|  |  |  |  |
| --- | --- | --- | --- |
|  | topics | concepts | Marks |
| 1 | Theorems | Six theorem | 4m |
| 2 | Constructions | Construction of( 1) similar triangles (2) tangents | 4m |
| 3 | Coordinated geometry | Using formula (1) distance (2) section (3) area of triangle | 6m |
| 4 | Probability | Finding probablity… very easy problems as in work sheet | 4m |
| 5 | Statistics | Finding (1) mean (2) median (3) mode (4) drawing graph..ogive | 8m |
| 6 | Areas and volumes | Finding area and volume of (1) frustum (2) cylinder (3) cone (4) sphere | 4m |
| 7 | algebra | Topics as in work sheet | 6m |
| 8 | trigonometry | As in work sheet | 4m |
|  |  |  |  |

**PLAN OF ACTION**

|  |  |
| --- | --- |
| 1 | READ ALL THE FORMULA DAILY AND WRITE ONCE |
| 2 | READ THE THEOREMS TWICE A WEEK |
| 3 | DO CONSTRUCTIONS ATLEAST TWICE A WEEK AS IN TEXT BOOK |
| 4 | TAKE MULTIPLE COPIES OF THE WORK SHEET AND KEEPING THE SAMPLE ANSWERS WORK |

**CO ORDINATE GEOMETRY**

**DISTANCE FORMULA :** 

|  |  |  |  |
| --- | --- | --- | --- |
| 1 | Find the distance between A(2,5) and B(4,6)  X1=2,y1=5 x2=4, y2=6  Formula AB =  =  **== =** | 4 | If P ( 2,-1) Q(3,4) R (-2,3) S(-3,-2) be four points in a plane show that PQRS is a rhombus not a square  PQ=  QR=  RS=  SP=  PR=  QS=  SIDES EQUAL ARE-------------------------  DIAGONALS ARE---------------------------- |
| 2 | Show that A (0,-1) B(6,7) C(-2,3) D(8,3) are vertices of a rectangle   |  |  |  |  | | --- | --- | --- | --- | | AB | X1=0,y1=-1 , x2=6,y2=7 |  | **=10** | | BC | X1=6,y1=7 x2=-2, y2=3 |  |  | | CD | X1=-2,y1=3 , x2=8,y2=3 |  |  | | DA | X1=8,y1=3 , x2=0, y2-1 |  |  | | AC | X1=0,y1=-1 , x2=-2,y2=3 |  |  | | BD | X1=6,y1=7, x2=8, y2=3 |  |  |   AB = CD ,BC=AD,AC=BD THERFORE IT IS ARECTANGLE | 5 |  |
| 3 | Show that vertices A(-3,0) B (1,-3) C (4,1) form a right angled isosceles triangle   |  |  |  |  | | --- | --- | --- | --- | | AB |  |  |  | | BC |  |  |  | | CA |  |  |  |   --------- AND -------- SIDES ARE EQUAL THERFORE IT IS ISOSCELES  ------------------------------ THEREFORE IT IS RIGHT ANGLED | 6 |  |

**SECTION FORMULA (X,Y)=** 

|  |  |  |  |
| --- | --- | --- | --- |
| **1** | Find the coordinates of the points which divides the line segment joining (2,3) and (5,6) in the ratio 2:3  x1=2, y1=3, x2=5, y2 =6 m=2, n=3  (x,y) = == | **2** | Find the coordinates of the points which divides the line segment joining (-1,3) and (4,-7)) in the ratio 3:4  x1=---- y1=------- x2=-------,y2 =--------, m------, n=----------  (x,y) =  = |
| **3** | In what ratio the line segment joining (2,3) and (4,5) is divided by x axis  Point on x axis is (x,0)  Ratio is k:1  So x1=2, y1=3, x2=4, y2 =5 m=k, n=1  (x,0)= =  Equate 0=  Solve | **4** | In what ratio (-2,-3) and (5,6) is divided by y axis  Point on y axis is(0,y) Let ratio be k:1  So x1=----, y1=----,x2=----,y2 =---- m=…., n=…..  (0,y) =  Equate0=  solve |
| **5** | In what ratio the line x-y-2 divides the line segment joining  (3,-1) and (8,9)  So x1=----, y1=----,x2=----,y2 =---- m=…., n=…..  (x,y) =  (x,y) =  Put x and y in the equation (-------) – (------) – 2=0 | **6** | Find the ratio in which (-3,p) divides the line segment joining (-  5,4) and (-2,3) .hence find p  So x1=----, y1=----,x2=----,y2 =---- m=…., n=…..  (-3,p) =  Equate |
| **7** | Mid point formula  Three vertices of a parallelogram are A (-1,0) B (3,1) C(2,2) .Find the fourth vertex  x1=----, y1=----,x2=----,y2 =---- x1=----, y1=----,x2=----,y2 =----  mid point of AC =mid point of BD | **8** | Find the point of trisection of A(5,-6) and B(-7,5)  Let P divide in the ratio 1:2  m=1,n=2 , x1=----, y1=----,x2=----,y2 =----  (x,y) =  Let Q divide in the ratio 2:1  M=2,n=1, x1=----, y1=----,x2=----,y2 =----  9x,y) |

