SECTION A

1. $2x^2+ x-3$

$4x^2 -9$

$2x^2 +3x – 2x – 3$

X(2x +3) -1(2x +3)

(2x+3) (2x-1)

$4x^2 – 6x + 6x -9$

Thus $(4x^2-9)$ can be written as (2x+3) (2x+3)

$\frac{(x-1)\ \ (2x+30}{(2x+3)\ (2x+3)}$

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

2. Volume = L x w x h

3.2m x 2.5m x 2m

$=1600m^3$

$1m^3=10001$

$1600m^3=x$

$\frac{M^3 1600 \times 1000L}{1m^3} = \frac{1,600,000}{250}$

=6400 MINUTES

3. $log\ {}_{n}^{n}= 1$ since log A + logB =AB

$log\ {}_{3}^{3}= 1$ log A-log B=$\frac{A}{B}\frac{2a+8}{9}=6$

$log_3^{(2a+8)} log_3^9 = 1+log_3^2$ 6a = 2a +8

$log_3^{(2a+8)} - log_3^3 + log_3^2$ 4a=8

a=2

Log 3 $\frac{2a+8}{9}= log_3^6$

4. 8.5 x 8.5 x 3.25 = 234.8125 cm^3 (Greatest)

7.5 x 7.5 x 3.15 = 177.1875cm^3

8x8x3.2=204.8cm^3

-234.8125cm

204.8

$204.8cm^3$

-177.1875cm

$27.6125cm^3$

$30.01cm^3$

30.01cm greatest

5. q=2a-3b+2c

$a=\frac{3}{2}$ $b=\left(\frac{4}{-3}\right)$ $c\left(\frac{0}{4}\right)$

$2\left(\frac{3}{2}\right) - 3\left(\frac{4}{-3}\right) + 2\left(\frac{0}{4}\right)$

$6-12+0=\left(\frac{6}{21}\right)$

$X^2 \times y^2$

$6^2 + 21^2$

$36 + 441$

6. $3(2\sqrt{3} + 32)$

$2\sqrt{3} - \sqrt{2})$ $(2\sqrt{3} + \sqrt{2})$

$6\sqrt{3} + 3\sqrt{2} 6\sqrt{3} + 3\sqrt{2}$

$12 + 2\sqrt{6} - 2\sqrt{6} - 2$

$6\sqrt{3} + 3\sqrt{2}$

10

10 10

7. QU.RU=SU.TU

(11x6)=(x+4)4 m1

66 = 4x +16

50=4x

X=$\frac{50}{4}$ m1

=12.5

SU=12.5 +4 A1

=16.5

8. Hire purchase price .Down payment =200 m1

Installment = 6x250= 1500

1700m1

=1700

1560

140

9. P=a$\sqrt{x^2 + b^2}$

$\left(\frac{py}{a}\right)^2 = (\sqrt{x^2} + b^2)^2$ m1

$\frac{P^2y^2}{a^2} = x^2 + b^2$ m1

$x^2 = \frac{P^2y^2}{a^2} - b^2$

m1

$x = \sqrt{\frac{P^2y^2}{a} - b^2}$

10. Q=-7

d=4

n^{th} term = a +(n-1)d

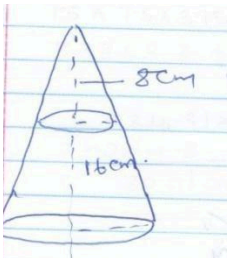
= -7,-3,1,5,9,13,17 m1

Sum = $\frac{n}{2}$(2a + (n-1) d)

$\frac{30}{2}$ (2(-7) + (30 -1) 4)

15(-14 +116)

= 15x102
=1530

11. 

