MATHEMATHEMATICS FORM 3

MARKING SCHEME PAPER 2

|  |  |  |  |
| --- | --- | --- | --- |
| No. |  |  |  |
| 1. | a = 2  r = 5  L = 1250  Sn = a  Tn = a  1250 = 2 x  125 x 10 = 2 x  x =  =  ⇒ 4 = n – 1  5 = n  S5 = 2  = 2  = 2 x  = 1562 | M1  A1 |  |
| 2 | P decrease by 50% | M1  M1  A1 |  |
| 3. | QU x RU = SU x TU  SU =  =  = 16.5cm | M1  M1  A1 |  |
| 4. | Det = 6 + 25 = 31  M-1 =  = =  = | B1  M1  M1  A1 |  |
| 5. | (3X –Y)(X-Y)  9X2 – Y2 = (3X –Y)(3X+Y) | M1  M1  A1 |  |
| 6. | h = = 5cm  Arc length = x 2 x 3.142 x5  = 10.5cm |  |  |
| 7. | =  =  =  = 6 - 2 | M1  M1  A1 |  |
| 8. | Mean – of six  ,  32, x  Median 36 =  72 = 32 + x  72 - 32 = x  40 = x  Mean mark  = 24 + 28 + 32 + 40 + 48 + 50  6  x = 37 | M1  M1  A1 |  |
|  |  | 3 Marks |  |
| 9. | Absolute error  =  =  =  2.25  % error = x 100  = x 100  = 0.45% | M1 |  |
| 10. | =  Sin C =  Sin C = 0.8654  C = 59.93  = 59.9 A1 | M1 |  |
| 11. |  | M1  M1  A1 |  |
| 12. | 2x – 3y = -6  -3y = -2x – 6  y = x + 2  Gradient =  Tan x = = 0.6667  x = 33.70  θ = 180 – 33.70  = 146.30 | B1  B1  B1 |  |
| 13. | = r  q = r2 (1 – as2)  q = r2 – r2as2  r2as2 = r2 – q  =  S = ± | M1  M1  A1 |  |
| 14. | C:\Documents and Settings\samuel\Local Settings\Temporary Internet Files\Content.Word\5.jpg14 | B1  B1  B1 |  |
|  | C:\Documents and Settings\samuel\Local Settings\Temporary Internet Files\Content.Word\8.jpg |  |  |
| 16. | Ext.angle =  ∠BTC = 180 – (72 + 72)  = 360 | M1  A1 |  |
| **SECTION 2** | | | |
| 17. | (a) Modal : 16 – 200  (b)   |  |  |  |  |  | | --- | --- | --- | --- | --- | | Mass (kg) | f | Mid pts  (x) | Fx | Cf | | 1-5 | 2 | 3 | 6 | 2 | | 6-10 | 3 | 8 | 24 | 5 | | 11-15 | 6 | 13 | 78 | 11 | | 16-20 | 8 | 18 | 144 | 19 | | 21-25 | 3 | 23 | 69 | 22 | | 26-30 | 2 | 28 | 56 | 24 | | 31-35 | 1 | 33 | 33 | 25 | |  | Σf=25 |  | Σfx= 410 |  |   Mean = = 16.4   1. Cf2,5,11,19,22,24,25   13th – Class 16 – 20  Median = 15.5 + x 5  = 16.75 | B1  M1✓  M1✓  A1  M1  A1  B1  B1  M1  A1 | Mid points  fx  Σfx  May be implied  Median class |
|  |  | 10 |  |
| 18.  60  θ  A  B  153.2  Tower  h 21.02    Tan θ =  θ = Tan-1 0.1372  = = 7.8120 or (70,49’)  60  60  A  B  200  h Tower  h (tower) = 200 tan60  = 200 x 0.1051  = 21.02 | (a)  B  A  C  D  200  200  500  3100  650  650  Bearing 1800 + 650 = 2450  =  BC =  = 169.0m  (b) = Sin500  BD = 200 x 0.766  = 153.2 | B1  B1  M1  A1  M1  A1  M1  A1  M1  A1 | Sketch |
|  |  | 10 |  |