**AREA OF TRIANGLE**

FORMULA AREA OF ATRIANGLE = ½ 

|  |  |  |  |
| --- | --- | --- | --- |
| 1 | Find the area of a triangle whose vertices are (1,2 ) (4,6) (3,5)  x1=1, y1=2, x2=4, y2 =6 ,x3=3,y3=5  Area = ½  = ½  ½ (1X1 + 4X3 + 3(-4) ) =1/2 (1 +12 -12) =1/2 X1=1/2 | 2 | Find the area of a triangle whose vertices are ((5,2) (4,7) (7,-4)  x1=---, y1=----, x2=----, y2 =--- ,x3=----,y3=--- |
| 3 | Find the value of k for which points are collinear (2,-2) (-3,8)  (-1,4)  x1=---, y1=----, x2=----, y2 =--- ,x3=----,y3=---  area = ½  =0  =0  Solve | 4 | Are the points collinear (5,1) (1,-1) (11,4) ?  x1=---, y1=----, x2=----, y2 =--- ,x3=----,y3=---  area = ½  area =---  is the value =0? If so they are collinear |
| 5 | Find the area of quadrilateral A(1,2) B(6,2) C (5,3) D (3,4)  Area of ABD  Area of ACD=  Add the two areas --------------------------- | 6 | Find area of quadrilateral (-3,2) (5,4) (7,-6) (-5,-4)  Area of ABD  Area of ACD=  Add the two areas --------------------------- |

**Worksheet**

1. Do the points A (3,2) ,B (-2.-3) C (2,3) form a triangle ? If so name the type of triangle formed ?
2. Show that points (a,a) (-a,-a) (-a, a) form an equilateral triangle
3. Show that vertices (-4,-1) (-2,-4) (4,0) ( 2,3) form a rectangle
4. Prove that (3,0) (6,4) (-1,3) form an isosceles a right angled triangle
5. Find p such that PQ=QR where P (6,-1) Q is ( 1,3) R (x,8)
6. Find the point on X axis which is equidistant from P (-2,5) and (2,-3)
7. Find value of k if point P 9 0,2) is equidistant from ( 3,k) (k,5)
8. Prove that ( 2,-2) ( -2,1)) ( 5,2) form a right angled triangle .hence find its area
9. Find the relation between x any if (x,y) is equidistant from points B (3,6) (-3,4)
10. Find the coordinated of the point which divides line segment joining (6,3) ( -4,5) internally in the ratio 3:4.
11. Find the points which trisect the line segment joining (1,-2) and (-3,4)
12. In what ratio does the y axis divide the line segment joining the point P (-4,5) and Q (3,-7).Also find the point of intersection
13. Determine the ratio in which the line 3x + y-9=0 divides the line segment joining (1,3) and (2,70
14. If points ( 6,1) (8,2) ( 9,4) (p,3) are vertices of a parallelogram
15. If coordinates of midpoints of the sides of a triangle are (1,2) (0,-1) ( 2,-1)Find the coordinates of the vertices
16. IF a( -2,-1) B (a,0) C ( 4,b) D( 1,2) are vertices of parallelogram .find a and b
17. Find the coordinates of the point which divides the line segment joining ( -1,3) and (4,-7) in the ratio 3:4
18. If a and B are two points having coordinates (-2,-2) ( 2,-4) find the coordinates of P such that AP = 3/7 AB
19. Find the area of a triangle whose vertices are ( 3,2) (11,8) ( 8,12)
20. Find the area of a quadrilateral whose vertices are ( (1,1) ( 7,-3) ( 1,2) ( 7,21)
21. Find the area of a quadrilateral whose vertices are ( -4,-2)(-3,-5) ( 3,-2) ( 2,3)
22. Find the value of k if point ( 8,1) 93,-4) (2,k) are collinear
23. Find the area of triangle formed the joining the midpoints of sides of the triangle joining (0,-1) (2,1) ( 0,3) .Find the ratio of the area of the triangle formed to the area of given trsingle
24. For what value of a the points (a,1) (1,-1) (11,4) are collinear
25. Are the points collinear (1,2) (2,3) (4,5)