Volume of cone=⅓πr^2
160cm^3 =⅓ x$\frac{22}{7}$ x r^2 x 8
r^2=$\frac{160\ x\ 21}{22x\ 8}$
r$^{2=}$

12. 2x – 3y + 6=0
3y=2x +6
Y=$\frac{2}{3}$x + 2

Gradient, m =tan (180-θ) = $\frac{2}{3}$ B1
180-θ = tan ($\frac{2}{3}$)
180-θ=33.7^0 B1
θ$^{=180-33.7}$
= 146. 30

13. $A=P(1+\frac{r}{100})^n$

$79692.42 = 50{,}000(1+\frac{r}{400})^{2x4}$

$\frac{79692.42}{50000} = (1+\frac{r}{400})^8$ m1

$1.593=(1+\frac{r}{400})^8$

$\sqrt[8]{1.5938}= (1+\frac{r}{400})$

$1.06=(1+\frac{r}{400})$ m1

$\frac{r}{400}=0.06$

R=0.06x 400

=24% A1

14. $<CBT = < BCT=\frac{360}{5}$ B1

$= 72^0$ B1

<BTC =180-(72x2) m1

$= 180 - 144$

$= 36^0$ A1

15. $\frac{2}{9.072\ x\ 10}$ $+\sqrt[3]{20.7726}$ - $(26.43 \times 10^{-2})^{½}$ 20.713

20.571

=(0.1079 x 10 x 2) + (2.749) – (5.1410) M1 0.202

0.1381

1.079 1.158 29

X 22.749 0.1410

1.158 3.907-5.1410 m1

16. Men hours days

5 6 8

3 8 - B1

$\frac{5}{3}$ x $\frac{6}{8}$ x 8 m1

=10 days A1

17. (i) Taxable income =($\frac{115}{100}$ x 15,200)= 1050

= 17480-1050

=16,630 m1

k£ $\frac{16,430\ x\ 12}{20}$ = 9858k£ m1

ii) 3630 x 2=7260 m

3630 x 3=10980

2598 x 4=10392

Total tax per month =$\frac{28,542}{12}$

=ksh.2378.50 B1

iii) Ne tax = 2378.50 – 450 m1

=ksh.1928.50 A1

Iv) Net salary = 15,200-1928.50 -1050 m1

=12,221.50 A1

18. (a) Det(4x2)-(3x3)=-1 B1

$\begin{pmatrix} 2 & 3 \\ 3 & -4 \end{pmatrix}$ B1

(b) 20x + 15y =9500 B1

i)30x + 20y = 13,500 B1

Divide by 5

ii)$\begin{pmatrix} x \\ y \end{pmatrix}$=$\begin{pmatrix} 2 & 3 \\ 3 & -4 \end{pmatrix}\begin{pmatrix} 1900 \\ 1350 \end{pmatrix}$ m1

ii)$\begin{pmatrix} x \\ y \end{pmatrix}$ = $\begin{pmatrix} 250 \\ 200 \end{pmatrix}$ m1

c)$\frac{110}{100}$x 250 = sh.275 m1

90/100 x 200 = sh.180 m1

$\begin{pmatrix} 20 & 15 \\ 15 & 20 \end{pmatrix}\begin{pmatrix} 215 \\ 180 \end{pmatrix}$=$\begin{pmatrix} 8200 \\ 11,850 \end{pmatrix}$

=8200+11,850

Sh.20.050

19. Original price=sh 340,000

No of ratio=x

Cost of each radio=sh.$\frac{340,000}{X}$

New no of radios = x-30

New price of radio=$\frac{340,000}{x-30}$ B1

$\frac{340,000}{X}$ + 300 = $\frac{340,000}{x-30}$ B1

340,000 + 300x = $\frac{340,000}{x-30}$ m1

340,000(x-30)+ 300x(x-30) = sh.340,000 m1

$3400x – 102,000 + 3x^2 - 90x = 3400x$

$3x^2-9x – 102,000 = 0$ m1

$X^2- 30x-34000=0$

P=3400

S=-30

$X^2-200x+170x-34000=0$ m1

X(x-200) + 170(x-200)=0 B1

(x+170) (x-200)=0 A1

X=200

New price of radio=$\frac{340,000}{170}$ A1

= sh.2000 m1

20.

