + \frac{(255 - 11)}{19} \times 4$ $= 10.553$ A1

	SOLUTION	MARKS	ALTERNATIVE METHOD
13.	$1600(1+\frac{r}{100})^2 = 2,5000$ ✓ $(1+\frac{r}{100})^2 = \frac{25000}{16000}$ $1+\frac{r}{100} = \sqrt{1.5625} = 1.25$ ✓ $\frac{r}{100} = 0.25$ ✓ $r = 25\%$ ✓	m1 m1 m1 m1	$\frac{25}{16} = 1 + \frac{2R}{100} + \frac{R2}{10,000}$ m1 $16r2 + 13200r + 90,000 = 0$ $r2 + 200r + 5625 = 0$ m1 $r = 200 + 250$ m 2 $r = \frac{50}{2} = 25\%$ m
14.	$\text{Cos}(30\theta + 120^0) - \frac{1.732}{2} = 0.8660$ $3\theta + 120^o = 390^0 3\theta + 120 = 330$ ✓ $3\theta = 270$ $3\theta = 210$ ✓ $\theta = 90$ ✓ $\theta = 70^o$ ✓	B1 B1 B1 A1	Both answers correct
15.	$C = 2 \times 2.8 \times \frac{22}{7} = 17.6$ cm $\frac{C}{\Pi} = 17.6 \times \frac{7}{22}$ $= 5.6$ ✓ $3.142 \times 2.8 \times 2 = 17.595$ $3.142 \times 5.5 = 17.281$ ✓ $3.142 \times 5.7 = 19.909$ Limits : 17.28 + 17.91 ✓	M1 M1 A1	working limit Lower limit Upper limit 17. 27 - 17.91 logs used
16.	A ← 180 km → B 72 P 72 N 72 M 9.17 75km B Distance covered by Bus A at 10 a.m. $= 90 \times 2 = 180$ km Bus B Time between 2 stops $72 = 1.2$ hrs (1hr 12 min) Bus B leaves L at 9.17 a.m. Distance between 9.17 - 10 a.m. = $60 \times \frac{43}{60} = 43$ km At 10 a.m. Bus B has covered (72 + 43)=115 km Distance between Bus A & B at 10 a.m. 360 - (180 + 115) = 65 km	B1 B1 B1	

	SOLUTION	MARKS	ALTERNATIVE METHOD
17.	(a) $3.5 \times 50 = 1.75$ 100		
	$4.75 \times 30 = 1.425$ ✓	M1	
	Total = 3.175 kg. ✓	A1	
	$3.175 \times 100 = 3.9688$ ✓	M1	
	3.969 ✓	A1	
	No of fat Kg = $\frac{x}{50} \times 100 = 4$		
	x = 2 kg fat	M1	
	Kg of A $\frac{3.5}{100} y + 4.75 \frac{(50 - y)}{100} = 2$		
	(50-y) Kg of B: $3y + 237.5 - 4.75y = 200$ $1.25 = 37.5$	M1	
	$Y = \frac{37.5}{1.25}$		
	y = 30		
	A = 30 Kg	B1	
	B = 20 Kg		
	B≥20 Kg	B1 8	
18.	(a) Taxable pay = $\frac{2000}{20} \times \frac{115}{100} - \frac{700}{20}$ ✓	M1	
	$1000 \times \frac{115}{100} - 35$ ✓	M1	
	1150 - 35 = £1115	M1	
	Taxable income	M1	
	$342 \times 2 + 342 \times 3 + 342 \times 4 + 39 \times 5$ $34.2 + 51.3 + 68.4 + 22.25 = 176.15$	M1 A1	M1 must mult. by 39
	Net tax = 35.23 - 600 Sh. 2923 (£146.15)	B1/8	