Note : hint

|  |  |  |
| --- | --- | --- |
| 1 | To prove | conditions |
| 1 | Points are collinear | Area =0 |
| 2 | Isosceles triangle | Two sides are equal |
| 3 | Equilateral triangle | All sides equal |
| 4 | Right angled triangle | AB2+BC2=CA2 |
| 5 | Rhombus | AB=BC=CD=DA,ACBD |
| 6 | Square | AB=BC=CD=DA,ACBD |
| 7 | parallelogram | AB=CD,BC =AD, ,ACBD |
| 8 | rectangle | AB=CD,BC =AD,Ac = BD |
|  |  |  |

**PROBABILITY**

FORMULA : PROBABILITY =

NUMBER OF TOTAL OUTCOMES

|  |  |  |  |
| --- | --- | --- | --- |
| 1 | Event | outcomes | Total outcomes |
| 2 | Tossing a coin | (H,T) | 2 |
| 3 | Tossing 2coins at a time | (HH,HT,TH,TT) | 4 |
| 4 | Tossing 3 coins at a time | (HHH,HHT,HTH,HTT,THH,THT,TTH,TTT) | 8 |
| 5 | Throwing a die | (1,2,3,4,5,6) | 6 |
| 6 | Throwing a pair of dice | (1,1) (1,2) (1,3) (1,4) (1,4) (1,6)  (21,) (2,2)………………………(2.6)  (3,1)………………………………(3,6)  (4,1)………………………………(4,6)  (5,1)……………………………...(5,6)  (6,1)…………………………….(6,6) | 36 |
| 7 | 3 red balls,5 blue balls,8white balls | 3+5+8 | 16 |
| 8 | A pack of cards | Red red black black  Heart diamond spade club  1 1  2 2  3 3  4 4  5 5  6 6  7 7  8 8  9 9  A A  J J  Q Q  K K | Total cards 52  Red cards 26  Black cards 26  Heart 13  Diamonds 13  Spade 13  Diamonds 13  Ace 4  Face 12 |
| 9 | Cards marked 1 to 10 | 1,2,3,………10 | 10 |
| 10 | Cards marked 2 to 50 | 2,3,4 …..50 | 50-2 =48 +1 =49 |
| 11 | Cards marked 3 to 23 | 3,4,………23 | 23-3=20+1=21 |

|  |  |  |  |
| --- | --- | --- | --- |
| 1 | An unbiased die is thrown .what is the probability of getting a) prime number b) number less than 5 c) odd number  Total outcomes =6  Favourable outcomes a) (2,3,5)=3outcomes  b) (1,2,3,4) =4 out comes c) (1,3,5) =3 outcomes  p(prime number) = 3/6 =1/2  p( number less than 5) = 4/6=2/3  p( odd number) 3/6=1/2 | 2 | Three unbiased coins are tossed simultaneously.Whatv is the probabilitry of getting a) all heads b) two heads c) atleast one head  Total outcomes ------------  Favourable outcomes a)------------ b)------------- c) -------------  P( all heads )=-------------  P( two heads )--------------  P( atleast one head) = ----------------------- |
| 3 | A bag contains 6red balls,3 white balls 10blue balls .What is the probability of getting a) red or blue balls b) green ball c) not a blue ball  Total out comes-----------------  Favourable outcomes a)----------------- b) ---------------- c) --------------  p | 4 | Two dice are thrown simultaneously.What is the probability of getting a) an even number as the sum  b) a doublet( hint doublet means same number on both the dice)  c) a multiple of three as sum total outcomes-------  fav outcomes ------------ |
| 5 | A pack of playing cards are shuffled and a card is picked. What is the probability of getting a) face card  b) either red or king c) ‘2’ of spade d) red face card | 6 | Cards are marked 2 to 25 and one card is picked. What is the probability of getting a) a prime number b) multiples of 3  c) sum equal to 16 |

