MATHEMATICS PAPER TWO

FORM THREE term 2

MARKING SCHEME

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

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

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 $= \left(\frac{1}{2}\right)2 = \frac{1}{4} = \frac{As}{Al}$

   $Al = 2,430 \times 4$

   $= 9720\ cm^2$

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 = $\frac{17.123}{15} = 1.1415\%$pm

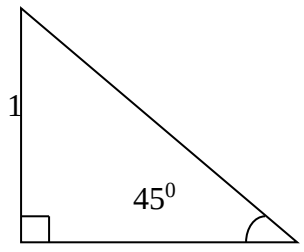
6. $\frac{9y^2 - 16x^2}{16x^2 - 9y^2} = \frac{(3y)^2 - (4x)^2}{(4x^2) - (3y)^2}$

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

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

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

7.



1

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

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

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

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

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

8. $5x - 4 = 5 + 2$ …….(i)

$-9 - 3x = x + 3$ …….. (ii)

From eqn (i) from eqn (ii)

$3x = 9$ $-2 - 12 = 4x$

$X = 3$ $-3 - = x$

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

9. V x d3 V kd3

Kd3 V $(3.5)3 \times k = 14.23$

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

$V = 0.3319 \times 4.5 \times 4.5 \times 4.5$

10. Area of a circle = Πr^2 $= {}^{22}/_{7} \times 8.4 \times 8.4$

$= 221.76 cm^2$

Area of a sector EOF = $\frac{160}{360} \times \Pi r^2$

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

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

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

$= 30.55$

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

$Fge = 2P$

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

13. $3x - y = -5$

$2x + 4y = 7$

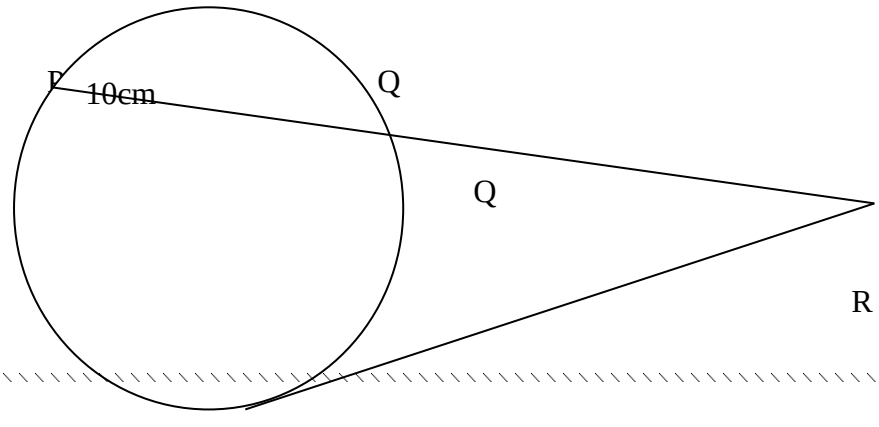
$$\begin{bmatrix} 3 & -1 \\ 2 & 4 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} -5 \\ 7 \end{bmatrix}$$

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

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

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

14.



14cm

S

Let RQ be x

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

$X^2 + 10x – 196 =0$

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

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

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

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

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

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

$2 \times 1.6337 + 3(0.0001966)$

$= 2.3274 + 0.0005898$ $\quad =2.3273298$ $\quad =\underline{2.3273}$

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

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

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

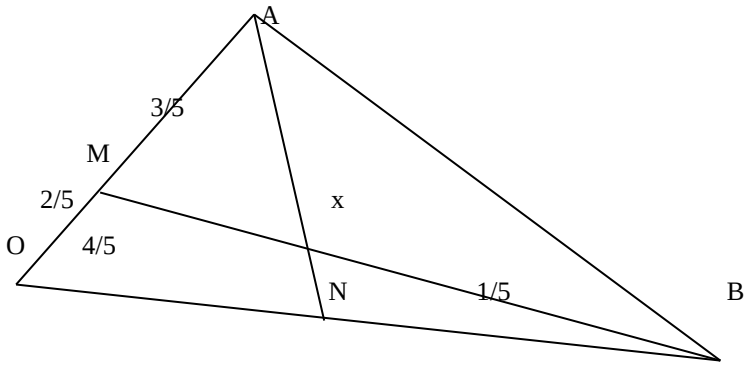
(ii) Net income

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 + $^2/_5$t 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---------- x7