SOLUTION	MARKS	ALTERNATIVE METHOD
19. (B) $\begin{bmatrix}0 & -1\\ 1 & 0\end{bmatrix}\begin{bmatrix}4 & 2 & 6 & 4\\ -4 & -2 & -6 & 12\end{bmatrix} = \begin{bmatrix}4 & 4 & 6 & 2\\ 4 & 2 & 6 & 4\end{bmatrix}$	B1	
A'(4,4) B'(4,2) C'(6,6) D'(2,5)		
C) (i)		
$\begin{pmatrix}1 & -2\\ 0 & 1\end{pmatrix}\begin{pmatrix}4 & 4 & 6 & 2\\ 4 & 2 & 6 & 4\end{pmatrix} = \begin{pmatrix}-4 & 0 & -6 & -6\\ 4 & 2 & 6 & 4\end{pmatrix}$	M1	
A" (-4, 4), B" (0,2) C"(-6,6) D" (-6,4)	A1	
d)		
$\begin{bmatrix}1 & -2\\ 0 & 1\end{bmatrix}\begin{bmatrix}0 & -1\\ 1 & 0\end{bmatrix} = \begin{bmatrix}2 & -1\\ 1 & 0\end{bmatrix}$	M1 A1	
20. Longitudinal difference 70 - 10 = 60°	B1	
(b) Dii betw x and y $\frac{60}{360} \times 22 \times 2\ 6371 \cos 45°$	M1	r = 6371 cos 45
$\frac{1}{6} \times \frac{22}{7} \times 26371 \times 0.7071$ 4718 km	A1	(Accept 4719, 4720, 4715)
(ii) Distance between x and y $\frac{4919.45}{1.85} = 2551.05$ mm		
(c) Time diff = 60 x 4 = 240 min = 4 hrs Local time at x = 6 pm	B1 B1/8	

SOLUTION	MARKS	ALTERNATIVE METHOD
21. (a) Area of the circular based $\frac{22}{7} \times 3.5 \times 3.5 = 38.5$ ✓	A1	
(b) Area of thecurved S.A. $\frac{22}{7} \times 2 \times 3 \times 3.5 \times 20$ ✓ 440 cm^2 ✓	M1 A1	
(c) $^4/_2 \Pi r^2 = 2x^{22}/_7 \times 3.5^2$ ✓. 44 X 0.5 X 3.5 22 X 3.5 77 cm^2 ✓	M1 A1	
(d) 38.5 + 440 + 77 ✓ 555.5 cm^2	A1 M1 M1 A1	
	8	
22. (i) a + b ✓ AD = AB + BD ✓ $a + (\frac{-2}{3})b$ $a - \frac{2}{3}a$ ✓	B1 M1 A1	
(b) $\frac{-2}{3}$ AD + $(\frac{-4H}{3})$ ✓ $^2/_3 (a - \frac{2b}{3} + \frac{-4b}{3})$ $\frac{2a}{3} - \frac{4b}{9} - \frac{4b}{3}$ $\frac{-2a}{3} - \frac{8a}{9} = \frac{2}{3}(-a - \frac{4b}{3})$ ✓	M1 A1	

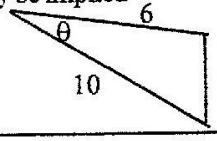
SOLUTION	MARKS	ALTERNATIVE METHOD
$\overrightarrow{PR} = \frac{1}{9}b - \frac{8}{3}a$ $\overrightarrow{px} = K(\frac{1}{9}b - \frac{8}{3}a)$ $\overrightarrow{BX} = h(-a) = ha$ $BX = -\frac{2}{3}a - \frac{8}{9}b + K(\frac{1}{9}b - \frac{8}{3}a)$ $= 2a + \frac{K}{3}8a - \frac{8}{3}b + \frac{1}{9}kb$ $= (-\frac{2}{3} - \frac{8}{3}k)a + (\frac{8}{9} + \frac{1}{9}k)b$ $-h = \frac{2}{9} + \frac{8}{3}K$ $-\frac{8}{9} + \frac{1}{9}k = 0$ $\frac{1}{9}k = \frac{8}{9}$ $K = 8$ $+h = +\frac{2}{3} + \frac{8}{9}xk$ $= +\frac{2}{3} + 64 = \frac{66}{3}$ $h = 6^*\ h=22$ $Px = \frac{8}{9}(1b - 8a) = \frac{8}{9}b - \frac{64}{3}a$ $PR : RX = 1:7$	M1 M1 A1	$PX = \frac{1}{9}b - \frac{1}{3}a$ $(\frac{8}{9}b - \frac{64}{3}a) - (\frac{1}{9}b - \frac{1}{3}a) = \frac{7}{9}b - \frac{56}{3}a$ $= 7(1b - 8a) : PR:RX = 1.7$
23.. CD = 5.4 cm Not to scale	B1 B1 B1 B1 B1 B1	x Const of 20o B1 (Check for const marks) x Length of AB Completed ABC Const. of 1 from A to BC produced * Length CD = 5.4 + 0.1-B1 (60) * Loc (DA = 4.1 [illegible] 5) X Location of A Line th[illegible] 'A' parall[illegible] [illegible] accept equi[illegible]alent statement