**Work sheet**

1. What is the probability of getting a a) two heads b) atleast one head when two coins are thrown simultaneously
2. A box contains 90 discs numbered 1 to 90. What is the probability of getting a0 two digit number b) a perfect square c) a number divisible by5
3. A bag contains 3 red balls and 5 black balls . What is the probability of getting a) a red ball b) not red ball
4. A bag contains 5 red balls , 8 white and 7 black balls . What is the probability of getting a) red or white b) not black c) neither white nor black
5. A bag contains tickets numbered 11,12,13 -------30 . What is the probability of getting a) a multiple of 7 b) greater than 15 and multiple of 5
6. A number is selected from 1 to 100. What is the probability of getting a multiple of both 3 and 4.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **0** | **30** | **45** | **60** | **90** |
| **Sin** | **0** | **½** |  |  | **1** |
| **Cos** | **1** |  |  | **½** | **0** |
| **tan** | **0** |  | **1** |  | **Not defined** |

**TRIGONOMETRY**

|  |  |
| --- | --- |
| **cosecθ** | **1/sinθ** |
| **secθ** | **1/cosθ** |
| **cotθ** | **1/tanθ** |

|  |  |  |
| --- | --- | --- |
| **sinθ** | **O/H** | **REVERSE IS cosecθ** |
| **cosθ** | **A/H** | **Reverse is secθ** |
| **tanθ** | **O/A** | **Reverse is cotθ** |

|  |  |  |  |
| --- | --- | --- | --- |
| 1 | Find cosec 30 + cot 45  = 2 + 1 =3 | 2 | Find cos30 cos45 + sin30 sin45  =  x  + ½ x **=** |
| 3 | Find the value of 2sin230 tan 60 -3cos260 sin230 | 4 | If sin**θ =3/5 find cosθ and tanθ**  3  5  ?  The unknown side is  =4  Cos**θ = A/H=4/5**  **Tanθ =O/A=3/4** |
| 5 | If cosB =1/3 find tanB + cosecB  Unknown side=  tanB=--------  cosec B=---------  tanB + cosecB= ---------- | 6 | If sin**θ =4/5,find** |

|  |  |
| --- | --- |
| **Sin** (90-**θ)** | **Cos** |
| **sec**(90-**θ)** | **Cosec** |
| **tan**(90-**θ)** | **cot** |

|  |  |  |  |
| --- | --- | --- | --- |
| 1 | Find  +  =  =  + =1+1 =2 | 2 | Tan10 tan15tan75tan80  = tan10 tan15 cot15cot10  =1x1=1 |
| 3 | 2 - -2cos60 | 4 | + -4cos245 |

WORKSHEET

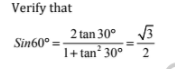
1. If sin A=1/2, then find the value ofcos A.
2. Given cosec|=4/3, calculate all other trigonometric ratios.
3. 
4. 
5. 



1. 



1. http://www.careerlauncher.com/cbse-ncert/class-10/10th-Math-Intro-Trig-hot-UntitOE4.JPG



