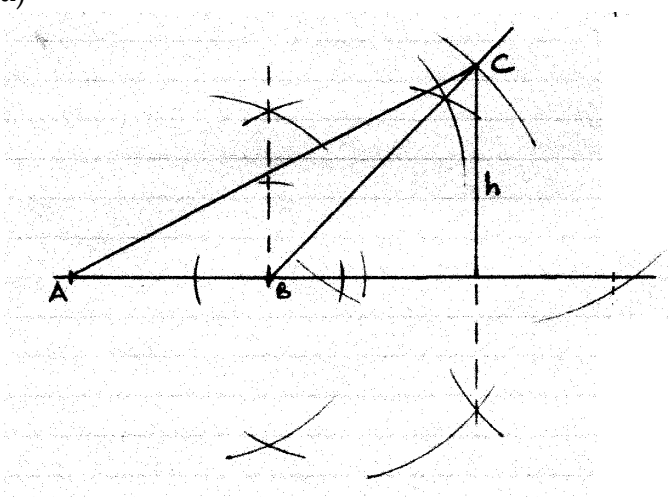
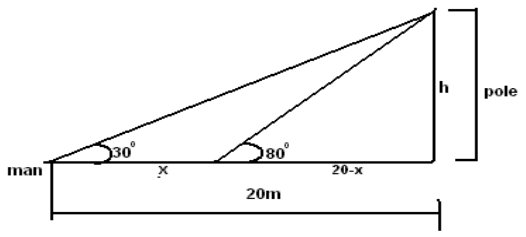
SUNRISE MATHEMATICS MARKING SCHEME 2021

1.	$2 + \frac{40}{60} = 2\frac{2}{3}$ hours $2\frac{2}{3}$ x 120 = 320 km $\frac{320}{4}$ = 80 litres 80x59 = 4720 sh.	 B1 M1 A1
		03
2.	$x + 80 = 180 \Rightarrow x = 100$ $180 - 128 = 52$ $52n + 100 = 360$ - - - - - - - - $52n = 260$ $n = 5$ - - - - - - - - $n = 5 + 1 = 6$ - - - - - - - -	 M1 M1 A1
		03
3.	a)  b) $h = 4.2$ I 0.1 cm - - - - - - - - $A = \frac{1}{2} \times 4 \times 4.2$ $= 8.4\ cm^2$ - - - - - - - - -	B1 B1 B1 B1

		04
4.	$2x - 2 \leq 3x + 1$ $-2 - 1 \leq 3x - 2x$ $-3 \leq x$ B1 for $-3 \leq x$ $3x + 1 < x + 11$ $2x < 10$ $X < 5$ B1 for $x < 5$ $-3 \leq x < 5$ Integral values -3,-2, -1, 0, 1,2,3,4 B1 – All correct integral values	B1 B1 B1
		03
5.	$\sqrt{\frac{1408X594X12}{605X125X100}}$ $\sqrt{\frac{128X54X12}{5X125X100}}$ $\sqrt{[\frac{128X9X2X3X3X2}{100X625}]}$ $=\frac{72}{625}$	M1 M1 A1
		03
6.	ASF = $\frac{48}{108} = \frac{4}{9}$ LSF = $\sqrt{\frac{4}{9}} = \frac{2}{3}$ VSF= $(\frac{2}{3})^3 = {}^{8}/_{27}$ Vol=$\frac{8}{27}$ x162 =48cm^3	M1 M1 A1
		03
7.	0.5 x14x8 sin θ=28m^2 Sin θ=0.5 θ=Sin^{-1} (0.5) Θ =30°	M1 A1
		02
8.	Tuesday-Thursday=24x3=72hours	B1

