**2020 FORM 4 TERM 1 OPENER EXAMS**

**MATHEMATICS PAPER 1 MARKING SCHEME.**

No. 1 -8 -5 x -8 +6

 -8 + 40 +6

 =38 m1

 -3 – 8 $÷$2 x 4

-3 – 4x 4 = 19

=$\frac{38}{-2}√$

=-2$√$

NO. 2

$\frac{17}{7}$ -$\frac{11}{6}$ = $\frac{25}{42}$ X $\frac{6}{5}$ =$\frac{5}{7}$

$\frac{2}{3}$ X $\frac{9}{4}$ = $\frac{3}{2}$ - $\frac{8}{7}$ = $\frac{5}{14}√$

$\frac{5}{7}$ X $\frac{14}{5}$ = 2$√$

NO.3

Let mother’s years be x and son’s be y now:

X+14 = 2(y+14)………………………..i

X + 14 = 2y + 28

X – 2y = 14 ………………………………ii

(x-4)+ (y-4)=30

X + y = 38………………………………….iii$√$

Iii – ii x+y = 38

 + -x + 2 = -14

 3y = 24 $√$ x=30$√$

At son’s birth:mothers age = 30-8 =22 years$√$

No. 4

105000 x 9.74

= sh 1,022,700

$$\frac{1022700 - 403879}{12.11}√$$

=51100 rands$√$

No. 5



No 6

g: c: s = 8 : 20 : 15

$\frac{43}{15}$x 15$√$

= 43 Animals$√$

No. 7

100% = x

90% = 1440

$$\frac{1440 x 100}{90}$$

 =1600

120% =1600

100% =x

$$\frac{1600 x100}{120}$$

=1333.3

1600 – 1333.3 = 266.70

No. 8

$\frac{1}{0.03654}$ – 4.1512

4.1512 = 17.231

$\frac{1}{0.03654}$ = $\frac{1}{3.654 ×10^{-2}}$ = $\frac{1}{3.654}×\frac{1}{10^{-2}}√$

=0.2737 $×10^{2}$ = 27.37$√$

27.37 – 17.231 = 10.139$√$

No. 9

$$\frac{12a^{2}-3b^{2}}{2a^{2}-ab-b^{2}}$$

$$\frac{3\left(2a+b\right)\left(2a-b\right)}{2a\left(a-b\right)+b \left(a-b\right)}√√$$

$$\frac{3\left(2a-b\right)}{a-b}√$$

No. 10

Sin $\left(x+60^{0}\right)$ = cos 2$x$

$X$+60 +2$x$ = 90$√$

$3X$ = 30

$X$ = 100$√$

$tantan \left(x+60\right) $ = tan 700

= 2.748 (from tables)

=2.748 (from calculator)

4 s. f. 2.7475 $√$

No. 11

$\frac{12}{8}$ = $\frac{3}{2}$

a.s.f. = $\frac{9}{12}√$

Area PST = $\frac{4}{9} ×336$ = 149 $\frac{1}{3}√$

Area QRST = 336 -149$\frac{1}{3}$ = 186$\frac{2}{3}√$

No 12

Volume = $\frac{mass }{density }$

=$\frac{1050cm^{3}}{8.4}$ = 125 $cm^{3}$

$∴$ L x L x 0.2 cm = 125 $cm^{3}√$

L2 = $\frac{125 cm}{0.2}$ = 625$√$

L = $\sqrt{625 }$ = 25 cm$√$

No. 13

2 x 3.142 x 36 = 226.224

3.142 x 610.82 = 204.0$√√$

Total 430.224$√√$

No. 14

9-3x $>$ 2x + 2

$\frac{7}{5}>$x$√$

$x$+ 1$>$-2x-1

$$3x > -2$$

X $>$ -$\frac{2}{3}√$

$-\frac{2}{3}<$x$<$ 1$\frac{2}{5}$

$$interal values 0, 1√$$

No.15

3t+2a=9000..... (i)

4t+a =9500...... (ii)

Multiply (ii)x2

8t+2a =19000-

3t+2a =9000

5t = 10000

t = 2000$√$

substitutingin (i) above

3 x 2000 + 2a = 9000

a = $\frac{3000}{2}$

a = 1500$√$

t = 2000

2 x 2000 + 5 x 1500

= 11500$√$

No.16

a) $r^{2}$= $7.6^{2}$ + $4.8^{2}$ – 2 x 7.6 x 4.8 cos 80

= 57.76 + 23.04 – 12.67

= 68.13 $√$

R = 68.13

= 8.3$√$

b) $\frac{sin b }{4.8}$ = $\frac{sinsin 80 }{8.254}$

SinB = 0.5727

B = sin -10.5727$√$

= 34.90$√$

SECTION II

No 17.

