ACK DIOCESE OF MUMIAS SECONDARY SCHOOLS

Kenya Certificate of Secondary Education

SEPTEMBER 2022

121/1

Mathematics Alt. A

Paper 1

Marking Scheme

SECTION I

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| No | Workings | | | Marks | Comments |
| 1. | - X X  - =  =3 | | | M1  M1  A1 | Removing brackets.    C.A.O |
|  | Total Marks | | | 3 |  |
| 2. | L.C.M (30,40)=120minutes (2 hours)    Number of times =  = 3 = 3 times | | | B1    M1    A1 | For L.C.M.      For the integer 3 |
|  | Total Marks | | | 3 |  |
| 3. | (0.0472)2 =(4.72 x 10−2)2  = 22.278 x 10−4 = 0.0022278  (0.1236)2 = (1.236 x 10−1)2  =1.528 x 10−2 = 0.01528  =  =-2  =0.13233 | | | M1                M1    A1 | For any one correct squaring from.              Correct square root.    to at least four significant  figures |
|  | Total Marks | | | 3 |  |
| 4. | 3(0)−2*x*=−2  *x*=1  ⸫R(1,0) | | | M1      A1 | Substituting *y* with 0      Coordinates of point R |
|  | Total Marks | | | 2 |  |
| 5. |  | Hypotenuse = = 5  ⸫ Cos (90-α) = |  |  |  |
|  | Total Marks | | | 2 |  |

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| No | Workings | Marks | Comments |
| 6. | 1. M=   75.66  = 200 000 US Dollars        =119488 | M1    A1      M1    A1 |  |
|  | Total Marks | 3 |  |
| 7. | <ABC = 42 Opposite angles in a cyclic quadrilateral add up to 180  <BAC = 42 Base angles of an isosceles triangle are equal    <ACB = 96 Sum of interior angles of a triangle add up to 180 | B1    B1    B1 |  |
|  | Total Marks | 3 |  |
| 8. | =312 ± 4m | B1      B1              M1  A1 | * Constructing 135o      * Completed PQRS |
|  | Total Marks | 3 |  |
| 9. | *a* : *b* : *c*  2 : 5  2 : 3 ,  ` 4: 10: 15  *a*:*c*= 4:15 | M1            A1 |  |
|  | Total Marks | 2 |  |
| 10. | P+1 .  2*p*+ 5 | M1    M1        A1 | * Numerator * Denominator * CAO |
|  | Total Marks | 3 |  |

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| No | Workings | | | Marks | Comments |
| 11. |  | | | B1    B1              B1 | Construction   * Hidden * Completed * solid |
|  | Total Marks | | | 4 |  |
| 12. | 2*x*−3≤ 4*x*+7 4*x*+7 <*x*+3  −2*x*≤10 3*x*< 6  *x*≥−5  *x<2*      -5≤ *x<2* | | | B1    B1    B1 | * *x* ≥−5 * *x*<2. * No. line |
|  | Total Marks | | | 3 |  |
| 13 | AB= |  |  | M1      M1    A1 | * Vector AB * magnitude * CAO |
|  | Total Marks | | | 3 |  |
| 14. | *p*3×*q* =135  *p*3×*q* = 33×5    *p* = 3 *q* = 5 | | | B1    B1  B1 | * Factoring        * Value of *p*      * Value of *q* |
|  | Total Marks | | | 3 |  |

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| No | Workings | Marks | Comments |
| 15. | |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | *x* | 0 | 0.4 | 0.8 | 1.2 | 1.6 | 2.0 | | y | 2.00 | 1.96 | 1.83 | 1.60 | 1.20 | 0.00 |   a)  b)Area = ×0.04[(2.00+0.00)+2(1.96 +1.83+ 1.60+1.20)]  = 0.2(2.00+13.18)  =3.036cm2 | B1  M1  M1  A1 |  |
|  | Total Marks | 3 |  |
| 16 | (4x155)+160(*n*−4)=180(*n*−2)  620+160*n*−640 =180*n*−360  20*n* = 340 *n* =17*sides* | M1    M1    A1 |  |