| 19. | (a) Distance covered by car = 500km  Time = hrs  = 5 hours  Arrival time ⇒ 9.30 + 5 hours  = 2.30 p.m  (b) Lorry took ⇒ 6 hrs 15 mins  Lorry’s speed = km/hr  40 km/hr  Relative speed ⇒ 100 – 40  = 60 km/hr  (c) Lorry’s Distance  ⇒ (12.5 – 8.15) x 40km/hr  = 160km  Car’s distance  = (12.5 – 9.30) x 100km/h  = 275km  Distance btn = 160 – 25  = 135km | M1  A1  M1  A1  M1  A1  B1  B1  M1  A1 | Accept 1430h |
| 20. | . a) T6 = p + 5c  T5 = p + 4d B1  p + 4d = p + 5c M1  4d = 5c  d = 5/4c A1  b) p + 3d - (p + 3c) = 11/2 M1  3d - 3c = 11/2  15/4c - 3c = 11/2  3/4c = 3/2 = c = 2 A1  d = 21/2 B1 accept 5/2  c) S5 = 6/2 (24 + 5 x 2) M1  S5 = 1/2n(2p + 10) = 2.5(2p + 10)  = 5p + 25  (6p + 30) - (5p + 25) = 10 M1  p + 5 = 10  p = 5 A1 |  |  |
|  |  |  |  |
| 21.  C:\Users\karumandi\Pictures\2017-07-08\002.jpg |  |  |  |
| 22. | (a) = 38000 + 14000 + 8500 + 3300  = 62800    K£ 37680 p.a.  (b) 1st K£ 600 🡪 6000 x 2 = 12000  Next £6000 🡪 6000 x 3 = 18000  Next £6000 🡪 6000 x4 = 24000  Next £6000 🡪 6000 x 5 = 30000  Next £6000 🡪 6000 x 6 = 36000  Next £6000 🡪 6000 x 7 = 42000  Rem. £ 1680 🡪 1680 x 8 = 13440  Tax due p.a. = Sh. 175440  Less relief Sh. 18000  Tax paid = Sh. 157440  (c) (i) Tax paid per month =  = 13,120  Total deductions  = 13120 + 320 + 1000 + 2000 + 500  = 23940  (ii) Net salary = 62800  - 23900  38,900 | M1  A1  M1  M1  M1  A1  M1  A1 | ✓ Taxable income in Sh/m  (can be implied in accuracy mark)  ✓ Values in just 4 slabs  ✓ Subtracting relief  ✓ Addition  ✓ Ans |
| 23. | Let the No. of goats be x  Let the No. of bulls be y  + =  2x + 15y = 190………(i)  2(2000x) + (y – 3)15000 = 190,000-5000  4000x + 15000y – 45600 = 185,000  + =  4x + 15y = 230 ………………………….(ii)  4x + 15y = 230 (Elimination substitution  2x + 15y = 190  2x = 40  x = 20  2x + 15y = 190 but x = 20  2(20) + 15y = 190  15y = 190 – 40  15y = 150  15 15  y = 10  ∴x = 20 goats and y = 10 bulls  (b) Profit per goat x 2000 = 500  Profit per bull x 15000 = 4,500  Goat 20 x 500 = 10,000  Bulls 10 x 4500 = 45,000  Total profit = 10,000 + 45,000  = 55,000/= | M1  M1  A1  M1  M1  M1  M1  M1  A1 |  |
| 24. | (a) y = 2x2 – 3x – 5   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | x | -2 | -1 | 0 | 1 | 2 | 3 | | 2x2 | 8 | 2 | 0 | 2 | 8 | 18 | | -3x | 6 | 3 | 0 | -3 | -6 | -9 | | -5 | -5 | -5 | -5 | -5 | -5 | -5 | | y | 9 | 0 | -5 | -6 | -3 | 4 |   (b) (i) Roots = -1 and 2.5  (ii) 2x2 – x – 3 = 0  2x2 – 3x – 5 = y  -2x – 2 = y  Line = y = -2x – 2  Roots x = -1 and 1.5 ± 0.1 | B2  S1  P1  C1  B1  M1  A1  B1  B1 | Table  Scale  Plotting  Smooth curve  Line drawn  For both |
|  | 31  X  Y |  |  |
|  |  |  |  |