	Monday=2400-0445=19hours 15minutes Friday=18hours 45minutes Total time=72+19.25+18.75=110hours Time lost=0.5x110=55minutes 1845hrs-55minutes=1750hours =5.50pm	M1 A1
		03
9.	$N=9t^2-25a^2=(3t-5a)(3t+5a)$ $D=6t^2+19at+15a2=6t^2+9at+10at+15a^2$ $=3t(2t+3a)+5a(2t+3a)$ $=(3t+5a)(2t+3a)$ $\frac{N}{D}=\frac{(3t-5a)(3t+5a)}{(3t+5a)(2t+3a)}$ $=\frac{3t-5a}{2t+3a}$	M1 M1 A1
		03
10.	$\frac{5}{63.34}-\sqrt[3]{0.0169}$ $=5\left(\frac{1}{63.34}\right)-\sqrt[3]{16.9\times10^{-3}}$ $=5\times0.01579-2.566\times10^{-1}$ $=-0.17765$	M1 M1 A1
		03
11. (a) (b)	$M=\frac{15{,}132{,}000}{75.66}$ $=200{,}000\ US\ \ Dollars$ $\frac{15{,}132{,}000}{126.64}$ 11944 Sterling pounds	M1 A1 M1 A1
		04
12.	$Marked\ price\ =\frac{100}{90}\times7200$ $=sh\ 8\ 000$	M1 M1

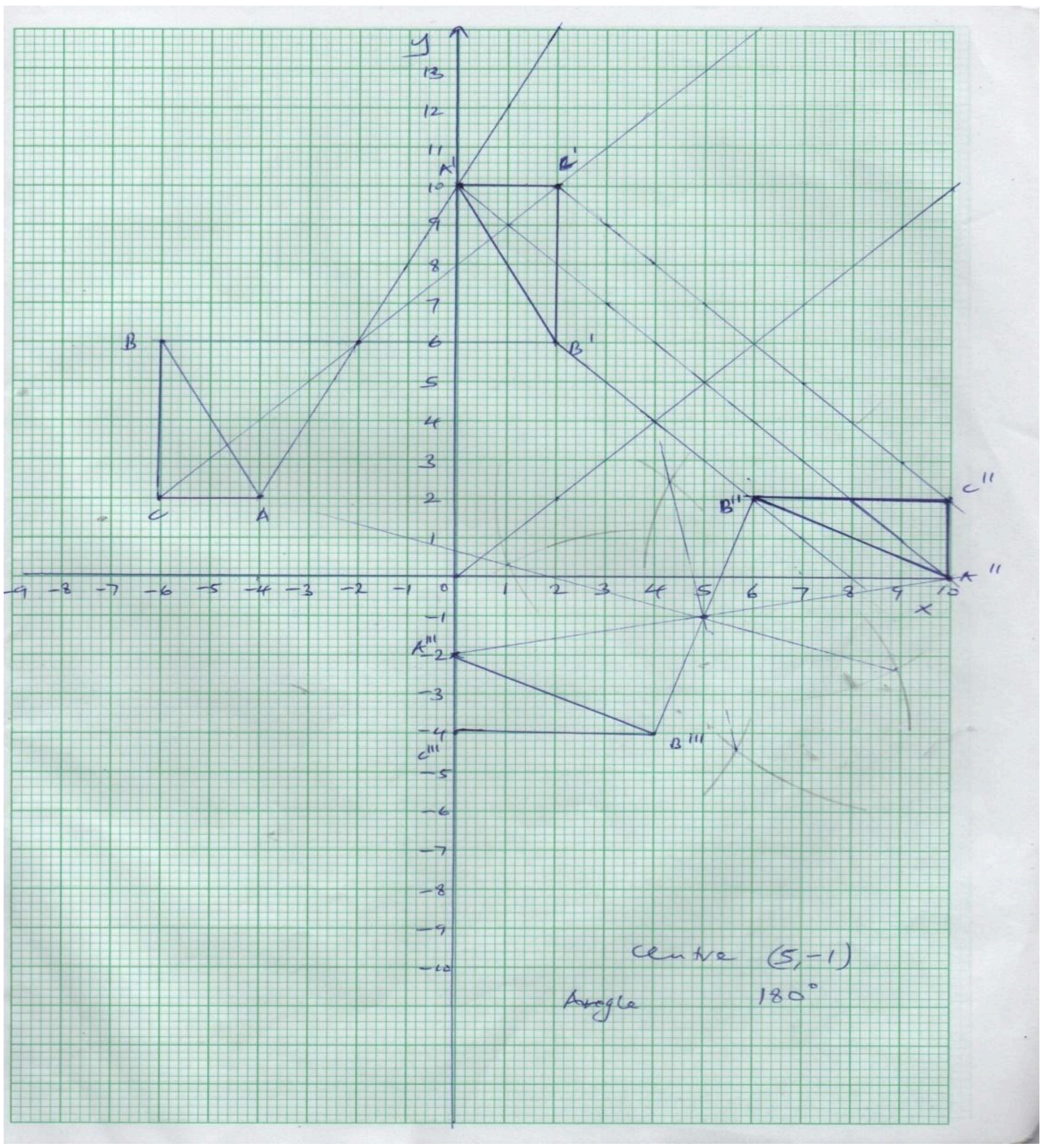
	Selling price = $\frac{100}{125}$x 8000 =sh6400	A1
		03
13.	<table><tr><th>*Log*</th><th>*No*</th></tr><tr><td>*1.5649* $\frac{\bar{1}.3256 +}{0.8905}$ $\frac{2.2682 -}{\bar{2}.6223}$ $\frac{\bar{2}.6223}{3}$ $\frac{\bar{3}+1.6223}{3}$ $\bar{1}.5408$</td><td>*36.72* $(0.46)^2 \Rightarrow 2\,(\bar{1}.6628)$ *3.474 x 10^{-1}* *= 0.3474*</td></tr></table>	
		04
14.	Let the no. be xy $10x + y = 5(x + y)\ldots\ldots\ldots\ldots\ldots\ldots(i)$ $(10y + x) - (10x + y) = 9\ldots\ldots(ii)$ $-4y + 5x = 0$ $9y - 9x = 9$ $-36y + 45x = 0$ $36y - 36 = 36$ $9x = 36$ $x = 4$ $\therefore y = 5$ $\therefore The\ number\ is\ 45$	M1 M1 A1
		03
15.		M1

