**121/1**

**MATHS**

**PAPER 1**

**MARKING SCHEME TRAIL 2 2019**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
| 1 | Num = $\frac{-67}{35}$ LCM = 1085Den = 31$-\frac{67}{35} ÷31+\frac{3}{35}= \frac{93-67}{1085}$ = $\frac{93-67}{1085}=\frac{26}{1085}$ | M1A1 |  |
|  |  | 02 |  |
| 2 | ($\frac{1}{34.52}+ \sqrt[3]{0.787}+ \left(0.934\right)^{3}$$\frac{1}{3.452 x 10}+ \sqrt[3]{\frac{787}{1000}}$ + $\left(\frac{9.34}{10}\right)^{2}$0.2901 x 0.1 + 9.233 x 0.1 + 814.8 x 0.0010.02901 + 0.9233 + 0.8148= 1.76711 | M1M1A1 |   |
|  |  | 03 |  |
| 3 | 23(2y – 1 ) x 25y = 24(y + 1)2(6y – 3 + 5y) = 24y + 4 ∴ 11y -3 = 4y + 4 7y = 7 y = 1 |  |  |
| 4 | $\frac{97.5}{100}$ x 120,000 = 117,000$\frac{5}{100}$ x 117000 = 58509000 + 5850= Sh.14,850 | M1M1A1 |  |
|  |  | 03 |  |
| 5 | **x = y +** $\sqrt{x^{2}+ a^{2}}$x – y = $\sqrt{x^{2}+ a^{2}}$(x – y)2 x2 + a2(x – y)2 x2 = a2+ $\sqrt{\left(x-y+x\right)(x-y-x)}$ = a+ $\sqrt{\left(2x-y\right)\left(-y\right)}$ = a+ $\sqrt{(y^{2}- 2xy)}$ = a |  |  |
| 6 | Interior angle be xInterior angle = 120o + x120o + x + x = 180o120o + 2x = 180o2x = 60ox = 30on = $\frac{360^{0}}{30^{0}}$n = 12 sides | M1A1B1 |  |
|  |  | 03 |  |
| 7 | C:\Users\Main\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Word\001.jpgOK = $\frac{3}{5}OA+\frac{2}{5}OB$= $\frac{3}{5} \left(\genfrac{}{}{0pt}{}{-8}{4}\right)+\frac{2}{5} \left(\genfrac{}{}{0pt}{}{-2}{-12}\right)$= $\left(\genfrac{}{}{0pt}{}{\frac{-28}{5}}{\frac{-12}{5}}\right)$Co-ord = (-5.5, -2.4)C:\Users\Main\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Word\001.jpgOK = $-\frac{1}{4}OA+\frac{5}{4}OB$= $-\frac{1}{4} \left(\genfrac{}{}{0pt}{}{-8}{4}\right)+\frac{5}{4} \left(\genfrac{}{}{0pt}{}{-2}{-12}\right)$= $\left(\genfrac{}{}{0pt}{}{0.5}{-16}\right)$Co-ord = (0.5, -16) | M1A1M1A1 |  |
|  |  | 04 |  |
| 8 | GCD = 3LCM = 1008 = 24X32X7 48= 24X3 72= 23X32X = 3X7 = 21 |  |  |
|  |  | 03 |  |
| 9 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| + | 1 | 2 | 3 | 4 | 5 | 6 |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |

P(7 and above) = $\frac{21}{36}$= $\frac{7}{12}$ | M1M1A1 |  |
|  |  | 03 |  |
| 10 | x = $\frac{1+5y}{2}$4 $\left(\frac{1+5y}{2}\right)^{2}$ + 25y2 = 41y = $\frac{4}{5}$ or -1$∴x=2\frac{1}{2} or -2$ $\left(2\frac{1}{2},\frac{4}{5}\right) and (-2, -1)$  | M1M1A1 | Express x interms of yForm quadratic function and solve |
|  |  | 03 |  |
| 11 |  |  |  |
| 11 | x + x + 10o + 120o + 130o = 360 o2x + 260 o = 360 o2x = 100 ox = 50oTotal no of animals = y$\frac{120}{360} ×y=30$ $\frac{360}{120} ×30$ = y = 90$Camels$ = $\frac{60}{360} ×90= $15 camels | B1M1A1B1 |  |
|  |  | 04 |  |
| 12 | x + x + 10o + 120o + 130o = 360 o2x + 260 o = 360 o2x = 100 ox = 50oTotal no of animals = y$\frac{120}{360} ×y=30$ $\frac{360}{120} ×30$ = y = 90$Camels$ = $\frac{60}{360} ×90= $15 camels | B1M1A1B1 |  |
|  |  | 02 |  |
| 13 | 3x – (-4x + 5) = 03x + 4x – 5 = 07x = 5 x = $\frac{5}{7}$ | M1A1 |  |
|  |  | 03 |  |
| 14 | Max value of $\frac{x+y}{z}= \frac{10+7}{4}$ = 4.25Min value of $\frac{x+y}{z}= \frac{3+5}{6}$ = 2.1667Actual value of $\frac{x+y}{z}= \frac{9+6}{5}$ = 3Absolute error = $\frac{4.25-2.1667}{2}$ = 1.0417Percentage error = $\frac{1.0417}{3} ×100$ = 34.72% | M1M1M1A1 | ✓ max and min values✓ actual values✓ absolute error✓ answ |
|  |  | 03 |  |
| 15 |  |  |  |
|  |  |  |  |
| 16 | 2x – 1 < x + 3x < 4x + 3 < 12(x + 4)x + 3 < 12x + 48$\frac{-11x}{-11} < \frac{45}{-11}$ x > - 4 $\frac{1}{11}$Range of values - 4 $\frac{1}{11} < x < 4$ | M1M1A1 |  |
|  |  | 03 |  |
| 17 | Let the number of sh.100 tickets be xLet the number of sh. 50 tickets be yTotal amount collected = 100x + 50y = 100,000If 30% more of y were sold, the amount = $\frac{130}{100}$ x 50yIf 40% less of x were sold, the amount = $\frac{60}{100}$ x 100x(65y + 60x = 112500) x 10……….(i)(50y + 100x = 100,000) x 13……..(ii)650y + 600x = 1125000…………(iii)650y + 1300x = 1300000………..(iv)Subtract eqn (iv) from eqn (ii)700x = 175000 x = 250$∴$ 50y + 100 x 250 = 100,00050y $÷$ 25000 = 100,00050y = 100000 – 250050y = 75000 y = 1500Number of tickets costing sh.50= 1500Number of tickets costing sh.100 = 250 | M1M1M1M1A1M1M1A1B1B1 | For both expansions |
|  |  | 10 |  |

|  |  |  |  |
| --- | --- | --- | --- |
| 18 | C:\Users\Main\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Word\006.jpgc) WM = 6.4 cm ($\pm $0.1)Area of ΔXZW½ b x h = ½ x 96 x 6.4 = 30.72 cm2 | B1B1B1B1B1B1B1B1M1A1 | For 120o construction Complete construction of ΔXYZLength Angle YXZPerp bisec of XZ to MCorrect location of WComplete ΔXZWLength WM½ x 6.4 x 9.6For 30.72 cm2 |
|  |  | 10 |  |
| 19 | a)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| x | f | d = X - A | fd | d2 | d2f |
| 2.22.73.23.74.24.75.2 | 51524401042 | -1.5-1.0-0.500.51.01.5 | -7.5-15-120543 | 2.2510.2500.2512.25 | 11.2515602.544.5 |
|  | $\sum\_{}^{}f=100$  |  | $\sum\_{}^{}fd=-22.5$  |  | $\sum\_{}^{}d^{2}f=45.25$  |

b) i) Mean = 3.7 + $\frac{-22.5}{100}$ = 3.475= 3.48ii) Standard deviation $\frac{45.25}{100}- \left(\frac{-22.5}{100}\right)^{2}$ = 0.3819$s.d= \sqrt{0.3819}$ = 0.617980$=0.62$  | M1M1M1M1M1M1M1A1M1A1 | d = X – Afdd2d2f$\sum\_{}^{}fd$ $\sum\_{}^{}d^{2}f$  |
|  |  | 10 |  |

