2021 MARKING SCHEME

1. $\frac{-2(5+3)-9}{3+5} \div 5 = -14\surd\surd$

$-3 \times -5 + (-2) \times 4 \qquad 7$
$= -2 \quad \surd$

2. LCM of 9, 15 and 21

$32 \times 5 \times 7 = 315$ minutes$\surd$
Last time ringing together

11.00	2300
5.15	515
5.45 p.m. $\surd$	1745hrs$\surd$

3. let a technician be x and artisan be y

$3x + 2y = 9000$
$4x + 1y = 9500$
$8x+2y = 19000$
$3x +2y = 9000$
$\frac{5x}{5} = \frac{10000}{5} = 2000$.....$\surd$
Hiring a technician = 2000$\surd$
Hiring artisan
$4(2000) + y = 9500$
$Y = 1500$
$2(2000) + 5(1500) = 11{,}500\surd$

4. a) sh 77.24 x 100,000$\surd$

= sh 7,724,00$\surd$
b) Sh 77.24 x 100 000
= 63172$\surd$
122.27$\surd$

5. $3x + (x-20) = 180^0$

$4x = 200^0$
$X = 50^{0\surd}$
$(x-20)n=360$
$30n=360\surd$
$n = 12 \quad \surd$

6. $\frac{243^{-\frac{2}{5}} \times 125^{\frac{2}{3}}}{9^{-\frac{3}{2}}} = \frac{3^{-2} \times 5^2}{3^{-3}}\surd$

$= \frac{27 \times 25}{9}\surd$
$= 75 \quad \surd$

7. let mother's year be x and son's be y now:

$X+14=2(y+14)$ .....(i)
$X+14= 2y+ 28$
$x-2y = 14$.....(ii) $\surd$
$(x-4)+(y-4) =30$
$X+y=38$ .....(iii) $\surd$
(iii)-(ii)
$X+y=38$
$-x+2=-14$
$3y=24$
$Y=24 \quad x=30\surd$
At son's birth: mother's age
$30-8=22$ $\surd$

8. $\sin(x + 60^0) = \cos 2x$

$X + 60 + 2x = 90^0$
$3x = 30\surd$
$x = 100$
$\tan(10 + 60)^0 = \tan 70^{0\surd}$
2.748(4.S.F) from tables $\surd$

9. $2\pi r^2 + 2\pi rh = 154$

$r = h$
$2\pi r^3 + 2\pi r^2 = 154\surd$
$4\pi r^2 = 154$
$r = \sqrt{\frac{154}{4 \times 3.142}}\surd$
$= 3.500$
diameter = 2r= 3.500 x 2
= 7.00 (s dp) $\surd$

10. Volume of plate = $\frac{1.05}{8.4}$ x 100$\surd$

$= 125cm^3$
$L^2 = \frac{125\ cm}{0.2} = 625 \qquad \surd$

$L = \sqrt{625} = 25$cm $\surd$

11. $\frac{a(a-b)(a+b)}{2(a+b)\ (a-b)}$

$\frac{a^2-ba+ba+b^2}{(2a+2b)\ (a-b)}\surd$

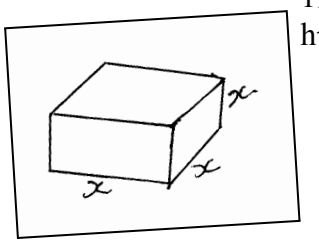
$\frac{a^2+b^2}{2a^2-2ab+2ab-2b^2}\surd$

$\frac{a^2+b^2}{2a^2-2b^2}$

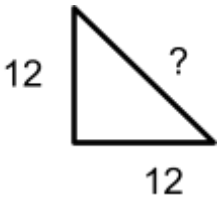
$\frac{a^2+b^2}{2(a^2-b^2)}$ √

12. From 0700h Monday to 1900h Wednesday

= 24 x 2 + 12 h
=60h√
Time lost = 60 x 15 = 900 sec
=15 min√
Time shown on clock:
1900 h – 15 min = 1845 h√

13. 