MENSURATION

|  |  |  |  |
| --- | --- | --- | --- |
|  | CURVED SURFACE AREA | TOTAL SURFACE AREA | VOLUME |
| CYLINDER | 2πrh | 2πr(r +h) | πr2h |
| CONE | πrl | Πr(r+l) | 1/3 πr2h |
| SPHERE |  | 4πr2 | 4/3πr3 |
| FRUSTUM | πl(r1+r2) | πl(r1+r2) + πr12+ π r22 | 1/3 π h (r12+r22 +r1r2) |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Find the volume of a cylinder   |  |  |  |  | | --- | --- | --- | --- | | 1 | r=7 | h=10 | πr2h=22/7 x7x7x10= | | 2 | R=14 | H=7 |  | | 3 | R=3.5 | H=15 |  | | Find volume 0f cone   |  |  |  |  | | --- | --- | --- | --- | | 1 | r=7 | h=10 | 1/3 πr2h=1/3x22/7 x7x7x10= | | 2 | R=14 | H=7 |  | | 3 | R=3.5 | H=15 |  | |
| |  |  |  |  |  | | --- | --- | --- | --- | --- | | 1 | R1=7 | R2=5 | H=10 | V=1/3 π h (r12+r22 +r1r2)  =  == | | 2 | R1=4 | R2=5 | H=10 |  | | 3 | R1=28 | R2=7 | H=45 |  | | Find the volume of frustum   |  |  |  | | --- | --- | --- | | 1 | R=7 | 4/3πr3=  = | | 2 | R=5 |  | | 3 | R=3 |  | |

Find CSA and TSA of cylinder

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 1 | R=7 | H=10 | CSA=2πrh== | TSA=2πr(r +h)= = |
| 2 | R=5 | H=5 |  |  |
| 3 | R=135 | H=7 |  |  |

Find CSA and TSA of cone

|  |  |  |  |
| --- | --- | --- | --- |
| R=7 | L=10 | CSA= πrl= | TSA= Πr(r+l)= |
| R=14 | L=5 |  |  |

Find area of a bucket (frustum)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | R1=7 | R2=5 | l=10 | πl(r1+r2) + π r22 = + = |  |
|  | R1=4 | R2=5 | l=10 |  |  |
|  | R1=7 | R2=5 | l=10 |  |  |

**Note the problems will be application of the above problems ( HINTS**)

**Example 1) if it is a tent with cylinder surmounted by a cone then find for a) area CSA of cylinder + CSA of cone …..to find l use **

**b) volume = Vol of cylinder + volume of cone**

1. **If it is a toy like hemisphere surmounted by cone then a) CSA of toy =CSA of hemisphere+ CSA of cone**

**b) volume = vol of hemisphere + vol of cone**

**3) If object has cylinder with two hemispherical ends then SA = 2X CSA OF HEMISPHERE + CSA OF CYLINDER**

**VOL = vol of two hemispheres + vol of cylinder**

**3) If its conversion of one solid in to another then equate the two volumes**

**Ex : 1)a conical; vessel has water it is poured into a cylindrical vessel then write vol of cone = vol of cylinder**

**2. solid cylinder is recast into a cone then write vol of cylinder = vol opf cone**

**3) a cube is melted and many spheres are made .find the number of spheres the write number of spheres =**

**4) A cylinder had icecream it is put into cones having hemispherical tops .then how many icecreams cn be filled**

**Number of cones =**

**5) GLAss cylinder is filled with water ,A metal cube is submerged into it .what is the volume of water which flows out ?**

