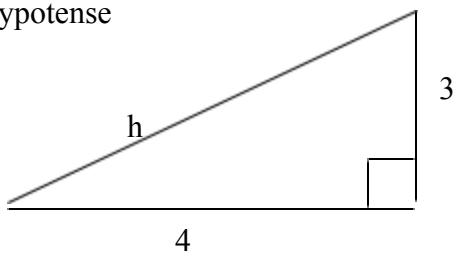
121/2
MATHS
PAPER 2

MARKING SCHEME .

1.	**(**x- y) (x+y) (3282 – 3272) (3282 + 3272) 65540	**M1** **M1** **A1**	
		3	
2.	Tan x = is positive 3rd quadrant Then sin x = -3/5 Hypotense  h = $\sqrt{4^2 + 3^2} = \sqrt{25} = 5$ Sin x = -3/5 Cos x – sin x = -4/5 - -3/5 = -3/5 = -1/5	**B1** **M1** **A1**	**Identification the hypotenuse** **Cao** **accept (-0.2)**
		3	
3.	$1^6 + 6(-\frac{1}{2}x) + 15(-\frac{1}{2}x)^2 + 20(-\frac{1}{2}x)^3$ $= 1 - 3x + \frac{15}{4}x^2 - 5x^3$ X = -0.04 $1-3(-0.04) + \frac{15}{4}(-0.04)^2 - 5(-0.04)^3$	**M1** **M1**	**For✔ simplification**

	$4 \quad 4$ $= 1 + 0.12 + 0.006 + 0.0006^{16}$ $= 1.12616$ $= 1.1262$	 **M1** **A1**	**For✔ substitution of x**
		4	
4.	$\frac{a + ar^3}{2} = 140$ $\frac{64 + 64\,r^3}{2} = 140$ $64 + 64\,r^3 = 280 \longrightarrow 64\,r^3 = 280 - 64$ $64\,r^3 = 216 \longrightarrow r = \sqrt{\frac{216}{64}}$ $r = \frac{3}{2}$	**M1** **M1** **A1**	
		3	

5.	$a^2 = \frac{b^2d^2}{b^2 - d}$ $a^2b^2 - a^2d = b^2d^2$ $a^2b^2 - b^2d^2 = a^2d$ $b^2(a^2 - d^2) = a^2d$ $b^2 = \frac{a^2\,d}{a^2 - d^2}$ $= \sqrt{\frac{a^2\,d}{a^2\,d^2}}$	**M1** **M1** **A1**	**✔ sq on both sides** **CAO**
		3	
6	$P = aQ + \sqrt{Q}$ $P = 16a + 4b$ $(500 = 16a + 4b)$ $(800 = 25a + 5b)$ $2500 = 80a + 20b$ $3200 = 100a + 20b$ $-700 = -20a$ $35 = a$ Then $b = -15$ Equation connecting P and Q $p = 35Q - 15\sqrt{Q}$	**M1** **M1** **M1** **A1**	**For ✔ equation** **For ✔ formation of simultaneous equations** **For ✔ values of both a and b**

		4	
7.	$1000\left(1+\frac{6}{100}\right)^3$ 1000×1.06^3 *Ksh* 11910.16 11910	**M1** **A1**	
		2	
8	4.562 x 0.38 = 1.73356 $\sqrt[4]{1.73356}$ = 1.14745 ÷0.82 = 1.3993 = 1.4	 **M1** **M1** **A1**	
		3	
9.	18 x 64 x 5 24 x 80 6 x 64 8x 16 3 days	**M1** **M1** **A1**	 **For✔ simplification**
		3	
10.	True value = $\sqrt{1+n}$ = 1.44 = 1.2 Approx. value $1+\frac{n}{2}=1+\frac{44}{2}=1.22$ = 1.22 – 1.2 = 0.02 $\frac{1.02}{1.2}$ x 100 = = 1.67 %	 **M1** **M1** **A1**	
		3	
11.	$\begin{pmatrix}3&0\\0&4\end{pmatrix}\begin{pmatrix}a&b\\0&c\end{pmatrix}=\begin{pmatrix}3+a&b\\0&4+c\end{pmatrix}$ 3a + 0 = 3 + a 3b + 0 = b 3a = 3 + a ⟶ a = $\frac{3}{2}$ 3b + 0 = b 2b = 0	**M1** **M1**	**For matrix equation** **For✔ forming of simultaneous equation**

