**MARKING SCHEME –FORM 3**

**PAPER 2 (121/2)**

|  |  |  |  |
| --- | --- | --- | --- |
| **NO** | **CALCULATIONS** | **MARKS** | **REMARKS** |
| 1 | 4 ÷ 80 x -20  3  -2 x 5 + 2 x 3  1/20 x -20/3  -10 + 6  -1/3 = 1/3 x ¼  -4  = 1/12 | M1  M1  M1  A1 | √ numerator  √ denominator |
|  |  | 4 |  |
| 2 | Let the other number be *x*  140 = 20 x *x*  7  x = 140 x 7  20  = 49 | M1  A1 |  |
|  |  | 2 |  |
| 3 | 3(z2 – 22)  3 – 1 – z  3(z + 2) (z – 2)  2 – z  -3 (z + 2) (2 – z)  (2 – z)  = -3 (z + 2) | M1  M1  A1 | √ numerator factor |
|  |  | 3 |  |
| 4 | Short distance  Am = 4.2cm ± 0.1  AC = 5.6 cm ± 0.1 | B1  B1  B1  B1 | Constructing 45o  ΔABC  Dropped from A to BC |
|  |  | 4 |  |
| 5 | y = 5/3 – 2/3x  gradient (m1) = -2/3  gradient m2 = 3/2  1- m = 3  2- 4 2  2 – 2m = -6  2m = 8  m = 4  y - 1 = 3  x – 2 2  2y – 2 = 3x – 6  2y = 3x – 4  y = 3/2x - 2 | M1  A1  M1  A1 |  |
|  |  | 4 |  |
| 6 | 1 x 0.1 + 4.3462  0.04072 + 18.888  18.928  = 4.3509 | B1  B1  B1 | √ reciprocal  √ square  √ square root |
| 7 | A = ½ x 14 x 22 sin 75o – 75 x 22 x 142  360 7  A = 7 x 22 sin 75o – 55 x 7  3  = 20.42cm2 | M1  M1  A1 | M1  Difference |
|  |  | 4 |  |
| 8 | Yen = 1000 x 105 x 105 + 1260  100  = 111510 Yen  Kshs. = 111510 x 63  105  = Kshs. 66,906 | M1  A1  B1 |  |
|  |  | 3 |  |
| 9 | ∠XAD = 30o  180 – (50 + 30)  = 180 – 80 = 100o | B1  B1 |  |
|  |  | 2 |  |
| 10 | Surface are of base = 6 x 6 = 36cm2  Area of sides (flaps) = ½ x 6cm x 6cm)4=96cm2  Total surface are = 36cm2 + 96cm2 = 132cm2 | B1  M1  M1  A1 | Acc. |
|  |  | 4 |  |
| 11 | X + Y = 10……………(i)  (10y + x) – (10x + y) = 54……………(ii)  -9x + 9y = 54  -x + y = 6  x + y = 10  2y = 16  y = 8  -x + 8 = 6  -x = -2  x = 2  the no. is 28 | M1  M1  A1  B1 | Both √solns |
|  |  | 4 |  |
| 12 | 2x – 3y  x2 – x (2x – 3) = -4  x2 – 2x2 + 3x = -4  -x2 + 3x + 4 = 0  -x2 – 3x – 4 = 0  x2 – 4x + x – 4 = 0  x(x-4) + 1 (x-4) = 0  (x + 1) (x – 4) = 0  x =4  x = -1  when x = -1 y = -5  x = 4 y = 5 | M1  M1  A1  B1 | All √ for x values  All √for y values |
|  |  | 4 |  |
| 13 | Volume of cube 4.4 x 4.4 x 4.4  Volume of sphere  22/7 x r3 = 4.4 x 4.4 x 4.4  r3 = 4.4 x 4.4 x 4.4 x 7/22 x ¾  r3 = 20.328  r = 2.73 cm (3s.f) | M1  M1  A1  B1 |  |
|  |  | 3 |  |
| 14 | (2θ – 10) + 6 = 90o  8θ– 10 = 90o  8θ = 100  = 12.5o | M1  A1 | Sum of complementary angles  Value of θ |
|  |  | 2 |  |
| 15 | L.C.M = 22 x 3  = 12  No. of steps = 12 + 1  = 13 | B1  B1  A1 |  |
|  |  | 3 |  |
| 16 | 4x – 3 ≥ 6x – 1 6x -1 < 3x + 16  4x – 6x ≥ -1 +3 6x – 3x < 16 + 1  2x ≥ 2 3x < 17  x ≥ 1 x < 17/3  x < 52/3  1 ≥ x 52/3  Integral solutions  1, 2, 3, 4, 5 | M1  A1  B1 | 3..5  Working solution  3..5  Integral values |
|  |  | 3 |  |
| 17 | (a)    ***minibus matatu***  i) Distance traveled by minibus for 2/3 hr  = 7/3 x 90 = 210km  Remaining distance = 360 - 210 = 150km.  **A**s =90 + 110 = 200km  Time for meeting 150km = 0.75hrs  200km/hr = 45mins  Meeting time = 10.35  + .45  11 .20am  ii) Distance from A 210+ (035x90)  =210 +67.5 = 277.5km  b) Time minibus arrived at **B** time = D = 360 = 4hrs  S 90  815 + 4hrs = 12.l5pm  Time taken by the tourist to arrive at  **B** = I2.15pm— l0.30am = lhr45min  Distance = Time x speed  145/60 x 100 = 175km  Home to **B** = 175km  Home to **A**=360- 175 = 185km | B1  B1  M1  A1  M1  A1  B1  M1  A1  A1  B1 | √Distance covered by minibus for 21/3 hrs  √Ans  √add ≅ CAO |