SECTION II

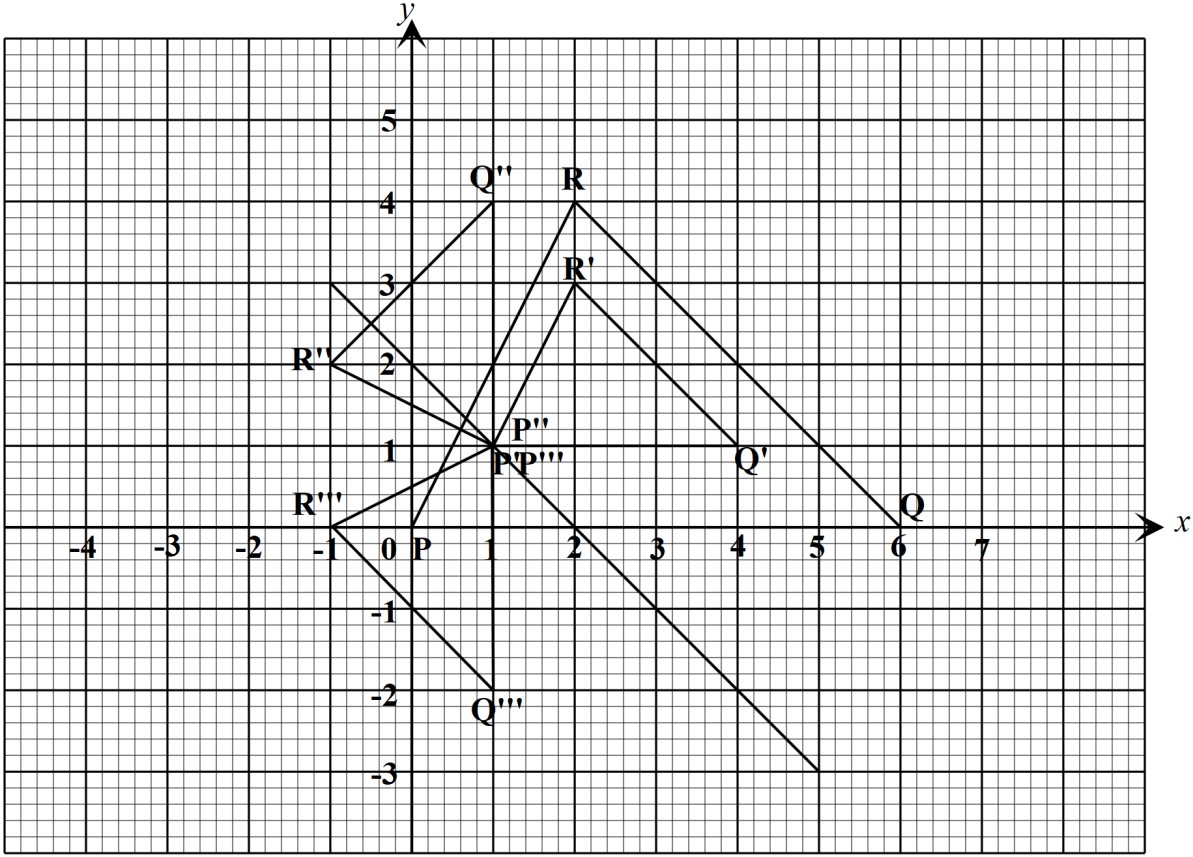
|  |  |  |  |
| --- | --- | --- | --- |
| No | Workings | Marks | Comments |
| 17. | 1. *S*.*A*= 2XX352   =7700*cm*2 *x*  *x*+60 = *x*  *35 14*  14(*x*+60)= 35*x*  14*x*−35*x* =−840  −21*x* =−840  *x* = 40  ⸫ Slant height = 40 + 60 = 100cm     1. Total Surface Area of the model:   = 2π*r*2 +(π*RL*−π*rl*)+π*r*2  Curved S.A = (35x100−14x40*r*)  = 92400*cm*2  Base area: x142  = 616*cm*2  Total Surface area of the model:  = 7700 + 9240 + 616  =17 556cm2 | M1    A1    M1          A1  B1          M1    A1    M1        M1    A1 | * Applying similarity            * Curved S.A            * Base area          * Addition including hemisphere * CAO |
|  | Total Marks | 10 |  |

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| No | Workings | Marks | Comments |
| 18. | 1. Matatu distance = = 30*km*   Nissan distance = 120x30 = 40*km*  *60*  After 30 mins = 90x30  60  =45 km  Relative distance = (120 −90)= 30 km/hr Relative speed = 75−40 = 35 km  Time taken to overtake =  = 1 hour 10 mins time = 8 : 50 + 1: 10 = 10:00 a.m.       1. Overtaking time = 10:00 - 8:00 = 2 hours   Distance = 90 x 2    = 180 km     1. Time = distance = 240   speed 90  = 2 hours 40 minutes Arrival time = 8:00 + 2:40  = 10 : 40 a.m. | M1      M1  M1    M1    A1      M1  A1      M1      M1    A1 | ✓Distance after 30 mins   * Relative distance. * . |
|  | Total Marks | 10 |  |

