121/1

MATHEMATICS **LANJET CLUSTER JOINT EVALUATION – 2024**

PAPER 1 Kenya Certificate to Secondary Education

MAR/APR 2024 **MATHEMATICS PAPER 1- ALT A**

TIME: 2 ½ HOURS **TIME: 2 ½ HOURS**

**MARKING SCHEME**

|  |  |  |  |
| --- | --- | --- | --- |
| 1. | $$\frac{\frac{5}{6} of \left(\frac{13}{3}-\frac{23}{6}\right)}{\frac{5}{12} x \frac{3}{25}+ \frac{14}{9} x \frac{3}{7}}$$= $\frac{\frac{5}{ 6} x \frac{3}{6 }}{\frac{1}{20}+ \frac{2}{3}} $ = $\frac{ \frac{5}{12} }{\frac{43}{60}}$ = $\frac{5}{12}$ x $\frac{60}{43}$ = $\frac{25}{43} $ | M1M1A1 | For $\frac{5}{12}$For $\frac{43}{60}$for answer |
|  |  | 03 |  |
| 2. | $\sqrt{\frac{504 x 143 x 910 x 10}{28 x 117 x 286 x 7}}$12118= $\sqrt{\frac{18 x 910 x 10}{117 x 2 x 7}}$ 130911= $\sqrt{\frac{9 x 13 x 100}{117}}$ = $\sqrt{100}$ = 10 | M1M1A1 | Simplify up to perfect square $\sqrt{100}$ |
|  |  | 03 |  |
| 3. | $\left(\frac{3^{3}}{2^{3}}\right)^{x+7}$= $\left(\frac{2^{2}}{3^{2}}\right)^{-3x}$$\left(\frac{3}{2}\right)^{3(x+7)}$ = $\left(\frac{3}{2}\right)^{6x}$3(x + 7) = 6x3x + 21 = 6xx = 7 | M1M1A1 |  |
|  |  | 03 |  |
| 4. | 30 = 2 x 3 x 550 = 2 x 5235 = 5 x 7L.C.M = 2 x 3x 52 x 7= 1050 mins17 hrs 30 minsTime = 7.18 +17.30 2448 ⇒ 12.48 a.m. Tuesday  | B1M1A1 | For addition(Accept 0048h Tuesday)  |
|  |  | 03 |  |