|  |  |  |  |
| 18 |  |  |  |
|  |  |  |  |
| 19 | (a) Volume of hemisphere = ½ x 4/3 x 22/7 x 73 = 718.6667cm2  Volume of cylindrical part = 22/7 x 72 x 5cm2 = 770cm2  Volume of the frustrum part  = 1/3 x 22/7 x 72 x12 - 1/3 x 22/7 x 3.5  = 616 – 21= 595  = 718.6667 + 770 + 595 = 2083.6667  (b) Surface area of hemisphere  2 x 22/7 x 7 x 7 = 308cm  Surface area of curved surface = 2 x 22/7 x 5 = 220  Cone = 22/7 x 193 – 22/7 x 3.5 x 48.25 + 22/7 x 3.52  22/7(97.25 – 24.31) + 38.5  229.24 + 38.5  267.74  308 + 220 + 267.74 = 795.74 | M1  M1  M1  M1  A1  M1  M1  M1  A1 | 7 = 6 + x  3.5 x  7x = 21 + 3.5x  3.5x = 21  x = 6 |
|  |  |  |  |
| 20 | (a) ∠DAC = ∠DBC = 36° ,angle subtended by Chord or arc C  and the circumference  (b) ∠ADB =180- (42 + 36+58) opposite angles of a cyclic  Quadrilateral add to 180o = 44o  (c) ∠ACD = ∠ABD = 42°subtended by chord DA / arc DA at  the circle  (d) ∠CDB =180° - (44 +36 + 42) Opposite angles of a cyclic  quadrilateral add up to 180° = 580  (e) ∠CEB = 1800 - (44 + 36) angle of a triangle add to 180°  = 100o | B1  B1  B1  B1  B1  B1  B1  B1  B1  B1 | For angle  For reason |
|  |  | 10 |  |
| 21 | (a) y = 1 + x – 2x2   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | x | -3 | -2 | -1 | 0 | 1 | 2 | 3 | | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | -2x2 | -18 | 8 | -2 | 0 | -2 | -8 | -18 | | y | -20 | -9 | -2 | 1 | 0 | -5 | -14 |   y = 1 + x – 2x2   |  |  | | --- | --- | | x | 0 -2 -4 | | y | -4 -2 0 |   0 = +5 + 2x – 2x2  y = -4 – x  x =-5  x = 1.0  maximum value P(0, 1) | B2 B1  S1  P1  C1  B1  L1  B1  B1 | √6  √For both |
| 22 | Money collected for one way is 25 x 80 = kshs2000  3 trips has got 6 ways  ∴ 200 x 6 = ksh 12000  Net profit = money collected - expenses  Expenses = 1500 + 350 (labour) + 4000(others) = kshs 5850  :.net profit l2000 - 5850= kshs6150  Total profit that day = 80 x 6150 =Ksh 4920  One woman gets 2/5 x 4920 = kshs. 1968  The other 3/5 x 4920  =kshs. 2952 | M1  A1  M1  A1  M1  M1  A1  M1  A1  A1 |  |
|  |  | 10 |  |
| 23 | A1(-3, -2) B1(-1, -4) C1(-3, -8) D1(-5, -4)  A11(-1, 2) B11(3, 0) C11(-7, -2) D11(-3, -4)  A11(-4, 3) B111(-2, 5) C111(-4, 9) D111(-6,) | B1  B1 |  |
|  |  | 10 |  |
| 24 | (a) tan 67o = h  160    h = 160 tan 67o  = 376.94m  tanθ = 376.94m  420m  = 0.89747619  = 0.8975    θ = 41.91o  376.94 = tan 35o  QR + 420o  QR + 420o = 376.94  tan 35o  = 538.33m  But PR = (QR + 420) = 538.33m | B1  M1  A1  B1  M1  A1  M1  M1  A1 | √sketch  diagram  √expression for PR working  Acc. |
|  |  | 10 |  |

18. (a) ∆PQS , S = 130 B1

Total A = 130 (130 – 125) (130 – 65) ( 130 – 170) M1

+ ½ x 70 x 84 sin 320 M1

= 2535000 + 1557.96

= 3150.13m2 A1

(b) Unutilised = 35 x 1557.96 + 60 x 1592.17

100 100

= 1500.588

= 1501m2 A1

(c ) 5 x 65 x 1557.96 + 2 x 40 x 1592.17 M1M1

3 100 3 100

= 2112.368667 A1

= 2112.37m2 B1