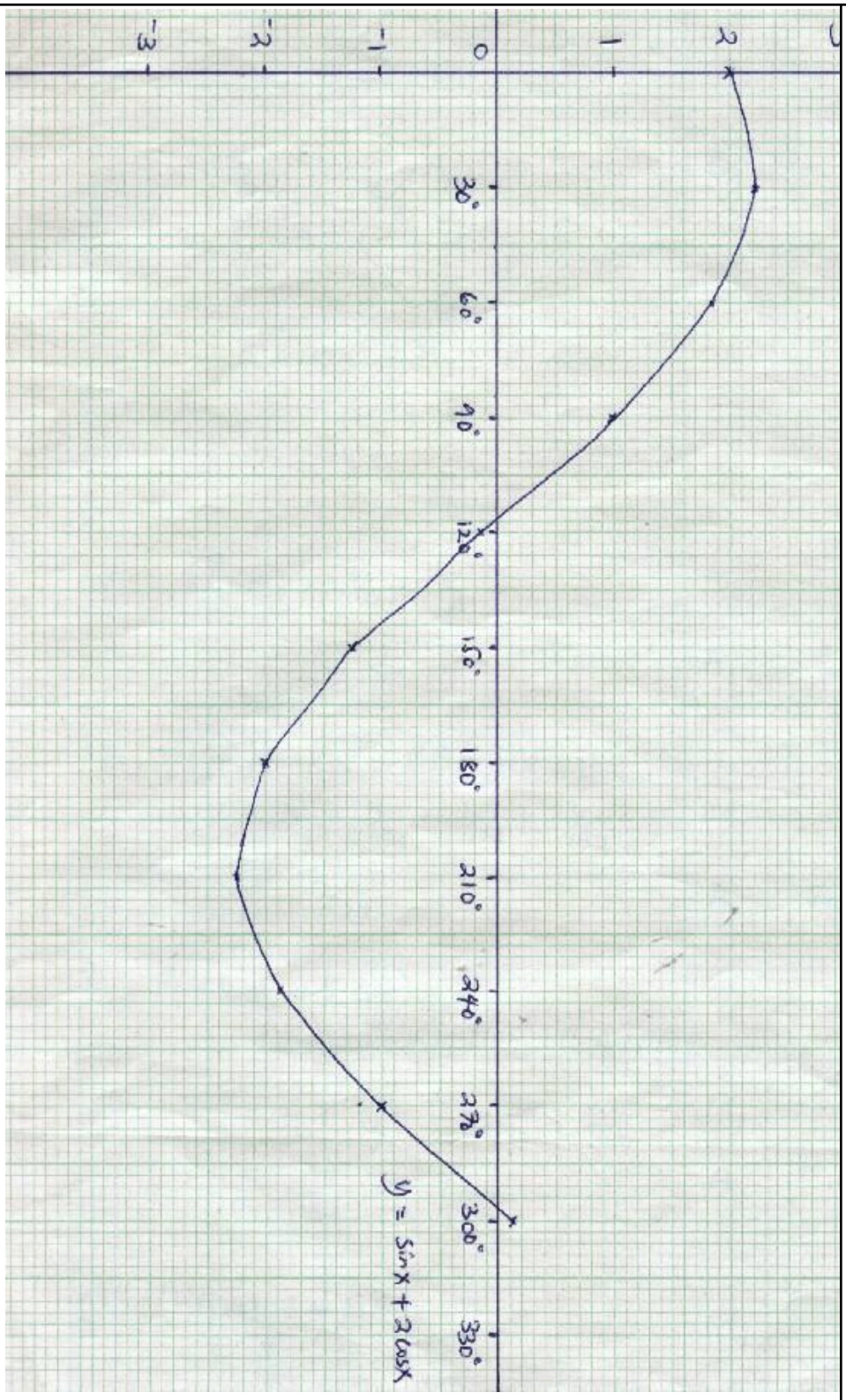
	B = 0 0 + 4c = 4 + c 3c = 4 C= $\frac{4}{3}$	**A1**	**For values of a, b and c (correct)**
12.	$\frac{2x^2 - 2x + x - 1}{(x + 1)(x - 1)}$ $\frac{2x(x - 1) + 1(x - 1)}{(x + 1)(n - 1)}$ $= \frac{(2x + 1)}{(x + 1)}$ $= \frac{2x + 1}{x + 1}$	**M1** **M1** **A1**	
		3	
13	2 cm = 25000cm 3 1cm = 250m 4 1cm = 0.25 $1cm^2 = 0.0625$ $20cm^2 = 20 \times 0.0625$ $= 1.25/ cm^2$	**M1** **M1** **A1**	
		3	
14.	$AB \cdot BC = DC^{-2}$ 5: BC = 36 BC = $\frac{36}{5}$ = 7.2 cm	**M1** **M1** **A1**	
		3	
15.	$\log_{10}^8 + \log_{10}^{750} - \log_{10}^6$ $\log_{10} \log_{10} \frac{(8 \times 750)}{6}$ $= \log_{10}^{1000}$ = 3	**M1** **M1** **A1**	
		3	
16.	P (R)= ½ x $\frac{4}{12}$		