	SOLUTION	MARKS	ALTERNATIVE METHOD
23.	Line parallel to BC and 4.5 away from it BC = 5 cm AD = 6 cm $\frac{3}{4} \times 6 = 4.5$	B1	
	(c) Location of A' - line parallel to BC and 4.5 cm away from BC	B1	
24.	(a) (i) treated with the drug $\frac{20}{36} = \frac{5}{9}$	B1	
	(ii) treated with the drug $\frac{16}{36} = \frac{4}{9}$ 1 mark	B1	
	(b) (i) treated with the drug and will die $\frac{5}{9} \times \frac{1}{10} = \frac{5}{90} = \frac{1}{18}$ 2 marks	M1 A1	
	(ii) $\frac{4}{9} \times \frac{1}{10} = \frac{28}{90} = \frac{14}{45}$ 2 marks	M1 A1	
	(iii) $\frac{4}{9} \times \frac{3}{10} = \frac{12}{90} = \frac{6}{45} = \frac{2}{15}$ 2 marks	M1 A1	
		8	

K.C.S.E 1998 MATHEMATICS PAPER 121/2 MARKING SCHEME

SOLUTION	MARKS	ALTERNATIVE METHOD
1. NO | LOG 55.9 | 1.7474 0.2621 | $\bar{1}.4185$ 0.01177 | $\bar{2},0708$ $\overline{3,4893}$ 1.776×10^2 | $5+\bar{2}.4893 = 1.4979$ 5 2.2495 = 177.6	m1 m1 A1 4	All three logs ✓ ✓ attempt to divide by 5
2. $\frac{3(x-1)-(2x+1)}{3x} = \frac{3x-3-2x-1}{3x}$ $= \frac{x-4}{3x}$ $\frac{x-4}{3x} = \frac{2}{3}$ $3x - 12 = 6x$ $x = -4$	B1 M1 A1 3	Equating & removal of den
$\frac{3\sqrt{14} + \sqrt{2}3\sqrt{14} - 2\sqrt{3}}{(14)2 - (2\sqrt{3})2} = 4\sqrt{\frac{3}{2}}$ $= 2\sqrt{3}$	M1 A1 2	Single term with denominates expanded
4(a) $AC = \sqrt{4^2 + (4\sqrt{3})^2} = \sqrt{16 + \frac{16}{3}} = \sqrt{\frac{64}{3}}$ $\frac{8}{\sqrt{3}}$ or 4.618 ✓	m1 A1	
b) $BC = \frac{4.618}{\tan 30} = \frac{4.618}{0.5774}$ = 8 ✓	M1	$\frac{8 \div 1}{\sqrt{3}\ \sqrt{3}}$ if A is lost
5. 1995 value = 50,000 x 1.2 ✓ = 60,000 1997 value = 60000 x $(1.1)^2$ ✓ = 72,600 ✓	A1 M1 A1 3	(7,996, 7,997, 7,998. 7.999)

SOLUTION	MARKS	ALTERNATIVE METHOD
6. Sh to £ = $\frac{500\,000}{102}$ = 4902 ✓ £ to $ = $\frac{500\,000}{102}$ x 1.7 = 8.333 ✓ $ to Sh. = $\frac{500\,000}{102}$ x 1.7 x 60.6 ✓ = 505,000 ✓	ml ml ml A1 4	allow Sh. 505,100
7. Trade B.P. = $\frac{84}{120}$ x 100 ✓ = 70 ✓ b) Cost of manufacturers = 70 x $\frac{100}{140}$ = 50 ✓	M1 A1 B1	
8. a) ✓ Const of 1 bisector of AB b) ✓Const of 1 bisector of Ac or BC or <OAB = 12° ± 1° or <OBA = 12° ±1° Drawn ✓position of P on XY of AB	B1/3 B1 B1 3	Pts P and O must be on opp. sides
9. 3u = w + u + y 2u = w + v	ml A1 2	* if its 3u + u = v + w without evidence M1A1 OW - 1 vector egn. or equivalent
10. $3p^2 + \frac{2}{3}P = 1$ $p2 + 2p - 3 = 0$ $(p-1)(p+3) = 0$ → p = 10r p = -3 ∴ 3 1/2 → y = 0	B1 M1 A1 B1	or equivalent at lost if all values given
11. Initial volume = $\frac{4}{3}\pi x 2^3 = \frac{32\pi}{3}$ New vol = $\frac{32\pi}{3}$ x 337.5 M1 = 36π	M1	
12 Log 1/125 x^2 = Log 1/125 1/125 x^2 = 1/125 $x^2 = 1$ x = 1	M1 M1 A1	For single logs for both sides For dropping logs must convert 3 logs 5 or log 1/125 M1 for solving x, condone x ±1 for A1