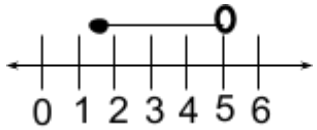
$\sqrt[3]{1728}$ = 12√



$\sqrt{12^2 + 12^2}$
=$\sqrt{288}$ =16.97 cm√

14. a) x-5≤3x - 8

-2x≤-3√
3x - 8 < 2x -3
x<5
∴ 1.5 ≤ x <5√

b) 

√

15. $\left(\frac{3}{-2}\right) - \left(\frac{2}{3}\right)$ √

= $\left(\frac{1}{-5}\right)$

Magnitude = $\sqrt{1^2 + (-5)^2}$ √
= $\sqrt{26} \approx 5.1$ √

16. (a) mode

=22√
(b) Median
15,15,16,19,19,20,20,21,22,22,22,26 ,27,28

Median = $\frac{20+21}{2}$ √
= 20.5 √

17. a) mass after decrease

112 x $\frac{15}{16}$
= 105 kg√
Total decrease
(112-105) x 540√
=3780 kg√
b) (i) no. of 90kg bags
$\frac{105 \times 540}{90}$ √
=630
Least number of trips
$\frac{630}{120}$√
= 5.25
⟹ 6 trips√
ii) Expenses
Buying price = 1500 x 630 = 945000√
Transport = 1500 x 630 = 945000
Total 945000 + 15000√
Selling price per bag:
= $\frac{960000 \times 1.26}{630}$ = 1920√√

18. a) 10.5x100x6x100=630,000cm^3

Area of the tile = 30x30 = 900 cm$^{2\sqrt{}}$
No of tiles = $\frac{area\ of\ the\ floor}{area\ of\ one\ tile}$
= $\frac{630000}{900}$ =700 tiles√

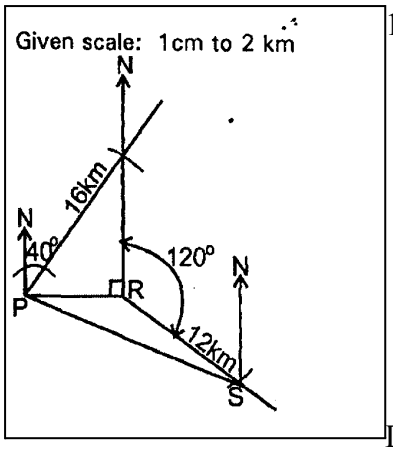
b) i) 1 carton = 20 tiles
? = 700 tiles
$\frac{700 \times 1}{20}$ =35 cartons. √
1 carton = 800 sh.
35 Cartons = $\frac{35 \times 800}{1}$ = 28,000sh√
1 room =28,000 sh.
15 rooms = $\frac{28000 \times 15}{1}$ =420,000sh
= sh. 420,000√

ii) Transport = 2000
subsistence = 600
2000 + 600 = 2600sh√
Total cost = 420,000 +2600
=Ksh. 422,600√
$\frac{12.5}{100}$ x 422,600 = 52,825sh
Profit = 52,825sh
Cost price = 422,600sh
Selling price = 422,600sh + 52,825√
=475,425sh
35 cartons = 475,245

1 carton= 475425

1 carton = $\frac{475{,}425\ x\ 1}{35}$ 13,584sh√√

19. a)



b) i) Distance of P from s =10. 8 + 0.1cm

ii) < PSN = 74 + 10√

earing of P from S = 286 + 10

c) area of PQR = $^1/_2$ x 10.2 x 12.2

= 63.44km^2

Area of PRS = $^1/_2$ x 10.2 x 2 sin-60^0

= 30.6km2

Area of ranch PQRS

= 62.22 + 30.6

= 92.82km^2

20.