	P (R)= ½ x 3/18 = 1/6 + 3/20 = (20 + 18)/120 = 38/120 = 19/60	**M1** **M1** **M1** **A1**	
		4	

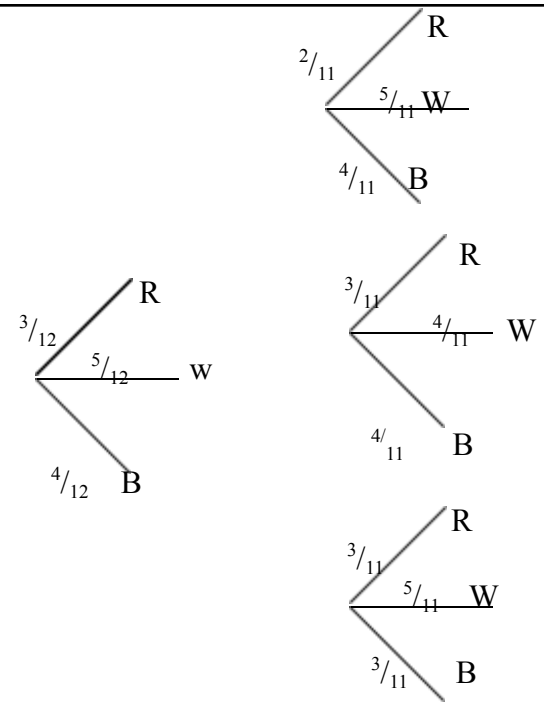
17	Taxable income 115/100 x 8570 = 9855.50 9855.50x 12 p.a 20 5913.30 **Tax** 1 – 1500 → 150 1501 – 3000 → 225 3001 – 4500 → 375 4501 – 5913.30 → 494.30 1244.30 - 90.00 K £ 1154.30 pa . or Ksh 1923.83 per month Total Decuctions 2/100 x 9855.5 197.11 (wcps) + 20.00 246.00 + Tax per month 1923.83 2386.94 Net salary	**M1** **A1** **M1** **M1** **A1** **M1** **A1**	