SOLUTION	MARKS	ALTERNATIVE METHOD
13. $1 + 6x\ 15^2 + 15x^2 + 20x^2 + 6x^5 + x^6$ ✓ $1 + 6(0.03) + 15(0.03)^2 + 20(0.03)^3$ ✓ $= 1+0.18+0.135+0.0054$ $= 1.19404$ $= 1.194$ ✓	B1 M1 A1 3	Accept discending powers of x Allow more than 3 terms if used and if used and follow thro'
14. a) P(all boys) $= {}^5/_{12} \times {}^4/_{11} \times {}^3/_{10}$ $= {}^1/_{77}$ b) (2 girls) $= \frac{5}{12}\times\frac{7}{11}\times\frac{6}{10}\times\frac{7}{12}\times\frac{5}{11}\times\frac{6}{10}\times\frac{7}{12}\times\frac{6}{11}\times\frac{5}{10}$ $= \frac{21}{44}$	M1 A1 M1 A1 4	
15. $\cos\theta = \frac{6}{10} = 0.6000$ $\theta = 53°8'$ (53.13°)	B1 M1	For identification of the angle it may be implied  $\theta = 36.52$ or $126°\ 55$
16. a) $BN^2 = 10^2 - 5^2 = 75$ $\Rightarrow BN = 8.65$ $EN^2 = 5^2 + 12^2 = 169$ $\Rightarrow EN = 13$ b) $\tan\alpha = \frac{8.66}{13} = 0.6662$ $\alpha = 33°40(i)$ (33.67°)	B1 B1 ml A1	
17. a Vol $= \frac{22}{7} \times 3.5 \times 2.8 = 107.8$ capacity $= \frac{22}{7}\times3.5\times3.5\times2.8\times100 = 107800$ b) Water used per day $= 6x\ 15 + 80 + 60 = 230$ No of days $= \frac{107800}{230} = 468.7$ Complete days = 468 Water saved in 90 days $= 2x\ 15 \times 90 + \frac{20}{100} \times 60 \times 90$ $2700 + 1080 = 3780$ litres No of extra days $= \frac{3780}{230} = 16.43$ Total no of days $= 468.5 + 16.43$ $= 485.13$	ml ml A1 A1 A1	Conversion to litres (✓) All M but AO 0.7 x 107800 ↑ 3780 = 230 468 + 17.3 C… ALT.METHOD c) Water used in 90 days $90(4x\ 15 \times \frac{80}{100} \times 60 \times 80)$ $= 90x100 = 16920$ Water rem = 107800 - 16 380 days = 468 23 +395.13 = 485

SOLUTION	MARKS	ALTERNATIVE METHOD

18.

B2 — Both columns

x	0	30	45	60	90	120	135	150	180	225	270	315	360
2sinx	0	1	1.4	1.7	2	1.7	1.4	1	0	-1.4	-2	-1.4	0
Cosx	1	0.9	0.7	0.5	0	-0.5	-0.7	-0.9	-1	-0.7	-1	0.7	1
Y	1	1.9	2.1	2.2	2	2.8	0.7	0.1	-1	-2.1	-2	-0.7	1

B) ✓ scale used — S1 — allow B1 for one column
All pts ✓ by plotted — P1
smooth curve — C1

c) $140° \pm 3° < 140° \pm 3°$ — B1 — (✓) for ✓ simplification of two limits
B1 — accept $x < 140 \pm 3°$
accept $x > 348 + 3°$