**Write volume of water flowing out = vol of cylinder- vol of cube**

**WORK SHEET**

1. A friction clutch is in the form of frustum of cone the diameters of the ends are 32cms and 20 cms aand length 8cms . find its surface area and volume
2. The perimeters of the ends of the frustum are 48cms and 36 cms .If height is 11 cms .find volume
3. The radii of circular ends of frustum of height 6cms are 14cms and 6cms .Find the lateral surface area and total surface area
4. A container opened from top and made up of a metal sheet is in the form of a frustum of a cone of height 16cms with radii of its lower and upper ends as 8cms and 20 cms respectively .Find the cost of the milk which can completely fill the container at the rate of rs 20 per litre .Also find the cost of metal sheet used to make the container if it costs rs8 per 100cm2( use pi =3.14)
5. A fez cap used by turks is shaped like the frustum of a cone .If its raius on the open side is 10cms ,radius at the upper base is 4cms and its slant height is 15cms ,find the area of material used for making it.
6. A cylindrical bucket, 32 cm high and with radius of base 18 cm, is filled with sand. This bucket is emptied on the ground and a conical heap of sand is formed. If the height of the conical heap is 24 cm, find the radius and slant height of the heap.
7. How many silver coins, 1.75 cm in diameter and of thickness 2 mm, must be melted to form a cuboid of dimensions 5.5 cm × 10 cm × 3.5 cm?
8. A container shaped like a right circular cylinder having diameter 12 cm and height 15 cm is full of ice cream. The ice cream is to be filled into cones of height 12 cm and diameter 6 cm, having a hemispherical shape on the top. Find the number of such cones which can be filled with ice cream.
9. A 20 m deep well with diameter 7 m is dug and the earth from digging is evenly spread out to form a platform 22 m by 14 m. Find the height of the platform.
10. A cone of height 24 cm and radius of base 6 cm is made up of modeling clay. A child reshapes it in the form of a sphere. Find the radius of the sphere.
11. A vessel is in the form of an inverted cone. Its height is 8 cm and the radius of its top, which is open, is 5 cm. It is filled with water up to the brim. When lead shots, each of which is a sphere of radius 0.5 cm are dropped into the vessel, one-fourth of the water flows out. Find the number of lead shots dropped in the vessel.
12. A solid iron pole consists of a cylinder of height 220 cm and base diameter 24 cm, which is surmounted by another cylinder of height 60 cm and radius 8 cm. Find the mass of the pole, given that 1 cm3 of iron has approximately 8g mass. (Use π = 3.14)
13. A solid consisting of a right circular cone of height 120 cm and radius 60 cm standing on a hemisphere of radius 60 cm is placed upright in a right circular cylinder full of water such that it touches the bottom. Find the volume of water left in the cylinder, if the radius of the cylinder is 60 cm and its height is 180 cm.
14. Rachel, an engineering student, was asked to make a model shaped like a cylinder with two cones attached at its two ends by using a thin aluminium sheet. The diameter of the model is 3 cm and its length is 12 cm. If each cone has a height of 2 cm, find the volume  
    of air contained in the model that Rachel made.
15. A tent is in the shape of a cylinder surmounted by a conical top. If the height and diameter of the cylindrical part are 2.1 m and 4 m respectively, and the slant height of the top is 2.8 m, find the area of the canvas used for making the tent. Also, find the cost of  
    the canvas of the tent at the rate of Rs 500 per m2.
16. From a solid cylinder whose height is 2.4 cm and diameter 1.4 cm, a conical cavity of the same height and same diameter is hollowed out. Find the total surface area of the remaining solid to the nearest cm2.
17. A vessel is in the form of a hollow hemisphere mounted by a hollow cylinder. The diameter of the hemisphere is 14 cm and the total height of the vessel is 13 cm. Find the inner surface area of the vessel.
18. A toy is in the form of a cone of radius 3.5 cm mounted on a hemisphere of same radius.The total height of the toy is 15.5 cm. Find the total surface area of the toy

**ALGEBRA**

|  |  |  |  |
| --- | --- | --- | --- |
| 1 | Prove that is irrational  Proof If possible let  be a rational number then =p/q ,pand q are coprime  Squaring 2=p2/q2 therfore 2q2=p2therfore 2divides p  Therefore p=2r for some r  Squaring p2=4r2but p2=2q2hence 4r2=2q2 which implies 2r2=q2  Hence therefore 2 divides q  This implies 2 is common factor of both p and q which is a contradiction .therfore  cant be a rational bnumber therefore | 2 | Prove that is irrational |
| 3 | **Nature of roots** find the nature of roots  Ex: 2x2-4x +3 here a =2,b=-4,c=3 therfore D=b2-4ac =(-4)2-4x2x3  D=16-24=-8 <0 therefore no real roots   |  |  |  |  | | --- | --- | --- | --- | |  | equation | b2-4ac | Condition | | 1 | X2-x +10 |  |  | | 2 | 2y2+3y +5 |  |  | | 3 | X2 –x -2 |  |  | | 4 | **Condition for consistency**: find whther the pair of equations have solution 2x +4y=5 and 6x +12y=15  a1=2,b1=4,c1=5. a2=6,b2=12,c2=15  =2/6 =1/3,  = 4/12 =1/3 =5/15=1/3  Therefore = =hence infinitely many solution |
| 4 |  | 5 |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

**STATISTICS**

TO FIND MEAN :

