**ASUMBI GIRLS HIGH SCHOOL**

**TERM 2– DECEMBER 2021**

**FORM 4 – MATHEMATICS PAPER 2**

**MARKING SCHEME**

|  |  |  |  |
| --- | --- | --- | --- |
|  | WORKING | MARKS | COMMENTS |
| 1 |

|  |  |
| --- | --- |
| No.  | Log |
| 1.000------0.03506---28.5 ------- +90.35118.87------4.917×1004.917 | 0.00002.54481.45522.0751÷30.6917 |
|
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|
|
|

 | M1M1M1A1 | For + and –For +For ÷ |
| 2. | $\frac{3}{2+√2}$ + $\frac{4-√2}{2-√2}$  = $\frac{3(2-\sqrt{2)}+(4-√2)(2+√2)}{(2+√2)(2-√2)}$= $\frac{\begin{array}{c}6\\3\sqrt{2}+8+4\sqrt{2}-2\sqrt{2}-2\end{array}}{4-2}$=$ \frac{12-√2}{2}$ | M1M1A1 |  |
| 3 | (p-3q)5 = p5+5p4(-3q)-10p3(-3q)2+10p2(-3q)3= p5 +-15p4q +90p3q2 -270p2q31. Coefficient =-15
2. 4th term =-270p2q3
 |  |  |
| 4 | b=$\sqrt{k}-ac$$b^{2}$=$k-c$c=$\frac{k-b^{2}}{a}$c=$\frac{1^{2}-2^{2}}{4}$ = -$ \frac{3}{4}$ | M1A1 |  |
| 5 | $$\left(\genfrac{}{}{0pt}{}{\begin{matrix}3x&x-6\end{matrix}}{\begin{matrix}-6&2x-2\end{matrix}}\right)$$D = 3x$\left(2x-2\right)$ -6$\left(x-6\right)$=0 =6$x^{2}$-6x-6x+6=0 =6$x^{2}$-12x+6=0 =6$x^{2}$-6x-6x+6 =0 6x$\left(x-1\right)$- 6$\left(x-1\right)$=0$\left(x-1\right)$(6x-6)=0X=1 | M1M1A1 3 |  |
| 6 | Error = $\frac{\frac{max-min}{2}}{actual} $× 100 = $\frac{½(2041.2-1573.2)}{40×45}$ × 100 = 13$\%$ | M1M1A1 **3** |  |
| 8 | Log28(2+3x) = log24(2x+6)16 +24x = 8x + 2416x = 8X= ½ | M1M1A1 3 |  |
| 9 | 5.2(RT) = 3.2x4.7RT = $\frac{3.2 x 4.7}{5.2}$  = 2.59RS = 5.2 + 2.89 = 8.09 |  |  |
|  |  | B1 B1B1B1 | For perpendicular bisectorCircle centre ASemicircle Shaded region |
| 11 | 3X2 + 3Y2 – 18X + 12Y – 9 =0X2 + Y2 -6X +4Y =0X2 - 6X + 9 + Y2 +4Y + 4 = 3+ 9+4(X - 3)2 + (Y + 2)2 = 16 Centre (3,-2) Radius = 4 | B1B1B1 3 | For factorizedFor centreFor radius |
| 12 | 147 $\gg $ 105$\%$Cp = $\frac{100}{105}$ x 147 = sh 140 Let the ratio b 1$\vdots $ n= $\frac{100x1+150n}{1+n}$ 140100 +105n = 140 + 140n10n = 40 n =4 ratio $1\vdots 4$ | M1M1B1  3 |  |
| 13 |  Total tax= 3038+1162= 4200Tax calc  $\frac{8400}{20}$ x2 = 840$\frac{9600}{20}$ x3 = 1440$\frac{x}{20}$ x 4 = 1920 total = 4200x= $\frac{1920x20}{4}$ = 9600Income = (18000+9600) x $\frac{100}{115}$  = sh 24000  | M1M1M1A1 4 |  |
| 14 | x (x+3) -12=0x2 + 3x-12 = 0x2+ 4x-x -12 =0x(x+4)-1(x+4)=0(x-1)(x+4)= 0X=1 x=-4 | M1M1A13 | For determinant equated to 0Factors |
| 15 | .$\frac{240}{sin45}=\frac{b}{\begin{array}{c}sin105\\\end{array}}$b = $\frac{240}{sin45}$ x sin105 327.8461 | B1M1A1 3 |  |
| 16 |  |  |  |
|  | **SECTION II** |  |  |
| 17 |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| X | -2 | -1.5 | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
| y | -23 | -8.625 | 1 | 9 | 7 | 1 | -3 | 1 | 19 |

