MATHEMATICS PAPER TWO

FORM THREE term 2

MARKING SCHEME

1. $\frac{32 \times 4 \times 0.05}{0.00625} = \frac{32 \times 4 \times 0.05}{0.5}$

$= \frac{32 \times 4 \times \cancel{8}}{\cancel{50}} \frac{1}{10}$

2. $5^{X2-y} = 53$

$3^{2x} : 3^{4y} = 3^0$

$2x - y = 3$ ------ (i)

$2x - 4y = 0$ ----- (ii)

From equation (i) $y = 2x - 3$ --- (iii)

Substitute (iii) into (ii)

$2x - 4(2x - 3) = 0$

$2x - 8x + 12 = 0$

$-6x = -12$

$X = 2$

$y = 2x - 3$

$y = 2(2) - 3$

$y = 4 - 3$

$y = 1$

3. L.s. f = $\frac{\cancel{324}}{\cancel{768}} = \frac{\cancel{81}}{\cancel{192}} \frac{1}{2} = \frac{1}{2}$

A.s.f = $(\frac{1}{2})2 = \frac{1}{4} = \frac{As}{Al}$

Al = 2, 430 x 4

$= \underline{9720\ cm^2}$

4. Let Buluma's salary be x

Food = 3/8x

Electricity + water bolls = 1/5 x 5/8x = 1/8x

Fees – 1/4x

$\frac{3}{8} + \frac{1}{8} + \frac{1}{4} = \frac{3x + x\ 2x}{8}$

$= \frac{6x}{8} = \frac{3x}{4}$

Invested - $\frac{10}{100} \times \frac{1x}{4} = \frac{1}{40} x$

$\frac{3}{4}x + \frac{1}{40}x = \frac{30x + x}{40} = \frac{31x}{40}$

$\frac{9x}{40} = 4500 + 1800$

$\frac{9x}{40} = \frac{6300}{1}$

$X = \frac{\text{ksh } 6300 \times 40}{9}$

$X = 28{,}000$

5. H.P = Deposit = 12,000

M.I = 15 x 2050 = 30750

Total = 42,750 -

Cash price = 36,500

6,250

Interest rate

$\frac{6250}{36{,}500} \times 100 = 17.123$ for 15 months

Therefore interest per month = $\frac{17.123}{15} = 1.1415^0/_0$pm

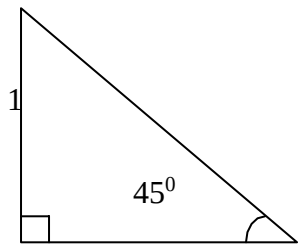
6. $\frac{9y^2 - 16x^2}{16x^2 - 9y^2} = \frac{(3y)^2 - (4x)^2}{(4x^2) - (3y)^2}$

$\frac{(3y - 4x)(3y + 4x)}{3y - 4x} = -1\ \frac{(4x - 3y)}{(4x - 3y)} 1 = -1$

$(4x - 3y)(4x + 3y)$

$4x - 3y \quad (4x - 3y)\ 1$

7.



1

$\frac{1}{1 - \frac{1}{2\sqrt{\ }}}$

$= \sqrt{\frac{4 + \sqrt{2}}{\sqrt{4} + \sqrt{2} - \sqrt{2} - 1}}$

$\sqrt{\ } \qquad \sqrt{\ }$

= 1 / √2 = 1 / ((1/√2) · (√2 - 1)/√2) = 2 + 2 = 2 2

= $\frac{\sqrt{2}}{\sqrt{2}-1} \times \frac{\sqrt{2}+1}{\sqrt{2}+1}$

= $\frac{\sqrt{2}(\sqrt{2}+1)}{\sqrt{2}(\sqrt{2}+1) - 1(\sqrt{2}+1)}$

8. 5x – 4 = 5 +2..............(i)

– 9 – 3x = x +3............(ii)

From eqn (i) from eqn (ii)