Table 2mks
Curve 3mks

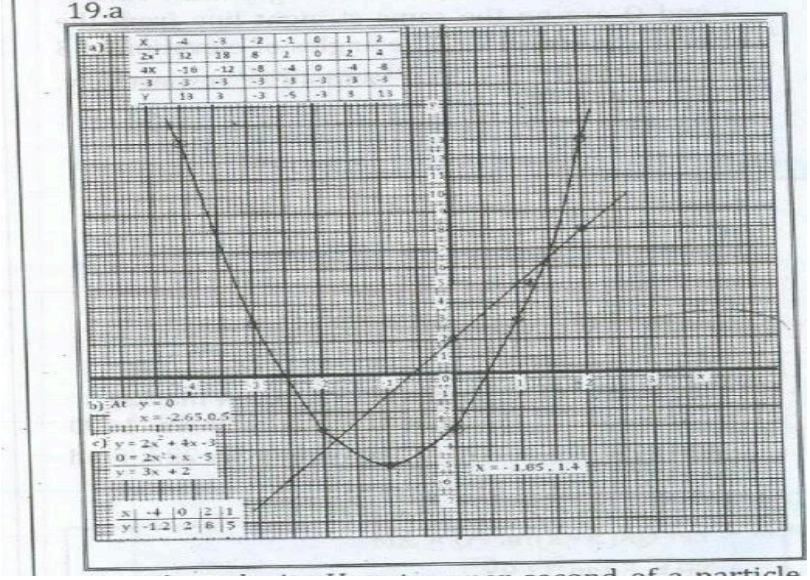
$y = 2x^2 + 4x - 3$

$0 = 2x^2 + x - 5$

$y = 3x + 2$

$x = -1.8, 1.6$

19.a



21. $< AED = 180 - 60$

$=120^0$ opposite angles of a cycle quadrilateral

$<BAD = 50^0$(Alternate segment theorem)

$<$ DCB $=180-(110^0+50^0)$

$=20^0$(internal angles of a triangle add up to 180^0)

Area of triangle $=½ab \sin 110^0$

$=½ \times 3 \times 5 \times \sin 110^0$

$= 21.14cm^2$

22. (a) $P= \frac{kq}{r^2}$ m1

$q=\frac{k(12)}{144}$

$k=\frac{144 \, x \, 9}{12}$ m1

$=108$

$P=\frac{108q}{r^2} = \frac{(108)(15)}{5^2}$ A1

P=64.8

b)$P=\frac{kq}{r^2}$

$q=\frac{pr^2}{108}$ B1

(c)$q= \frac{1.2\ p\ x\ (0.9r^2)}{k}$ m1

$=\frac{0.972pr^2}{k}$ m1

$\frac{0.972pr^2}{k} - \frac{pr^2}{k}$

$=-0.028\ \frac{pr^2}{k}$ A1

% = 0.028 x 100
=-2.8% or reduction by 2.8%

23. (a) a,a+2d, a +5d

$\frac{a+2d}{a} = \frac{a+5d}{a+2d}$ = r B2

$(a+2d)^2=a(a+5a)$

$a^2 + 4ad + 4d^2 = a^2 + 5ad$

$4d^2= 5ad-4ad$

$$\frac{4d^2}{d} = \frac{ad}{d}$$

$$a = 4d$$

$r=\frac{a+2d}{a}$ m1

$r=\frac{6d}{4d}$ m1

r=1.5

(b)(i) Sn = $\frac{n}{2}(2a + (n - 1)a)$

$\frac{20}{2}$ (2(16) + (20-1) 4) m1

10(32+76) A1

10(108)

=<u>1080</u>

ii) $\frac{16\,(1.5^{20} - 1)}{1.5-1}$ = 106.376.2154 A1

24. (a) $a^2 = b^2 + c^2$ - 2bc cos A

Cos A= $\frac{b^2\, c^2\, a^2}{2bc}$

= $\frac{10^2 + 8^2 - 7^2}{2x10x8}$ A1

=44.05^0

(b) $\frac{7}{\sin sin\ 44.05}$ 2R

R=$\frac{7}{2\sin sin\ 44.05}$ A1

=5.034

c) Area of sector $\frac{88.1}{360}$ x 3.142 x 5.034^2

= 19.49cm A1

=½ x 5.034^2 x sin 88.1 m

=$12.66cm^2$ A1

Shaded area=19.49-12.66 m

= $6.83cm^2$A1