1. DIRECT METHOD :

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  | | --- | --- | --- | --- | | CLASS INTERVAL | frequency | xi | xifi | | 10-20 | 3 | 15 | 45 | | 20-30 | 6 | 25 | 150 | | 30-40 | 8 | 35 | 280 | | 40-50 | 3 | 45 | 135 | | 50-60 | 6 | 55 | 330 | | 60-70 | 4 | 65 | 260 | | TOTAL | 30 |  | 1200 | | Mean = ∑xifi/ ∑fi  = 1200 / 30  = 40 |
| |  |  |  |  | | --- | --- | --- | --- | | CLASS INTERVAL | frequency | xi | xifi | | 100-120 | 12 |  |  | | 120-130 | 8 |  |  | | 130-140 | 13 |  |  | | 140-150 | 4 |  |  | | 150-160 | 6 |  |  | | 160-170 | 7 |  |  | | TOTAL |  |  |  | | Mean = ∑xifi/ ∑fi |
| |  |  |  |  | | --- | --- | --- | --- | | CLASS INTERVAL | frequency | xi | xifi | | 0-20 | 15 |  |  | | 20-40 | 12 |  |  | | 40-60 | 10 |  |  | | 60-80 | 22 |  |  | | 80-100 | 11 |  |  | | 100-120 | 10 |  |  | | 120-140 | 5 |  |  | | TOTAL |  |  |  | | Mean = ∑xifi/ ∑fi |
|  |  |

ASSUMED MEAN METHOD:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  | | --- | --- | --- | --- | --- | | CLASS INTERVAL | frequency | xi | di = xi - a | fidi | | 100-120 | 12 | 110 | -20 | -240 | | 120-130 | 8 | 120 | -10 | -80 | | 130-140 | 13 | 130 = a | 0 | 0 | | 140-150 | 4 | 140 | 10 | 40 | | 150-160 | 6 | 150 | 20 | 120 | | 160-170 | 7 | 160 | 30 | 210 | | TOTAL | 40 |  |  | 50 | | Mean = a + ∑fidi/∑fi  = 40 + 50/40    = 40 + 1.25    = 41.25 |
| |  |  |  |  |  | | --- | --- | --- | --- | --- | | CLASS INTERVAL | frequency | xi | di | fidi | | 10-20 | 3 |  |  |  | | 20-30 | 6 |  |  |  | | 30-40 | 8 |  |  |  | | 40-50 | 3 |  |  |  | | 50-60 | 6 |  |  |  | | 60-70 | 4 |  |  |  | |  |  |  |  |  | | Mean = a + ∑fidi/∑fi |
| |  |  |  |  |  | | --- | --- | --- | --- | --- | | CLASS INTERVAL | frequency | xi | di | fidi | | 0-20 | 15 |  |  |  | | 20-40 | 12 |  |  |  | | 40-60 | 10 |  |  |  | | 60-80 | 22 |  |  |  | | 80-100 | 11 |  |  |  | | 100-120 | 10 |  |  |  | | 120-140 | 5 |  |  |  | | Mean = a + ∑fidi/∑fi |

STEP DEVIATION METHOD:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  | | --- | --- | --- | --- | --- | | CLASS INTERVAL | frequency | xi | Ui | fiui | | 10-20 | 3 | 15 | -2 | -6 | | 20-30 | 6 | 25 | -1 | -6 | | 30-40 | 8 | 35 = a | 0 | 0 | | 40-50 | 3 | 45 | 1 | 3 | | 50-60 | 6 | 55 | 2 | 12 | | 60-70 | 4 | 65 | 3 | 12 | | TOTAL | 30 |  |  | 15 | | Mean = a + [ ∑fiui/ ∑fi ]× h  = 35 + 15/30 × 10    =35 + 5 = 40 |
| |  |  |  |  |  | | --- | --- | --- | --- | --- | | CLASS INTERVAL | frequency | xi | ui | fiui | | 100-120 | 12 |  |  |  | | 120-130 | 8 |  |  |  | | 130-140 | 13 |  |  |  | | 140-150 | 4 |  |  |  | | 150-160 | 6 |  |  |  | | 160-170 | 7 |  |  |  | | 170-180 | 10 |  |  |  | | Mean = a + [ ∑fiui/ ∑fi ]× h |
| |  |  |  |  |  | | --- | --- | --- | --- | --- | | CLASS INTERVAL | frequency | xi | ui | fiui | | 0-20 | 15 |  |  |  | | 20-40 | 12 |  |  |  | | 40-60 | 10 |  |  |  | | 60-80 | 22 |  |  |  | | 80-100 | 11 |  |  |  | | 100-120 | 10 |  |  |  | | 120-140 | 5 |  |  |  | | Mean = a + [ ∑fiui/ ∑fi ]× h |
|  |  |