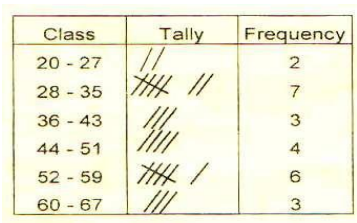
	$Tan\ 80^0 = \frac{h}{20-x}$ $\Rightarrow h = (20-x)\tan 80 \ldots\ldots\ldots\ldots\ldots\ldots\ldots (i)$ $Also \quad \tan 30 = \frac{h}{20}$ $\Rightarrow h = 20\ \tan 30 \ldots\ldots\ldots\ldots\ldots\ldots\ldots (ii)$ $\therefore 20\tan 30 = (20-x)\tan 80.$ $11.547 = 113.425 - 5.6711x$ $5.671x = 101.878$ $x = 17.96$ $\cong 18m$	M1 A1
		03
16.	Sin 4y = Cos 2y $4y^0 + 2y^0 = 90^0$ $6y^0 = 90^0$	
		02
17. (a)	Surface area of hemisphere=2π r^2 S.A= 2xπ $x1.5^2$ $14.14cm^2$ Surface area of cylindrical part 2π rh S.A=2xπ xrxh $22\pi x1.5x6.5 = 61.29cm2$ T.S.A=14.14+61.29 =75.43cm^2	M1 M1 M1 A1 M1
(b)	Volume of hemispherical part=2/3 πr^3 =2/3xπx1.5^3 =7.071cm^3 Volume of cylindrical part=πr^2h =πx1.5^2x6.5 =45.96cm^3 T. volume=7.069+45.96 =53.04cm^3	A1 M1 A1
(c)	Density=M/v =10/53.04 =0.1886g/cm^3	M1 A1

		10
18. (a)	**AB = b - a**	A1
(i) (ii)	**OC** = $\frac{1}{4}a + \frac{3}{4}b$	A2
(iii)	**BD** = $\frac{1}{2}$ **a - b**	A1
(b)	**OX**=**b**(1-h)+$\frac{1}{2}ah$	A1
(C)	**OX**=**b**(1-h)+$\frac{1}{2}ah$ **OX**=$\frac{1}{4}ak+\frac{3}{4}bk$ $\frac{1}{2}$**a**h =$\frac{1}{4}ak$ 2 h = k $\frac{3}{4}$**b** k=**b** (1-h) $\frac{3}{4}$k=1 - h $\frac{3}{4}$(2 h)=1 - h $\frac{5}{2}$h =1 ⟹ h = $\frac{2}{5}$ K=2($\frac{2}{5}$) = $\frac{4}{5}$ K = $\frac{4}{5}$	M1 M1 M1 A1
(d)	$\frac{1}{5}a+\frac{3}{5}b$	A1
		10
19. (a)	$\frac{y-3}{x+1}=\frac{1}{2}$ $y-3=-\frac{1}{2}x-\frac{1}{2}$ $y=-\frac{1}{2}x+\frac{5}{2}$	M1 A1