Range $0 \leq x < 140° \pm 3°$

$348° \pm 3° \leq x \leq 360$ — 8

19. a) $\angle RST = 104$ — B1
b) $TSU = 180 - 104 = 76°$ — B1 — for ✓ values of all is < necessary for application of <properties of triangle or quadrilatiral
$\angle QTS = 180 - (90 + 37) = 53°$
or $\angle QRU = 180 - 48 = 132°$
$\angle SUT = (48 + 53)° - 76$
quadrilateral
OR $360 - (132 + 76 + 127)$ — M1 — for ✓ use in Δ of quad
$= 25°$
c) Obtuce $\angle RUT = 76 \times 2$ — A1 — or equivalent (may be implied)
(implied) $= 152°$ — A1
d) $\angle PST = 70 - 48$ or equiv $= 42°$ — ml — May be implied
A1
8

20 a) $x^2 - 2x - 3 = 0 \Leftrightarrow (x - 3)(x + 1) = 0$ — M1

b) $\int (x^2 + 2x - 3)\,dx = \frac{x^3}{3} - x^2 - 3x + c$ — A1

c) $\left| x^3 - x^2 - 3x \right|_2^3 = (\frac{27}{3} - 9 - 9) - (\frac{8}{3} - 4 - 6)$ — ml — at least two in the integral
$= 12/3$

$\left| x^3 - x^2 + 3x \right|_{-2}^{-4} = (-64/3 - 16 + 12) - -27/3 - 9 - 9$ — ml — at least two terms in the integral
$= 21/3$

sum of areas $= 12/3 + 21/3$ ✓ — M1 — allow for substitution in absolute value of $-12/3$
$= 12/3 + 21/3$

SOLUTION	MARKS	ALTERNATIVE METHOD
21. Log V: 0.48 | 0.60 | 0.70 | 0.78 | 0.85 | 0.90 Log R: 1.43 | 1.69 | 1.88 | 2.03 | 2.17 | 2.28		
b) points if plotted Line of best fit drawn c) (I) gradient = 2 (ii) intercept = 0.48 ± 0.02 k = 3.02 $\Rightarrow$ R = 3.02	P1 L1 B1 B1 B1 B1	✓ Give one if he uses "his" scale At least 4 pts, 2 of which are (✓) pts used must be on the line (✓) (✓) (✓) allow rounding off
22. a 600 km and 500 km seen or used (✓) scale used ✓b earing and distance of P ✓bearing and distance of Q b) PQ = 10.6 ± 0.1 = 1060 ± 10Km c) (i) $254° \pm 1°$ (ii) $074 \pm 1°$	B1 S1 B1 B1 B1 B1 his B1 B1 8	Apply MR if 1 hr is used (✓) measurement and conversion of (✓) Apply ✓ if one plane is ✓ by
23. a) PS = $\sqrt{(34^2 - 16^2)}$ = $\sqrt{900}$ ✓ = 30 ✓ b) Cos POs = $\frac{17^2 + 17^2 - 30^2}{2 \times 17 \times 17} = \frac{322}{578} = -0.5572$ ∴ Pos = $123° 50^{(2)}$ (123.86) c) Area of sector = $\frac{123.8}{360} \times 3.142 \times 17 \times 17$ ✓ = 312.3 Area of A = $\frac{1}{2} \times 17 \times 17 \sin 123° 50'$ = $\frac{1}{2} \times 17 \times 17 \times 0.8307$ ✓ = 120 Area of segment = 312.3 - 120 ✓ = 192.3	M1 M1 A1 M1 ml A1	tan $\frac{1}{2}\theta = 15$ $\frac{1}{2}\theta = 61°55 = 125o\ 50$ at $\frac{1}{2}$ = $\frac{1}{2} \times 15 \times 8 = 60$ M1 $\frac{1}{2}$ segment = 156.2 - 60 M1 96.2 Segment = 96 2 x 2 = 192.4 A1
24. (a) $x + y \leq 400$, x . y; $x \leq 300$, $y \geq 80$ (if A and B are used thro out) b) All 4 inequlities ✓ by drawn and shaded c) (i) x = 300 and y = 100 (ii) Max profit = [illegible] x 300 + 400 x 100 = 220,000	B3	for all inequalities (allow B2 for 3✓ and B1 for 2 apply ✓ if linear equations)