 |  |  |
| 18 iIiiii | Y = nX + $\frac{m}{X}$ Y = nX + $\frac{m}{X}$ 135 = 2n + $\frac{m}{2}$140 = 3n + $\frac{m}{3}$4m + n = 2709m + n = 4205m = 150M = 30n = 270-120 =150y= 30x + $\frac{150}{x}$y = 30x10 + $\frac{150}{10}$ = 315 30x + $\frac{150}{x}$ = 18030 x2 +150 =180x30 x2 – 180x +150 = 0(x-5)(x-1)= 0X=5 or x=1 | M1M1A1B1B1 M1A1M1M1A1 10 | For both equationsElimination of one unknown |
| 19ab ( i)iiiii |  a a+3d a+ 12da+ 2d + a+ 10d =302a + 12a =30$ \frac{a+3d}{a}$ = $ \frac{a+12d}{a+3d}$ (a+3d )2 = a2 + 12ad9d2 -6ad + 9d2 = a2 +12ad9d2 – 6ad =0 9d2- 90d(15-6d) = 0 9d2 -90d +36d2 = 045 d2 + 90d = 09d (5d - 10)= 0d = 0 or d= 2a = 15-6d = 15-12 = 3 r = $\frac{a+ 3d}{a}$ = $\frac{3+6}{3}$ = 3 S10 = 3(310 -1) / 2 = 888572 | B1M1M1M1A1A1M1A1M1A110 |  |
| 20ab | Dist AB = $\frac{α}{360 }$ x 2$π$ R Cos$θ$ 3000 = $\frac{α}{360 }$ x 2$π$ R Cos$30$ Α = 31.150 60α cos $θ$ = 5x600 α = 50/cos60 = 1000 K = 100 – 45 = 550 Long diff = 450 + 550 =900 Time diff = 100 x4 / 60  = 6hrs 40minsTime at Q = 10.45am + 6hrs 40 mins 17 25 HRSTime when the plane reached 17 25hrs + 5 hrs 22 25 HRS   | M1 A1 |  |
| 21 iiiiiiiv | P(wakes up early) = p(BE’ or B’ E’) = $\frac{2}{3 }$ x $\frac{2}{5}$ + $\frac{1}{3 }$ x $\frac{6}{7}$  = $\frac{11}{14}$P(wakes up early but late for class)= P(BEC’ or B’ EC’) = $\frac{2}{3 }$ x $\frac{2}{5}$ x $\frac{5 }{7}$ + $ \frac{1}{3 }$ x $\frac{1}{7}$ x $\frac{5}{7}$ = $\frac{26}{147}$P(bed late but early for class)= P(B’EC or B’ E’C)  = $\frac{1}{3 }$ x $\frac{1}{7}$ x $\frac{2 }{7}$ + $ \frac{1}{3 }$ x $\frac{6}{7}$ x $\frac{1}{4}$  = 25/294 P(late) = P(BEC ‘or B E’C’ or B’EC’ or B’E’C’) = $\frac{2}{3 }$ x $\frac{3}{5}$ x $\frac{5 }{7}$ + $ \frac{1}{3 }$ x $\frac{1}{7}$ x $\frac{5}{7}$ + $\frac{2}{3 }$ x $\frac{2}{5}$ x $\frac{3 }{4}$ + $ \frac{1}{3 }$ x $\frac{6}{7}$ x $\frac{3}{4}$  =$\frac{1289}{1470}$  | M1A1M1A1M1A1M1A110 |  |
| 22 | 1. 1 k 3 = 5

0 1 1 13 + k = 5 K = 21 21. 1
2. a b 1 -2 = 2 -3

c d 3 3 4 -1 a + 3b = 2 -2a + 3b = -3 3a = 5 a = 5/3 3b = 2 – 5/3 3b = 1/3 b= 1/9 c + 3d = 4 -2c + 3d = -1 3c = 5 c = 5/3 d = (4 – 5/3)/ 3 d= 7/9 5/3 1/9 5/3 7/91. 2 1 3 0 3

0 2 1 3 -27 3 3 = 152 6 -2 -6(15,-6) | M1A1B1M1M1M1A1M1A1B1 |  |
| 23 | 1. 52x + 32y ≥ 500

13x + 8y ≥ 125………………………………………1200x + 300y ≥ 35002x + 3y ≥ 35…………………………………………..2x + y ≤ 15 ………………………………………………3x ≥ 0 , y ≥ 0  |  |  |
| 24 | a. $\int\_{2}^{3}(t2 – 2t + 4) dt$  [t3/3 – t2 + 4t] 3 2 (27/3 – 9+12) – (8/3 -4 +8) 12 – 4 - 8/3 8 – 8/3 (24-8)/3 16/3 or 5 1/3 b. t2 – 4t + 4 = 0 t = 4 ± √(16-4(4) 2 4 ± 0 = 2 2 c.a = dv/dt= 2t – t (at t = 2)a= 2(2) – 2 a= 2 m/s2 | M 1M1M1A1M1M1 A1M1M1A1 |  |