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| No | Workings | Marks | Comments |
| 19. | 1. *x* =100−87 *x* =13 2. Modal class : 19.0 – 19.4        |  |  |  |  |  | | --- | --- | --- | --- | --- | | *Length*(*cm*) | *x* | *f* | *fx* | *c*.*f* | | 18.0−18.4 | 18.2 | 5 | 91 | 5 | | 18.5−18.9 | 18.7 | 8 | 149.6 | 13 | | 19.0−19.4 | 19.2 | 30 | 576 | 43 | | 19.5−19.9 | 19.7 | *x* =13 | 256.1 | 56 | | 20.0−20.4 | 20.2 | 10 | 202 | 66 | | 20.5−20.9 | 20.7 | 20 | 414 | 86 | | 21.0−21.4 | 21.2 | 10 | 212 | 96 | | 21.5−21.9 | 21.7 | 4 | 86.8 | 100 | |  |  | =100 | =1987.5 |  |      1. *Mean =* = 1987.5   100  =19.875   1. *L*+ *i*     *f*  19.45+ (50-43) x 0.5  13  =19.45+10.26923 =19.72 | B1  B1      B1      B1  B1  B1                M1  A1          M1    A1 | * *x*        * *fx* * *C.f* *  *f* |
|  | Total Marks | 10 |  |
| 20. | 1. Diagram (Next page)            1. 16.5x300=4950 ±30*km*      1. 16x300=4800 ±30*km*      1. 3160  ± 10 | B1  B1  B2  B1      B2  B2      B1 | Point B ✓   * Point C * Point D ✓ Complete diagram      * Plotting * Curve      * both values |
|  | Total Marks | 10 |  |



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| No | Workings | Marks | Comments |
| 21. | 1. Plotting PQR 2. On grid (Triangle P'Q'R'under   enlargement S.F =  about(2,2) )  P'(1,1) Q'(4,1) R'(2,3)   1. On the grid (TriangleP''Q''R'' under positive quarter turn about(1,1) ) 2. On grid (Triangle P'''Q'''R''' under reflection in the line *y*=1 )      1. Reflection in the line *y*=−*x*+ 2 | B1  B1  B1      B1    B1  B1    B1  B1    B1  B1 | ✓Triangle PQR   * Enlargement process * Triangle P'Q'R'      * Coordinates of P'Q'R'.      * Rotation process. * triangle P''Q''R''drawn. * Line *y*=1. * Triangle P'''Q'''R''' drawn * Identifying reflection      * Equation. *y*=−*x*+ 2 |
|  | Total Marks | 10 |  |



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| NO | Working | Marks | Comments |
| 22. | 1. Determinant = 8−9=−1   *A-1*= =   1. (i) Equations:   20*x*+15*y* = 9500    15*x*+10*y* = 6750    (ii) Solving the equations:    20*x*+15*y*= 9500    =  =  =    ⸫ *x = Kshs 250 y = Kshs 300*    (c) Oranges new price =  x250 = *Kshs*.275  Mangoes new price =  x300 = *Kshs*.270  =  total cost = 9550 + 6825 = Kshs.16 375 | B1    B1        B1  B1                            M1      M1    A1        M1      M1      A1 | * Determinant      * Inverse        * Each value                           ✓Pre – multiplying with  inverse     * Correct multiplication.     ✓Both values       * New costs.        * Using matrix to find total cost. (Follow through) ✓ Total value. |
|  | Total Marks | 10 |  |

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| NO | Working | Marks | | Comments |
|  | (a)   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | *x* | -1 | 0 | 1 | 2 | 3 | 4 | 5 | | y | 7 | 2 | -1 | -2 | -1 | 2 | 7 |   (b) Curve    II. Line drawn  (c)x = 0.7 or 4.3 ± 0.1  (d) x = 2 |  | |  |
|  | Total Marks | 10 |  | |

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| No | Workings | Marks | Comments |
| 24. | *ds*   1. =12*t*2 −5*t* −3   *dt*  *v* =12*t*2 −5*t* −3 *v* =12(3)2 −5(3)−3 *v* = 90m/s     1. 12*t*2 −5*t* −3=0   12*t*2 −9*t* + 4*t* −3 = 0  3*t*(4*t* −3)+1(4*t* −3)= 0  (4*t* −3)(3*t* +1)= 0  *t* = or  *t =*  seconds     1. Displacement at *t* =   *s* = 4*t*3 − *t*2 −3*t*+3 *s* =  s = 4 3 - 2 - 3 + 3    s = = 1 or 1.03125   1. *a= =24t – 5*   *a = =24(2)-5*  *a* = 43 m/s2 | M1    M1    A1          M1    M1          A1                M1                A1      M1      A1 |  |
|  | Total Marks | 10 |  |