3x =9 - 2-12 = 4 x

X =3 - 3 - = x

Hence -3 = x = 3Integral values of x = -2, -1, 0, 1, 2, 3

9. V x d3 V kd3

Kd3 V (3.5)3 x k = 14.23

K = $\frac{14.23}{3.5 \times 3.5 \times 3.5}$ K = 0.3319

V = 0.3319 x 4.5 x 4.5 x4.5

10. Area of a circle = $\Pi r^2 = \frac{22}{7} \times 8.4 \times 8.4$

= $221.76 cm^2$

Area of a sector EOF = $\frac{160}{360}$ 6 x Πr^2

= $\frac{1}{6} \times 221.76 = 36.96 cm^2$

Therefore area of DOEF = $\frac{1}{2}$ x a b sin 60

= $\frac{1}{2}$ x 8.4 x 8.4 x 0.866

= 30.55

Area of the shaded part = 36.96 - 30.55

= 6.41cm2

Area unshaded = Area of circle - Area shaded

= 221.76 – 6.41

= $\underline{215.35cm^2}$

11. June 2009 – 15, 300

June 2010 – 16100

June 2011 – 16,900

June 2012 – 17,700

June 2013 – 18, 500

June 2014 – 19,300

12. $P = \frac{fh^2}{2} + fge$

$Fge = 2P$

$G = \frac{2P}{Fh^2}$ $\quad \frac{F^2h^2e}{}$

13. $3x - y = -5$

$2x + 4y = 7$

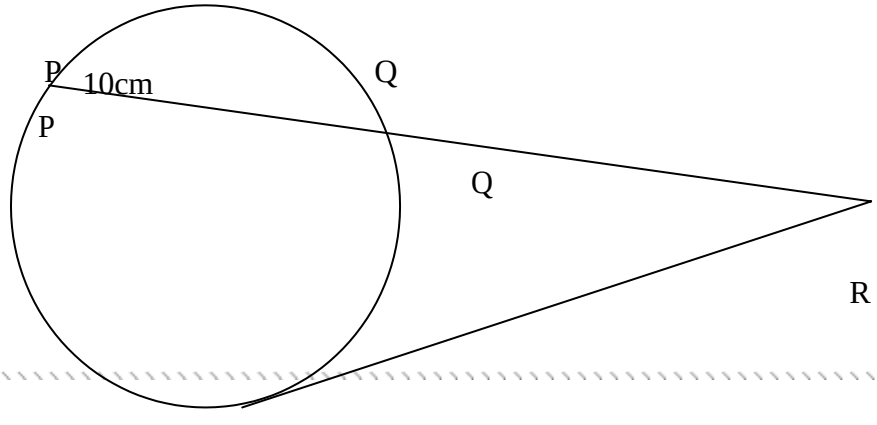
$$\begin{pmatrix} 3 & -1 \\ 2 & 4 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} -5 \\ 7 \end{pmatrix}$$

$$^1/_4 \quad \begin{pmatrix} 4 & 1 \\ -2 & 4 \end{pmatrix} \begin{pmatrix} 3 & -1 \\ 2 & 4 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \frac{1}{14} \begin{pmatrix} 4 & 1 \\ -2 & 3 \end{pmatrix} \begin{pmatrix} -5 \\ 7 \end{pmatrix}$$

$$\begin{pmatrix} X \\ Y \end{pmatrix} = \begin{pmatrix} -^{13}/_{14} \\ ^{31}/_{14} \end{pmatrix}$$

$X = -^{13}/_{14}$ $\qquad$ $Y = ^{31}/_{14}$

14.



14cm

S

Let RQ be x

$X(x+ 10) = 14^2$

$X^2 + 10x – 196 =0$

$X = \frac{-10x \pm \sqrt{102 – (4 \times 1 \times – 196)}}{2 \times 1}$ $x = \frac{-39.732 = 19.866}{2}$

$X = \frac{- 10 +- \sqrt{100 + 784}}{2}$ $x =9.866$

$X = \frac{-10+-\sqrt{884}}{2}$

$X = \frac{- 10+- 29.732}{2}$

14. $\frac{2 \times 3}{\sqrt{0.3746}}$ 5085

$2\left[\frac{1}{0.06121} + 3\frac{1}{5085}\right]$

2 x 1.6337 + 3(0.0001966)

= 2.3274 + 0.0005898 =2.3273298 =2.3273

15. $\text{Log}_3 128 = x$

$3x = 128$ $X = \frac{\log 128}{\text{Log}_3}$

16. (a)