   7x – 3y = 23…….x3

   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

$\frac{1880790}{12.15} \times 1$

= 154,797.53 S.A Rand

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

(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

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

$= ½ \times 60 \times 0.69691$

$= 20.074 cm^2$

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

= 0.357025

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

$= 0.4305^0/_0$

7. Log_{10} (3x +4) = log_{10} (3x – x) + log10

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

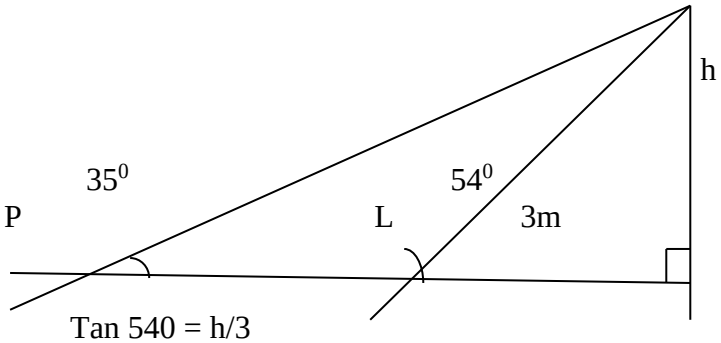
14

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 = 62.29⁰

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

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

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

$\frac{¾ + \frac{12}{7} \div \frac{4}{7} \text{ X } \frac{7}{3}}{\frac{45}{56} \text{ X } \frac{2}{3}} = \frac{¾ + \frac{12}{7} \text{ X } \frac{3}{4}}{\frac{15}{28}}$

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

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

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

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

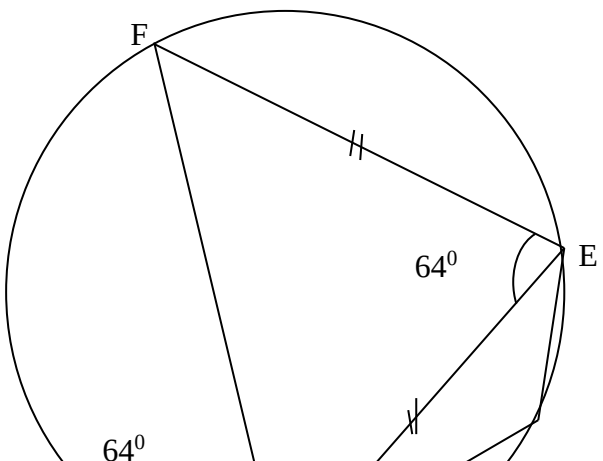
$= 3\ \frac{4}{5}$

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)

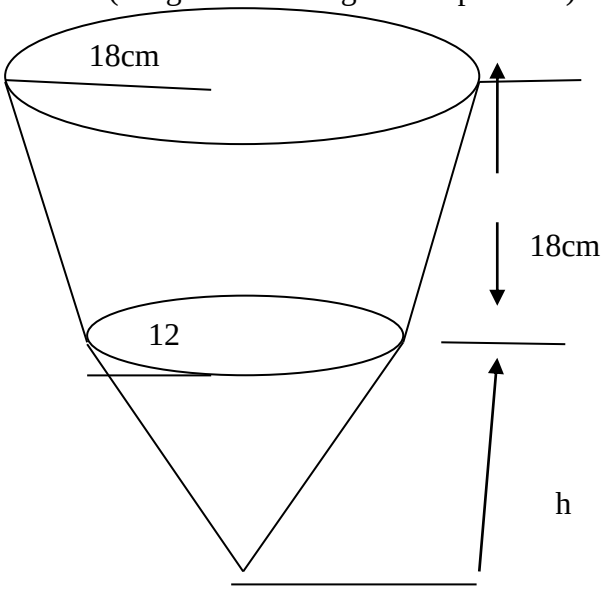
b) $\angle FBE^0 = \frac{180 - 64^0}{2} = \frac{116^0}{2(\text{sin of s of add up to } 180^0)} = 58^0$

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

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. $= 1/3\ \text{II}r^2 h$
(Small cone) $= 1/3 \times 22/7 \times 12 \times 12 \times h$
$= 1/3 \times 22/7 \times 12 \times 12 \times 36$
$= 5430.857 cm^3$

b) Vol. (original cone) $= 1/3\ \text{II}r^2 h$

$= \frac{1}{3} \times \frac{22}{7} \times 18 \times 18 \times \frac{18}{6} \times 54$

$= 184, 957.71 cm^3$

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