|  |  |  |  |
| --- | --- | --- | --- |
| 5. | x + y = 10(10y + x ) – (10x + y) = 549y - 9x = 54 y – x = 6 x + y = 10-x + y = 6 2y = 16 y = 8 x = 2 Number is 28 | M1M1A1 |  |
|  |  | 03 |  |
| 6. | ADBC6cmxx2xx2x(2x)2 + x2 = 625x2 = 36x = 2.683 Area = $\frac{1}{2}$(x + 2x)(2x)= $\frac{1}{2}$(3 x 2.683) (2 x 2.683)= 21.595467≈ 21.60 units | M1A1M1A1 | ✓ Expression for height✓ Expression for areaAccept |
|  |  | 04 |  |
| 7. | Inter. ∠ = xExter. ∠ = yx + y = 1800x – y = 10802x = 288 x = 1440∴ext. ∠360No. of sides = $\frac{360}{36}$ = 10 sides | B1M1A1 | For the inter. ∠and ext. ∠ |
|  |  | 03 |  |
| 8. | Let the commission be x%$\frac{x}{100}$ (500000 – 100000) = 4000x4000x + 10000 = 56000 x = 12.5% | M1M1A1 | ✓Expression of interest |
|  |  | 03 |  |
| 9. | Vol. cylinder ⇒ $π\left(14^{2}\right)h$Vol. cone ⇒ $\frac{1}{3}π\left(7^{2}\right) x 18$$π\left(14^{2}\right)h$ = $\frac{1}{3}π\left(7^{2}\right) x 18$ h = $\frac{1}{3}$ x $7^{2}$ x 18 x $\frac{1}{14^{2}}$ h = 1.5cm | M1M1A1 | For ✓ vol. expression for the cylinder & coneFor equating to determine change in height |
|  |  | 03 |  |
| 10. | $\frac{2x-4}{12- 3x^{2}}$ - $\frac{1}{3x+6}$$\frac{2(x-2)}{3\left(2-x\right)(2+x) }$ - $\frac{1}{3\left(x+2\right)}$- $\frac{2}{3(2+x)}$ - $\frac{1}{3(x+2)}$= - $\frac{1}{x+2}$ | M1M1A1 | For ✓ factorization |
|  |  | 03 |  |
| 11. |  Present 4 yrs agoDaugther ⇒ x x – 4Mother ⇒ 2.5x 2.5x – 4 $\frac{x-4}{2.5x-4}$ = $\frac{1}{3}$3x – 12 = 2.5x – 4 0.5x = 8 x = 16Mother = 2.5 x 16 = 40 years | M1A1B1 |  |
|  |  | 3 |  |
| 12. | 5y + 2x – 7 = 0y = -$\frac{2}{5}$x + $\frac{7}{5}$Gr. Line = -$\frac{2}{5}$$\frac{k-5}{3- -2}$ = $\frac{-2}{5}$k – 5 = -2k = 3 | B1B1A1 |  |
|  |  | 03 |  |
| 13. | 20000 x 147.86= 2,957,200$\frac{2957200-2512000}{74.50}$ = 5975.84 | M1M1A1 |  |
|  |  | 03 |  |
| 14. | C:\Users\Nzambia\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Word\maths.jpg(a)  (c) Height = 3.7cm |  | B1 ✓ Lines & angles drawn (allow ± 0.1cm)B1 ✓ LabellingB1 (Allow ± 0.1 cm) |
|  |  |  | 3 |
| 15. | No. | Log |  | M1M1M1A1 | ✓ 3 LogsFor addition and subtractionFor ✓ ÷ 3 |
|  | 849.62.41 | 2.92920.3820+ |
| 3941 | 3.31123.5956- |
|  | 1.7156 ÷ 3 |
| 8.039 x 10-1 | 1.9052= 0.8039 |
|  |  | 04 |  |
| 16. | $\frac{1}{0.3654}$ - 4.1512$\frac{1}{0.3654}$ ⇒ 2.7374.1512 ⇒ 17.231 2.737 – 17.231 = -14.494 | B1M1A1 | For both |
|  |  | 03 |  |
| 17. | (a) Original members = xOriginal each = $\frac{180000}{x}$Later each = $\frac{180,000}{x-3}$$\frac{180,000}{x-3}$ - $\frac{18000}{x}$ = 3000 $\frac{60}{x-3 }$ - $\frac{60}{x}$ = 160x – 60x + 180 = x2 – 3x x2 – 3x – 180 = 0(x – 15) (x + 12) = 0x = 15(b) $\frac{180,000}{15}$  = 12000(c) Increase = 3000 $\frac{3000}{12000}$ x 100 = 25% | B1B1M1M1M1A1M1A1M1A1 | ✓ Factorization |
|  |  | 10 |  |
| 18. | (a) r : R = 1:3(b) $\frac{7}{R}$ = $\frac{1}{3}$  R = 21cm(c) 2171530Vol. Big cone = $\frac{1}{3}$ x $\frac{22}{7}$ x $21^{2}$ x 45 = 20790cm3Vol. Small cone = $\frac{1}{3}$ x $\frac{22}{7}$ x $7^{2}$x 15 = 770cm3Vol. of frustrum = 20790 – 770 = 20020cm3(d) Vol. tank = 150 x 120 x 180 Buckets = $\frac{150 x 120 x 80}{20020}$ = 71.93 ≅ 72 full buckets | B1M1A1M1M1M1M1A1B1 | Alternative method:L.S.F = 1:3V.S.F = 1:27V.S.F frustum = 26∴ Vol. = 26 x 770 = 20020For subtraction |
|  |  | 10 |  |
| 19. | (a) (i)m/sSecs04202480Distance = $\frac{1}{2}$ (16 + 24) x 80 = 1600m (ii) -$\frac{80}{4}$= - 20m/s2(b) NRBELD7.128.22243km8.22105km90km/h72km/h Relative distance = 348 – $\left(90x\frac{7}{6}\right)$  = 243km Relative speed = 162km/hr Time taken = $\frac{243}{162}$hrs = 1.5 hrs Time = 8.22 + 1hr 30 mins = 9.52 a.m.(c) 90 x 2$\frac{2}{3}$km = 240km | M1A1M1A1B1M1M1A1M1A1 | Accept deccel. = $\frac{80}{4}$ = 20m/s2For both R.D & R.SOR 348 – (1.5 x 72)= 240km |
|  |  | 10 |  |
| 20. | (a) (i) Modal class = 30 – 39

