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| **Set 1** | | | |
| **PRE BOARD EXAMINATION – I(2023-24)** | | | |
| **Subject: MATHEMATICS (Answer key)**  **Grade:XII** | |
|  | a (2) a (3) d (4) b (5) c (6) a (7) a (8) b (9) c (10) c | | |
| **11** | d (12)c (13) d (14) a (15) c (16)b (17) a (18)a (19)a (20)b | | |
|  |  | | |
| 21. | tan-1()+cot-1()+tan-1(sin())  = +  =  **OR**  tan-1[2 cos(2 sin-1)]= tan-1[2 cos(2 sin-1 (sin )]  = tan-1[2 cos()]  = tan-1[2x )]  = | |  |
| 22 | f(x)=sinx -ax +b  f’(x)= cosx-a >0  if a<cosx  a (- ,-1)  OR  F’(x)= -  For decreasing f’(x)<0  -3<x<3 and f(x) is not defined at 0  So f(x) is decreasing in (-3.0) U(0,3) | |  |
| 23. | a=120 | |  |
| 24. | Length of the ladder = 500 cm    sin θ=  Diff., cos θ=  = -10 cm/sec  =.  =. ==-=- rad/sec | |  |
| 26. | I=dx= )dx + )dx+)dx  =11/4  OR  Put x=ata  dx=2atantset dt  2a dt  a(t sec2t – tant) +C  a(1+ ) - +C | |  |
| 27. |  | |  |
| 28 | let 1+ logx = t & 1+y2 = u  OR  Since this is a linear differential equation,  IF =  solution is  Integrating the RHS by parts,    Hence solution becomes,  So, solution is | |  |
| 29. | Minimize Z = 5x + 10 y , x + 2y     |  |  | | --- | --- | | Corner points | Z= 5x + 10 y | | A ( 60 , 0) | 300 | | B ( 120, 0 ) | 600 | | C ( 60, 30 ) | 600 | | D ( 40, 20 ) | 400 |   The minimum value of Z = 300 at ( 60, 0)  **OR**  Maximise Z = 2x + 5y , 2x+ 4y     |  |  | | --- | --- | | Corner points | Z= 2x + 5 y | | A ( 0 , 0) | 0 | | B ( 2, 0 ) | 4 | | C ( 0, 2 ) | 10 | | D ( , ) |  |   The maximum value of Z = 10 at ( 0, 2) | |  |
| 30. |  | |  |
| 31. | Let  Hence it is not a homogenous differential equation.  Putting    Integrating both sides, we get | |  |
| 32. | Let the line be represented by AB.  Therefore, the given line AB is  Let Q be the foot of the perpendicular on AB.  Since point Q lies on AB, Q is represented as  Direction ratios of PQ:  Direction ratios of AB:  PQ AB    Point Q is (2, 6,2)  PQ = units | |  |
| 33 | A-1=  Then X= (AT)­-1B = = =  Thus, x=1,y=1,z=1  OR | |  |
| 34. | The given points are drawn on graph paper to get a triangle ABC with vertices A(1,2), B(4,3) and C(2,0).  ...................[ diagram- 1 ½ marks]  Now equation of line AB is    ⇒ ⇒ x-1 = 3y-6  ⇒ 3y = x+5 ⇒  Similarly equation of BC is  …(ii)  and equation of AC is  y= 4 – 2x …(iii)  Now the area of ABC = ar.(trap. ABED) – ar.(∆ACD) – ar.(∆BEC)  =  =  =  = =  = | |  |
| 35. | Let (a, b), (c, d), (e, f)   1. Since   [ Addition and multiplication is commutative in N ]  R is reflexive   1. Let     R is symmetric   1. Let  and   and  and  and    R is transitive  OR  ***One-One:*** Let such that  case(i): Both positive  case(ii): Both negative  Case (iii): one negative and one positivenegative real number = a positive real no. which is wrong so rejected.  Hence it follows f(x) is one-one  ***Onto:*** Let y = f(x)  case(i) when x≥0    case(ii) when x <0    Thus range of the function f = codomain of ff is Onto  Since f(x) is 1-1 and onto hence it Bijective. | |  |
| 36 | a) 2, b) (- c)0 or iii) | |  |
| 37 | a) 2i-2k b) i - c) sq units | |  |
| 38 | a) SD=0 b) (1,2, -1) | |  |