(b)	$g = \frac{5 - -3}{4 - 1}$	A1
	$= \frac{8}{3}$	M1
(c)	$\frac{y-5}{x-4} = \frac{8}{3}$	
	$y - 5 = \frac{8}{3}x - \frac{32}{3}$	A1
(d)	$y = \frac{8}{3}x - \frac{32}{3} + 5$	M1
		M1
	$y = \frac{8}{3}x - \frac{17}{3}$	A1
(e)	$\frac{y-5}{x} = -\frac{3}{8}$	M1
	$y = \frac{-3}{8}x + 5$	A1
	$\frac{y-5}{x-4} = -\frac{1}{2}$	
	$y = -\frac{1}{2}x + 7$	
20.	$\frac{1200}{x}$	B1
	$\frac{1200}{x} + 10 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (i)$	M1
	$\frac{1200 + 200}{x - 5} = \frac{1400}{x - 5} \ldots\ldots\ldots\ldots\ldots\ldots (ii)$	M1
	$\Rightarrow \frac{1200}{x} + 10 = \frac{1400}{x - 5}$	M1
	$x^2 - 25x - 600 = 0$	
	$x^2 - 40x - 15x - 600 = 0$	M1
		M1

	$x(x-40)+15(x-40)=0$ $x=-15 \quad or \quad x=40$ $\Rightarrow No.\ of\ \ people = 40-5=35$ $\frac{1400}{35} = Sh\ 40.$	M1 M1 A1
		10
21.	Total ratio = 8+14+3=25 Material $\Rightarrow {}^{8}\!/_{25} \times 1250 = 400$ Labour $\Rightarrow \frac{14}{25} \times 1250 = 700$ Transport $\Rightarrow \frac{3}{25} \times 1250 = 150$ 2004 Material $\Rightarrow 400 \times 2 = 800$ Labours $= \frac{130}{100} \times 700 = 910$ Transport $\Rightarrow \frac{120}{100} \times 150 = 180$ Total in $2004 = (1800+910+180)$ = Sh 1890 In 2005 increased to 1981due to labour only $\therefore 800 + \left(\frac{x+100}{100} \times 910\right) + 180 = 1981$ $\left(\frac{x+100}{100}\right)91 = 198 - 980$ $x+100 = \frac{10010}{91} \quad x + 100 = 100$ $x = 10$ $\%increase = 10\%$	 B1 B1 B1 M1 M1 A1 M1 M1 A1
		10
22.	(a) a = $\frac{v-u}{t}$ 2.75 =$\frac{22-0}{t}$ t=$\frac{22}{2.75}$ = 8 sec (b) Distance = ½ x 8 x 22 = 88m (c) 847 = ½ (40+t) + 32) x 22 847 = ½ (72 +t) x 22 1694 = (72+t) 22 $\frac{1694}{22}$ = 72 + t	 M1 M1 A1 M1 A1 M1

	$77 = 72 + t$ T = 5 sec T = 40 +t = 40+5 = 45 sec. (d) a = $\frac{v-u}{t} = \frac{0-22}{5}$ = $-4.4 m/s^2$	 M1 A1 M1 A1
		10
23.	 A′(0,10) B′(2,6) } 3 C′(2,10) A″(10,2) B″(6,2) } 3 C″(10,2) △	A1 A1

	ABC =2	
24.	(a)  CF 2 9 12 16 22 25 (b) Median = $L + \left(\frac{\frac{N}{2}-C}{f}\right)i$ $= 43.5 + \left(\frac{12.5-12}{4}\right)8$ $= 43.5 + \left(\frac{1}{4}x\ 8\right)$ $= 43.5 + 1$ $= 44.5$ c) 