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | 10 |  |
| 20 | a) Area of the carpet (x + 4) (x – 1)C:\Users\Main\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Word\008.jpg(x + 4) (x – 1) = 36x2 – x + 4x – 4 = 36x2 + 3x – 40 = 0x2 + 8x – 5x – 40 = 0x(x + 8) – 5(x + 8) = 0(x + 8) (x – 5) = 0x = 5 or x = 8 x = 5mArea of uncarpeted floor2x2 – {(x + 4) (x – 1)2 x 25 – (9 x 4)50 – 36 = 14m2b) No. of tiles = $\frac{14 ×100 ×100}{20 ×20}$ = 350 tilesCost: (350 x 100) + (36 x 300)= sh.45,800 | M1M1M1A1M1A1M1A1M1A1 |  |
|  |  | 10 |  |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 21 | a)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| x | -3 | -2 | -1 | 0 | 1 | 2 |
| 2x2 | 18 | 8 | 2 | 0 | 2 | 8 |
| +3x | -9 | -6 | -3 | 0 | 3 | 6 |
| -6 | -6 | -6 | -6 | -6 | -6 | -6 |
| y | 3 | -4 | -7 | -6 | -1 | 8 |

C:\Users\Main\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Word\001.jpgb) i) x = 2.6 and 2.1 ii) y = 2x2 + 3x – 60 = 2x + 3x – 36y = -3 x = 0.7 and -2.2c) y = 2x2 + 3x – 6 0 = 2x + x – 7 y = 2x + 1x -3 0y -5 1 x = 1.6 and x = -2.1 | B2S1P1C1L1B1B1B1B1 |  |
|  |  | 10 |  |

|  |  |  |
| --- | --- | --- |
| 22 | a)C:\Users\Main\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Word\Mush 001.jpgb) 1cm represents 20mDrawing lengths $\frac{250}{20}=12.5cm,\frac{40}{20}=2cm,\frac{80}{20}=4cm,\frac{60}{20}=3cm$ $\frac{70}{20}=3.5cm,\frac{50}{20}=2.5cm$ DFC:\Users\Main\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Word\Mush 001.jpgArea in m2A1 = ½ x 40 x 50 = 1000m2A2 = ½ x (50 + 60)60 = 3900 m2A3 = ½ x (80 + 70)100 = 7500 m2A4 = ½ x 70 x 50 = 1750 m2A5 = ½ x 120 x 60 = 3600 m2A6 = ½ x (60 + 40)70 = 3500 m2A7 = ½ x 60 x 40 = 1200 m2Total area = (1000 + 3900 + 7500 + 1750 + 1750 + 3600 + 3500 + 1200) m2 = 22450 m21 ha = 10000 m2 22450 10000 2.245 ha | B1B1B1B2GM1M1M1M1A1 |
|  |  | 10 |
| 23 | 1. Acute ∠ROS = 2∠RTS

(∠ at centre)2 x 35 = 70o1. ∠RQS = ∠RTS

∠s in the same segment = 35o1. ∠PQS = 90o (∠ made by a tangent and radius)

∠PQR = ∠PQS + ∠RQS= 90o + 35o= 125o 1. ∠QOT = ∠ROS = 35o

(vertically opposite angles)In ΔPOQ, ∠QPT = 180o – (90 – 70)o = 20o (Sum of ∠s in a Δ)1. In ΔPQR, ∠PRQ = 180o – (125 + 20)o

 = 35o (∠ sum of Δ)∠PQT = ∠PRQ (∠s in alternate segment) = 35o | B1BB1B1B1B1B1B1B1B1 |
|  |  | 10 |
| 24 | 1. Distance travelled

= Area of trapezium OAPC= ½ x (AB + OC)V920 = ½ (35 + 80)V1840 = 115V V = $\frac{1840}{115}=16$1. Acceleration during first 15 sec

= gradient of OA= $\frac{16}{15}$= 1 $\frac{1}{15}$ m/s21. Distance travelled during the last 40 seconds

C:\Users\Main\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Word\003.jpgArea under DBC= ½ x (DB + EC) 16= ½ (10 + 40)16= 400m | M1M1M1A1M1M1A1B1M1M1A1 |