TO FIND MODE :

MODE = l + [ f1 – f0 / 2f1 – f0 – f2 ]

Where l = lower class limit of modal class

F1 = frequency of modal class

F0 = frequency of the previous class

F2 = frequency of the next class

Modal class : class interval with highest frequency

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  | | --- | --- | | Class interval | Frequency | | 0-10 | 8 = f0 | | 10-20 – modal class | 10 = f1 | | 20-30 | 5 = f2 | | 30-40 | 12 | | 40-50 | 6 | | 50-60 | 9 | | 60-70 | 7 | | Mode = l + [ f1 – f0 / 2f1 – f0 – f2 ]    = 10 + [10 – 8 / 2×10 – 8 – 5 ]    = 10 + 2/7  = 10+ 0.28 = 10.28 |
| |  |  | | --- | --- | | Class interval | Frequency | | 0-50 | 12 | | 50-100 | 4 | | 100-150 | 16 | | 150-200 – modal class | 22 | | 200-250 | 5 | | 250-300 | 7 | | 300-350 | 10 | | 350-400 | 13 | | Mode = l + [ f1 – f0 / 2f1 – f0 – f2 ] |

TO FIND MEDIAN:

MEDIAN = l +[ (n/2 – c.f )/f × h ]

Where l = lower class limit of median class

n = total frequency

c.f = cumulative freq of the prev class

f = freq of the median class

h = class size

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  | | --- | --- | --- | | Class interval | Frequency | Cumulative freq | | 0-10 | 3 | 3 | | 10-20 | 5 | 8 | | 20-30 | 2 | 10- c.f | | 30-40 – median class | 8 = f | 18 | | 40-50 | 5 | 23 | | 50-60 | 3 | 26 | | 60-70 | 4 | 30 | | MEDIAN = l +[ (n/2 – c.f )/f × h ]  n/2 = 30/2 =15  h = 10  median = 30 + [ (15 – 10)/8 × 10 ]    = 30 + 50/8  = 30 + 6.25 = 36.25 |
| |  |  |  | | --- | --- | --- | | Class interval | Frequency | Cumulative freq | | 0-50 | 12 |  | | 50-100 | 4 |  | | 100-150 | 16 |  | | 150-200 | 20 |  | | 200-250 | 15 |  | | 250-300 | 12 |  | | 300-350 | 10 |  | | 350-400 | 13 |  | | MEDIAN = l +[ (n/2 – c.f )/f × h ] |

Practice questions :

1. Find the mean of the following data:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Class interval | 100-150 | 150-200 | 200-250 | 250-300 | 300-350 | 350-400 | 400-450 |
| Freq | 24 | 40 | 33 | 28 | 30 | 22 | 16 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Class interval | 0-5 | 5-10 | 10-15 | 15-20 | 20-25 | 25-30 | 30-35 |
| Freq | 7 | 12 | 9 | 5 | 6 | 7 | 4 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Class interval | 40-55 | 55-70 | 70-85 | 85-100 | 100-120 | 120-140 |
| freq | 20 | 13 | 27 | 20 | 24 | 26 |

Find the mode of the following:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Class interval | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 | 80-90 | 90-100 |
| freq | 12 | 16 | 10 | 9 | 13 | 8 | 18 | 4 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Class interval | 300-400 | 400-500 | 500-600 | 600-700 | 700-800 | 800-900 | 900-1000 | 1000-1100 |
| freq | 22 | 25 | 16 | 30 | 25 | 27 | 19 | 20 |

Find the median of the following:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Class interval | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 | 80-90 | 90-100 |
| freq | 12 | 16 | 10 | 12 | 13 | 8 | 18 | 11 |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Class interval | 100-150 | 150-200 | 200-250 | 250-300 | 300-350 | 350-400 | 400-450 |
| Freq | 24 | 40 | 33 | 28 | 30 | 22 | 16 |