	9855.50 – 2386.94 Ksh 7468.65	**M1** **A1**	
		10	
18.	i) $\frac{\theta}{360}$ ($2\pi R \cos\theta$) $= \frac{60}{360} \times 2 \times \frac{22}{7} \times 6370 \cos 60$ $= 1/3 \times 22 \times 910 \times 0.5$ $= 3336$ (7) ii) Time $\frac{(4 \times 60)}{60}$ hrs 4 hrs. Local time 1200 + 4 = 1600hrs b) $\frac{\theta}{360} \times 2\pi R = 800$ $= \frac{\theta}{360} \times 2 \times \pi \times 6370 = 800$ $\theta = \frac{800 \times 360}{2 \times \pi \times 6370}$ $= 7.196°$ $\angle (60 - 7.196) = 52.80°$ (52.8° N 45°E)	**M1** **A1** **B1** **M1** **M1** **A1** **B1**	
19		**10**	
		10	

20.								**B2**	**For all 6 values of y✔** **B1 for at least 4 ✔**
	X	30	60	120	180	240	270		
	Sin x	0.5	0.87	0.87	0	-0.87	-1.0		
	2 cos x	1.73	1.0	-1.0	-2	-1.0	0		
								S1	
	Y	2.23	1.87	-0.13	-2	-1.87	-1.0	**P1**	**Appropriate scale use** **✔ plotting**



		C1	✔ curve
		B2	Points identified and stated B1 only stated
		L1	✔ line
		B2	Points identified and stated B1 only stated
	c) x = 114 ± 3° and x = 294 ± 3° line thro y = -1.5 d)		
		10	