1. Taxable income = 13,125 + 300 = 16,125

i. kf = 806.25

1 - 325 ⟶ 325 x2 = 650

325 – 650 ⟶ 325 x 3 = 975

651 – 975 ⟶ 156.25 x 4 = 6255

Ksh 2,250

ii. Ksh 2,250

-455

Khs 1, 795 – tax of the relief

b. Total deductions

i. Tax – 1,795.00

Service charge 100.00

Health ins -280.00

Wcps $2^0/_0$ 262.50

1437.50

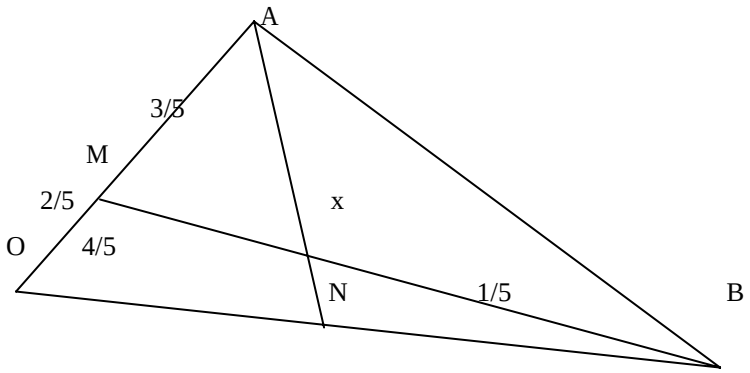
(ii) Net income

16,125.00 -

Ksh 14,37.50

Ksh 14,687.50

17.



1. AN = AO +ON

–a2 +4/5b2BM=BO +OM = -b2 + 2/5a2

2. AX = S ANOX = OA + AX

=OA + S AN =a2 s (-a2 +4/5b2)

=a2 – 5a2 +4/5s b2

= (1- s) a2 + 4/5s b2

3. 1 – s = 2/5t ---------(i)

4/5s = 1-t ---------- (ii)

S = 1 -2/5t----------(iii)

Subtracting (iii) into (ii)

$^4/_5(1 – {}^2/_5t) = t - 1^4/_5 – {}^8/_{25}t = 1-t$

$20-8/25t = 1-t^{12}/_{25}t = 1-t$

$1\ {}^{12}/_{25}t\ T = {}^{25}/_{37}$

Therefore $s= 1- {}^2/_5 x^{25}/_{27}$

BX= tBM

4. OX =OB +BX

= b + t BM

$= b_2 + t(-b_2 + {}^2/_5a_2)$

$b_2 - t\ b_2 + {}^2/_5t\ a_2$

$= (1 – t)\ b_2 + {}_2/_5\ t\ a_2$

Term 2

MATHEMATICS PAPER1

FORM THREE

MARKING SCHEME

1.

No	log
326.7	2.5142
0.0589	$\bar{2}.7701$
	1.2843
30.6	1.4857
0.2471	$\bar{1}.3929^{+}$
	0.8786
0.4057	
	3

1.652 0.1352

= 1.3652

2. 3x – 3sy---------- 7

7x – 3y = 23… 3

12x – 3sy = 147

21x – 9y = 69

-26y = 78

Y= -3

3. 3x -5(-3) = 21

3x + 15 = 21

3x = 6X = 2

$2x^2 + 2x – 4 = 0$

$X^2 + 2x+k = 4+k$

$K = (^1/_2 xb)^2 = (^1/_2 x2) =1K=1$

$X^2 + 2x + 1 = 5$

(x+1) (x +1) = 5

(x +1) 2 = 5

$X+1 = \pm\sqrt{5}$

X = -1 ± 1.49535X = -2.49535

X = 0.49535

4.

14 k$ = 9.70

Therefore 4k$ 280,000

KES = 280,000 x 9.70

KES 2,716,000

Spent KES 835, 210

KES 1,880,790

Kf 1215 = 1 S.A rand

$\frac{1880790}{12.15}$ x1

= 154,797.53 S.A Rand

5. R $(\frac{2+6}{2}, \frac{-1+3}{2})$

(4 ,1)

G of PQ = $\frac{Dy}{Dx} = \frac{3-1}{6-2} = \frac{4}{4} = 1$

Therefore G of ⌐ line to PQ = -1

Let point s (x, y) pass through R (4, 1)