(a) Equation of L

Gradient = $\frac{6-3}{-1--2}$

=3

Equation = $\frac{y-6}{x+1} = 3$

$=y - 3x = 9$√

(b) Equation of P√

$= \frac{y-6}{x+1} = -\frac{1}{3}$

= 3y + x =17√

(c) Equation of Q

$= \frac{y-2}{x-1} = 3$

$= y = 3x - 1$√

x intercept

When $y = 0 \Rightarrow x = +\frac{1}{3}$

y intercept √

When $x = 0 \Rightarrow y = -1$√

(d) Intersection of lines P and Q

$3y + x = 17$.....(i)

$y - 3x = -1$..... (ii)

$3y + x = 17$√

$3y - 9x = -3$

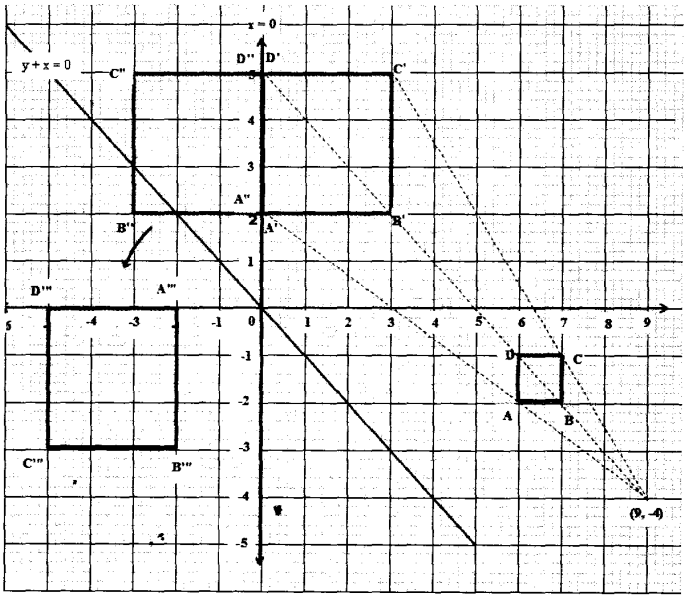
$10x = 20 \Rightarrow x = 2$

Subset $3y + 2 = 17 \Rightarrow y = 5$

$\therefore point\ of\ intersection\ (2, 5)$ √

21.

(a)



(b) (i) A′(0,2), B′(3,2), C′(3,5), D′(0,5)

(ii) A″(0,2), B″(-3,2), C″(-3,5), D″(0,5)

(iii) A‴(-2,0), B‴(-2,-3), C‴(-5,-3), D‴(-5,0)

(c) Reflection in the line y + x = 0

22. a) i) $\frac{r}{9} = \frac{4}{12}$

R = $\frac{9x4}{12}$ = 3 cm

ii) Volume of material drilled out

= $\frac{1}{3}$ π x $3^2 x$ 4 = 12π

b) Slant height of cone

= $\sqrt{9^2 + 12^2}$ = 15 cm

c) Surface area of solid after conical has been drilled

π x 9 x 9 x 15 + π x ($9^2 - 3^2$) + π x 3 x 5

= π(135+72+15)

= 222π

23.

(a) 15m/s

(b) Maximum speed

$\frac{1}{2}(15 + h)\times 10 + \frac{1}{2}(10 + 30)h = 825$

$75 + 5h + 20h = 825$

$25h = 750$

$h = 30m/s$

(c) (i) = $\frac{30-15}{10}$

= 1.5m/s^2

(ii) = $\frac{0-30}{20} = -1.5$m/s^2

(d) $\left[\frac{1}{5}(15 + 30)\times 10 + 10\times 30\right]\div 20$

$= (225 + 300)\div 20$

=26.25 m/s

24. (a) total sales = sh 360 x 500

= sh.180,000√

Commission

= sh (180,000 – 100,000) x $^2/_3$ √

= 13600√

(b) (i) New salary

= sh.(12000 + 12000 x $^{10}/_{100}$) √

= sh. 13200√

Commission paid

= Sh (17,600 -13,200)

= Sh.4400√

Commission is paid on sh.4400 x $^{100}/_2$

= 220,000√

Total sales = sh.220,000 + 100,000 √

=320,000/=√

(ii) No of handbags sold = $\frac{320,000}{500}$ = 640 √