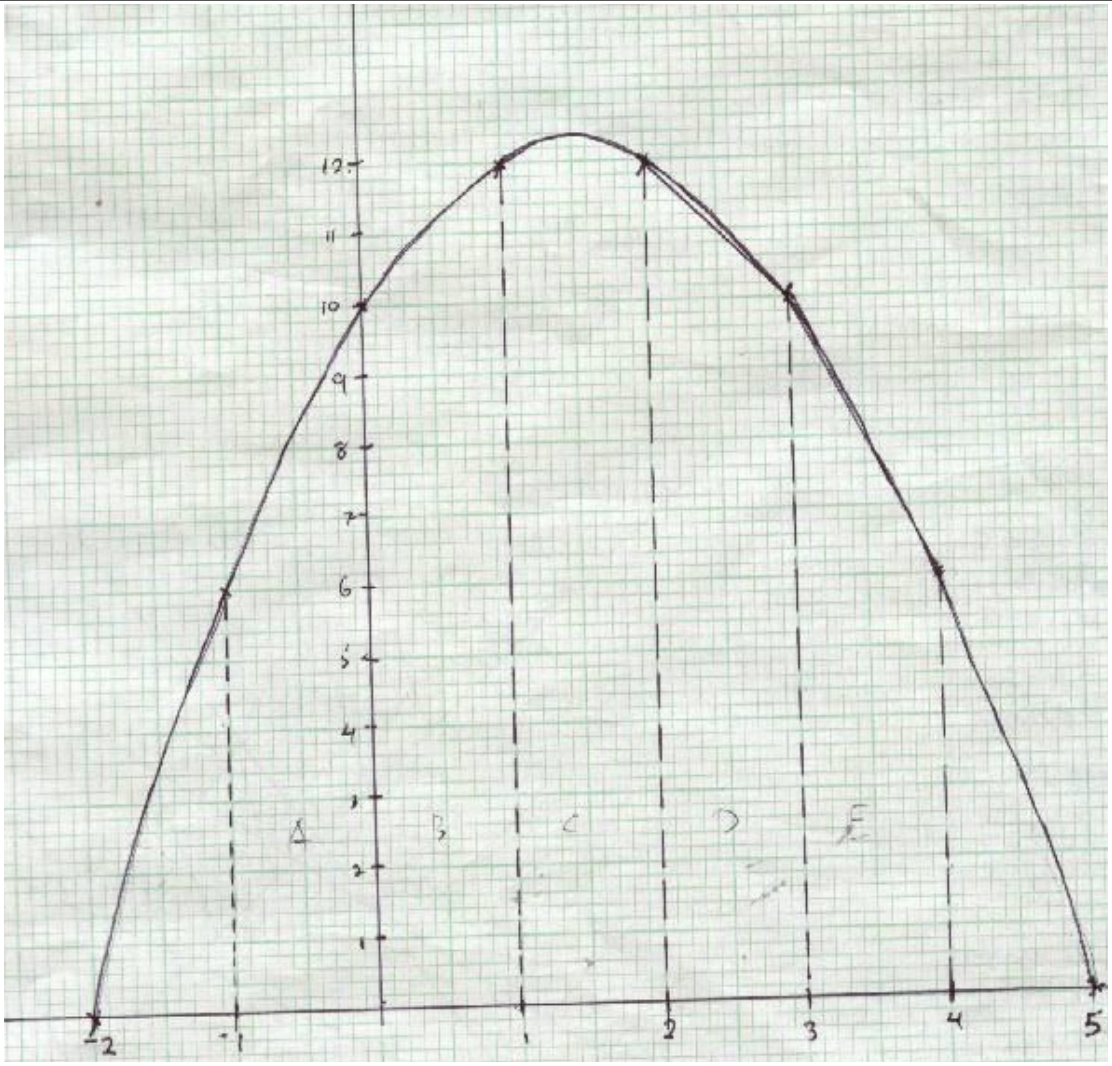
21		**B2**	**✓ ✓ prob, tree**

	a) P (RR) = $^{3}/_{12}$ x $^{2}/_{11}$	**M1**	
	$^{1}/_{22}$	**A1**	**Or equivalent 0.04545**
	b) P(IR) = RW or RB or WR or BR $^{15}/_{132}$ + $^{12}/_{132}$ + $^{15}/_{132}$ + $^{12}/_{132}$	**M1**	
	$^{9}/_{22}$	**A1**	**Or equivalent 0.4091**
	c) p(At least white Ball) = P(RW) + P(WR) + P(WW) + P (WB) + P(B)		
	$^{15}/_{132}$ + $^{9}/_{132}$ + $^{20}/_{132}$ + $^{20}/_{132}$ + $^{20}/_{132}$	**M1**	
	= $^{84}/_{132}$ or $^{7}/_{11}$	**A1**	**Or equivalent 0.6364**
			Or equivalent 0.2424

	d) P(RR or WW or BB) $= {}^{6}/_{132} + {}^{20}/_{132} + {}^{12}/_{132}$ $= {}^{19}/_{66}$	**M1** **A1**	

22		**B2**	**8 values ✔** **B1 at least 6✔**
		S1	**Appropriate scale use**
		P1	**✔ plotting**
		C1	**✔ curve**

X	-2	-1	0	1	2	3	4	5
Y	0	6	10	12	12	10	6	0



M1

A1
M1
M1
M1
A1

½ (6 + 10) + ½ (12 + 12) + ½ (12 + 10) + ½ (10 + 6)
= 8 + 11 + 12 + 11 + 8 = 50cm^2