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Marks | x | f | fx | cf |
| 20-29 | 24.5 | 3 | 73.5 | 3 |
| 30-39 | 34.5 | 18 | 621 | 21 |
| 40-49 | 44.5 | 13 | 578.5 | 34 |
| 50-59 | 54.5 | 14 | 763 | 48 |
| 60-69 | 64.5 | 17 | 1096.5 | 65 |
| 70-79 | 74.5 | 12 | 894 | 77 |
| 80-89 | 84.5 | 5 | 422.5 | 82 |
|  |  |  | 4449 |  |

Mean = $\frac{4449}{82}$= 54.2561≅ 54.26(ii) Median = 49.5 + $\frac{41-34}{14}$ x 10 = 54.5 Diff = 54.5 – 54.26  = 0.24 | B1B1B1M1A1B1M1A1 | = For ✓x columnFor ✓ fx columnCorrect to 2 d.pFor cumulative freq. |
|  |  | 10 |  |
| 21. | (a) A : B : C25=: 30/= : 45/=5 : 2 : 1100% = $\frac{\left(5 x 25\right)+ \left(30 x 2\right)+ (45 x 1)}{5+2+1}$= 28.75/=20% profit = $\frac{20}{100}$ x 28.75= 5.75/=(b) A = 27.5/=B = 33/=C = 49.5/=∴ 100% = $\frac{\left(27.5 x 5\right)+ \left(33 x 2\right)+ (49.5 x 1)}{5+2+1}$ = 31.625 % Profit = 1.15 x 31.625 = 36.36875 ≅ 36.50(c) 45 – 36.50 = 8.50% Profit = $\frac{8.5}{36.5}$ x 100 = 23.29% | M1A1M1A1M1M1A1M1M1A1 | ✓ Expression for profit |
|  |  | 10 |  |
| 22. | (a) 5.92 = 7.82 + 6.62 – 2(7.8) (6.6) Cos PCos P = $\frac{69.59}{102.96}$P = 47.480(b) $\frac{5.9}{Sin47.48^{0}}$ = 2RR = $\frac{5.9}{2Sin47.48^{0} }$   = 4.002cm(c) Area of Δ = $\frac{1}{2}$ x 7.8 x 6.6 Sin $47.48^{0}$ = 18.97$cm^{2}$Area of circle = 3.142 x 4.0022 = 50.32 Shaded area = 50.32 -18.97 31.35cm2 | M1M1A1M1M1A1M1M1M1M1A | For making Cos P subject✓ Expression for area of triangle \* Follow through for other$ π$ values✓ Expression for area of circleFor subtraction |

|  |  |  |  |
| --- | --- | --- | --- |
| 23. | C:\Users\Nzambia\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Word\maths 2.jpg(a) (b) Construction of any 2 ⊥ side bisectors✓Location of TDistance RT = 5.2km(c) Drop ⊥ from T to PQDistance = 1.5km(d) S = $\frac{10+8+4}{2}$= 11kmA = $\sqrt{11\left(11-10\right) (11-8)(11-4)}$ = 15.19868km2≅ 15.20km2 | B1B1B1B1B1B1B1M1A1 | For ✓ measurement with the given scale (1cm = 1km)For ✓ triangle labelled.Allow ± 0.1kmAllow ±0.1km\* Allow any other alternative method by  calculate only. |
|  |  | 10 |  |
| 24. | (a) (i) ✓PQR drawn✓PIQI RI drawn(ii) Reflection on the line y – axis (or x = 0)(b) (i) PII(-3,-2) QII(-2,-1) RII(-1,-4) ✓ ΔPIIQIIRII drawn(ii) Negative quarter turn about (0,0) OR (2700) turn about (0,0) OR – 900 turn about (0,0)(c) PIII(3,-2) QIII(2,-1) RIII(1,-4) ✓ΔPIIIQIIIRIII drawn(d) PQR and PIQIRI  PQR and PIIQIIRII  PIQIRI and and PIIIQIIIRIII  PIIQIIRII and PIIIQIIIRIII  | B1B1B1B1B1B1B1B1B2 | Coordinates can be implied on the diagramCoordinates can be implied on the diagram- for 4 pairs - Allow B1 for at least 2 pairs |
|  |  | 10 |  |