$D = \frac{Dy}{Dx} = \frac{y-1}{x-4} = \frac{-1}{1}$

$Y - 1 = -1 (x-4)$

$Y - 1 = - x - 4$

$Y = -x + 5$

a) Area = 1/2a6 sin B

$=1/2 \times 6 \times 10 \sin 42^0$

$= ½ \times 60 \times 0.69691$

$= 20.074cm^2$

b) Area of sector AOM

$= \frac{24^0}{360} \times 3.142 \times 6 \times 6$

=13.1964

Therefore area of the shaded portion = area of sector

= 20.074

- 13.196

6.9544cm^2

6. s = 14.6 ± 0.05 14.55 14.65

t = 5.68 ± 5.675 5.675 5.685

Maximum product = 14.65 x 5.685 = 38.28525

Min product = 14.55 x 5.675 = 82.57125

Working product = 14.6 x 5.68 = 82.928

Absolute error = $\frac{\text{max p} - \text{min p}}{2} = \frac{83.28525 - 82.5712}{2}$

= 0.357025

Therefore $^0/_0$ error = $\frac{0.35702 \times 100}{82.928}$

$= 0.4305^0/_0$

7. $\text{Log}_{10}(3x+4) = \log_{10}(3x - x) + \log 10$

$\text{Log}_{10}(3x+4) = \log_{10} 10(3 - x)$

$3x - 4 = 30 - 10x$

$13x = 36$

$X = 2$

8. Spouse : daughter : son

1 : 2 3

Son = 3/6 x 1,865,280 = 923, 640

Spouse = 1/6 x 1,865, 280 = $\frac{310, 880}{2}$ = 155440

Therefore son got = 932, 640+

155, 440

Ksh 1,088,080

9. In 1 hr --------- boy = $\frac{1}{31/2}$ = 1 ÷ 7/2 = 2/7

Girl = 1/6

Both 2/7 +1/6 = $\frac{12+7}{42} = \frac{19}{42}$

If 19/42 = 1 hr

1= 1 x 1÷ 19/42

= 42/19 = 21/19 hrs

= 2 hrs 13 min

10.

V

20

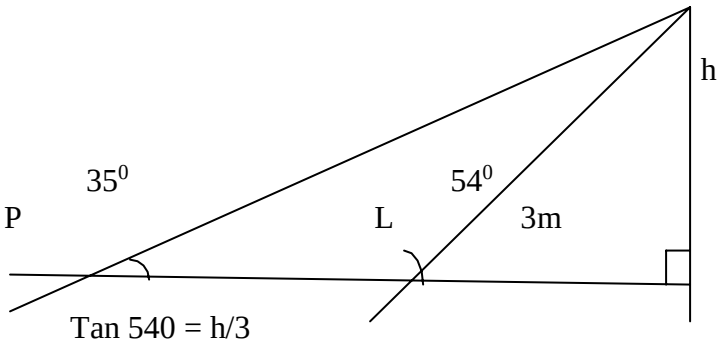
14

U

10

W

11



Tan 540 = h/3
H = 3 tan 540
H = 3 x 1.37638
H = 4.129m

11. Largest size is WUV
A = ½ x 14 x10 sin θ = $\sqrt{s\,(s-o)\,(s-b)\,(s-c)}$

= 70 sin 0 = $\sqrt{22(22-10)\,(22-14)\,(220-20)}$

= 70 sin θ = $\sqrt{20 \times 12 \times 8 \times 2}$

Sinθ = $\sqrt{\frac{3840}{70}}$ = 0.8853

θ =62.2880
θ = 62.29^0

12. (on a graph paper)

13. $\frac{7+\sqrt{2}}{5-\sqrt{2}} \times \frac{5+\sqrt{2}}{5+\sqrt{2}}$

$= \frac{7(5+\sqrt{2}) + 2(5+\sqrt{2})}{5(5+\sqrt{2}) - 2(5+\sqrt{2})}$

$= \frac{35 + 7\sqrt{2} + 5\sqrt{2} + 4}{25 + 5\sqrt{2} - 5\sqrt{2} - \sqrt{4}}$

$= \frac{35 + 12\sqrt{2} + 2}{} = \frac{37 + 12\sqrt{2}}{}$

25-2 24

$\frac{37}{24} + \frac{1}{2}$ 2

14.

a) BA2 $= \begin{pmatrix} 4 \\ 5 \end{pmatrix} - \begin{pmatrix} 5 \\ -4 \end{pmatrix} = -\begin{pmatrix} 1 \\ 9 \end{pmatrix}$

BA $= \sqrt{(-1)^2 + (9)^2}$

$= \sqrt{82} = 9.0554$

15. BODMAS

$\frac{¾ + \frac{12}{7} \div \frac{4}{7} \text{ X } \frac{7}{3}}{\frac{45}{56} \text{ X } \frac{2}{3}} = ¾ + \frac{\cancel{12}}{7} \text{ X } \frac{3}{4}$