a) 2y – 3x = 6

 3y + x = 20

 2y - 3x = 6$√$

 9y + 3x = 60

 11y = 60

Y= 6$√$

X = 20 -18

 = 2

Co-ordinates of A are (2,6) $√$

b) L2: 3y = -x + 20

y = - $\frac{1}{3}x$ + 20 $√$

Gradient of perpendicular = 3

$\frac{y-6}{x-2}$ =3$√$

Y= 3$X$- 6 + 6

Y = 3$X√$

c) Gradient of L4= gradient of L1

=$\frac{3}{2}$

$\frac{y-3}{x-1}$ = $\frac{3}{4}√$

2y -6 = 3$X$ + 3

2y - 3$X$ = 9 $√$

When $X$ = 0 y = 4.5$√$

When y = 0 x = -3$√$

No. 18



No. 19

a) x + 2 + 12 + 7 +15 + $X$= 40

$X$= 4$√$

b) Mean of $\frac{Σfx}{Σf}$ = $\frac{1287.5}{40}$ = 32.1875$√√$

c)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| CB | 4.5-14.5 | 14.5-29.5 | 29.5-34.5 | 34.5-44.5 | 44.5-49.5 |
| Fd | 0.2 | 0.8 | 1.4 | 1.5 | 0.8 |
| Fx | 19 | 264 | 224 | 595.5 | 188 |

d) total area A = 10 x 0.2 = 2 $√$

B= 15 x 0.8 = 12 2 + 12 + 7 + 15 + 4

C = 1.4 x y = 6 $√$ = $\frac{40}{2}$= 20$√$

D = 1.5 x 10 = 15

E = 0.8 x 5 = 4

Point to draw the lie is 29.5 + $\frac{6}{7}$ =30.36

No.20

a) $a^{2}$ =$b^{2}$+ $c^{2}$ – 2bc cos A

$7^{2}$ = 102 + 82 - $\left(2 x 10 8\right)$ cos A

49=164- 60 cos A

-116 =160 cos A

Cos A =$\frac{116}{160}√$

Cos A = 0.725$√$

Cos1 0.725 = 43.53115

$<$BAC = 43.53$√$

b) $\frac{a}{sinsin A }$ = 2R

$\frac{7}{sin 43.53}$ = 2R$√$

R =5.082cm$√$

(c) Sin 43.53 = $\frac{3.5}{r}$

r = $\frac{3.5}{sinsin 43.53 }= $5.082 cm$√$

Area of $△$OCB =$\frac{1}{2}$ ab sin $θ$

= $\frac{1}{2}$x 5.082 sin 87.06$√$

= 12.896cm2$√$

Area of sector ACB

=$\frac{θ}{360}πr^{2}$

=$\frac{87.06}{360}$ x $\frac{22}{7}$ x 5.082 = 19.630$√$

Shaded region

 (19.630 — 12.896) = 6.734 cm2$√$

No. 21

1. 15m/s$√$
2. Maximum speed

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

 $75+5h+20h=825√$

$$25h=750√√$$

1. $h=30m/s$(i) = $\frac{30-15}{10}$

 = 1.5m/s2$√$

(ii) = $\frac{0-30}{20}$ = $-$1.5m/s2$√√$

1. $\left[\frac{1}{5}\left(15+30\right)×10+10×30\right]÷20$

= $\left(225+300\right)÷20$

=26.25 m/s$√√√$

No.22

$$√√√√√√√√√√$$

 No. 23



a) i) Volume

Ratio $\frac{x}{14}$ =$\frac{22.5+x}{21}$

21$X=$14(22.5 +$X)$

21= 14(22.5 + x)$√$

21x - 14x = 315

 x = 45cm$√$

Volume of whole cone

=$\frac{1}{3}$ x $\frac{22}{7}$ x 21 x 21 x 67.5 =31185 cm3$√$

Volume of small cone

= =$\frac{1}{3}$ x $\frac{22}{7}$ x14 x 14 x 45 = 9240 cm3 $√$

Volume of frustum

31185- 9240 = 21 945 cm3$√$

ii) Mass of frustum

Mass=21945x$\frac{3g}{cm^{3}}$=65835g $√$

Mass in kg= $\frac{65.835 g}{1000g}$ = 65835kg$√$

b) 20% of 65.835kg = 13.167 kg

65.835 - 13.167 = 52.668 kg$√$

Volume of material remaining =

$\frac{56682}{3}$= 17556cm3$√$

Length of cube = $\sqrt[3]{17 556 }$= 25.99 cm$√$

No.24

(a) (i) 6400 + 1750 x 20

= Ksh4 400$√$

(ii) 41 400— 36000=Ksh 5400$√√$

(b) 36000 $(1+r/100) $ = 41 400

(1+$\frac{r}{100}$) = 1.15$√$

(1 + $\frac{r}{100}$) = $1.15^{\frac{3}{5}}√$

$\frac{r}{100}$= 0.087473554$√$

r= 8.7473554$√√$

(c) 36000 x 1.0872

= 42536.484$√$

42536.484 - 36000$√$

=6536.484$≈$ Ksh 6536$√$