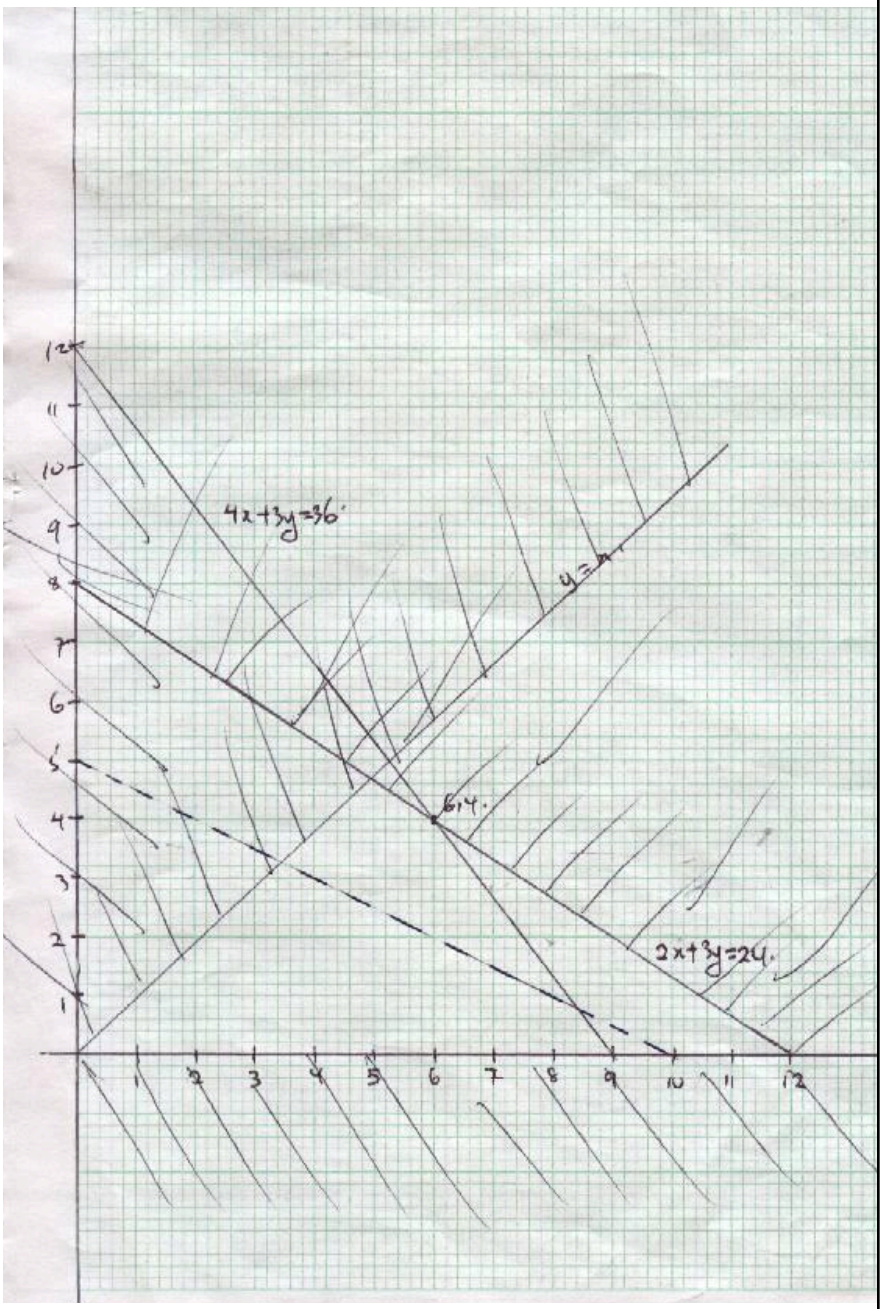
$$= \int_{-1}^{u} -x^2 + 3x + 10 = \left[-\frac{64}{3} + 24 + 10 \right] - \left[{}^{1}/_{3} + {}^{3}/_{2}x - 10 \right] = 51\,{}^{1}/_{5}\text{cm}$$

= % error $51\,{}^{1}/_{2} - 50$
= $\frac{1\,½}{51\,{}^{1}/_{2}}$ x 100 = 2 %

		10	

23.	a) i) $AC^2 = 8^2 + 6^2 = 100$	**M1**	

	AC = 10cm	**A1**	
	ii) $AF^2 = 10^2 + 5^2 = 125$	**M1**	
	AF = 11.18cm	**A1**	
		B1	**Sketch**
	b) Tan x = $^5/_{11}$ = 0.5	**M1**	
	x = 26.52°	**A1**	
		B1	**Sketch**
	c) Tan x = $^5/_6$ = 0.8333	**M1**	
	x = 39.7°	**A1**	
		10	

24		Inequalities x ≥O y ≤O 4x + 3y ≤ 36 4x + 3y = 24 y = n For ✔ shading of x ≥o and y≥ o 2x + 3y ≤ 36 y ≤ n P profit function object we function P = 4x + 3y Max profit at point (6,4) P = 4(6) + 4,88)(4) = 56 Hence he should here 6 medium of type A and 4 machine of type B	**B1** **B1** **B1** **B1** ✔ shading and line **B1** shading and line drawn **B1-for** ✔ shading and line drawn **B1** **B1** **B1**
			10