$\frac{15}{28}$

$\frac{¾ + 9/7}{\frac{15}{28}/\frac{15}{28}} = \frac{21+36}{}$

$\frac{57}{28} \div \frac{15}{28}$

$\frac{57}{15} \text{ X } \frac{28}{15}$

$= \frac{57}{15} = 3\frac{12}{15}$

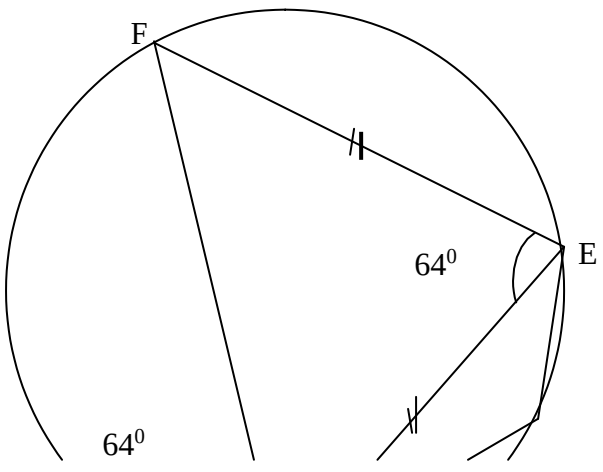
$= 3\frac{4}{5}$

16.

Speed	Mid point (x)	Frequency (No. of vehicle)	fx	17. C.f
40 – 44	42	28	1176	28
45 – 49	47	40	1880	68
50 – 54	52	65	3380	133
55 – 59	57	47	2679	180
60 – 64	62	38	2356	218
65 – 69	67	32	2144	250
		Ef= 250	Efx =13615	

- Mean ($\bar{x}$) = $\frac{Efx}{Ef} = \frac{13615}{250} = 54.46$

18.



D

A B C

a) $\angle BEF^0$ = 64^0 (interior alternate angles are the same)

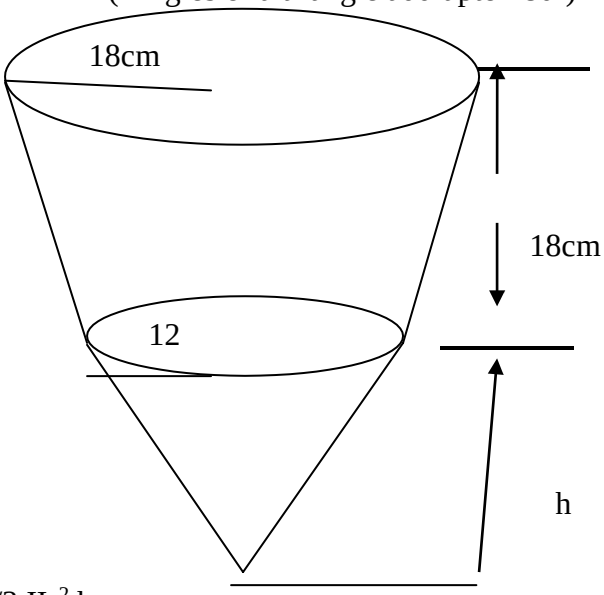
b) $\angle FBE^0$ = $180 - 64^0 = 116^0 = 58^0$
2 2(sin of s of add up to 180^0)

c) $\angle DBC$ = $58^0 - 36^0$ (Interior alternate s are equal hence $\angle CBE = BFE = 58^0$)
1. = 22^0

d) BDE = $180^0 - 58^0$ (Opposite s of a cyclic gradrilational add up to 180^0)
= 122^0

e) BED = $1800 - (122^0 + 36^0)$
= $180^0 - 158^0$
= 22^0 (Angles of a triangle add upto 180^0)

19. Diagram



a) Vol. = 1/3 $\pi r^2 h$
(Small cone) = 1/3 x 22/7 x12 x 12 x h
= 1/3 x 22/7 x 12 x12 x 36
= 5430.857cm^3

b) Vol. (original cone) = $1/3 \pi r^2 h$
6
=1 x 22x18 x 18 x 18 x 54
3 7
1
= 184, 957. 71cm^3

c) Volume of frustum
= 184, 957.71

5,430.86-
179, 256.85cm^3

d) 1000 cm3 = 1 liter

Therefore 179, 526.85 = 179, 526.85 x 1
1000
= 179.527 liters