

## Project works

### Project work-1

- Ask at least 20 relatives whether they ate meat or swung the swing in Dashain or not.
- Represent the sets of relatives who ate meat by M and the set of relatives who swung swing by S and answer the following questions.

(a) Write the cardinalities of sets of relatives who:

Participated in the survey, $n(U) = \dots\dots\dots$
Ate meat, $n(M) = \dots\dots\dots$
Swung the swings, $n(S) = \dots\dots\dots$
Ate meat and swung the swing both, $n(M \cap S) = \dots\dots\dots$
Did not eat meat and swing the swings, $n(\overline{M \cup S}) = \dots\dots\dots$

(b) Show the data you obtained in a Venn-diagram.

(c) Find the number of relatives who

- (i) Ate either meat or swung the swing both
- (ii) Ate neither meat nor swung the swing both
- (iii) Ate meat only
- (iv) Swung the swing only

(d) Find the ratio of number of relatives

- (i) Who ate meat and swung the swings
- (ii) Who ate meat only and swung the swings only
- (iii) Who liked only one and liked only two
- (iv) Who liked at least one and at most one

### Project work-2

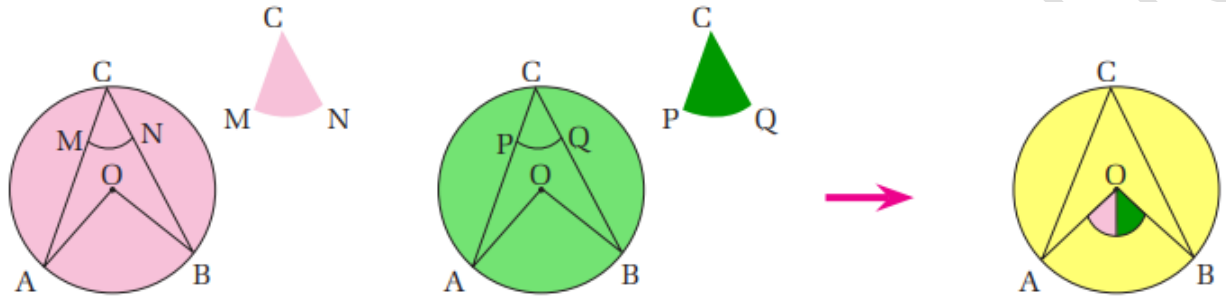
- Make a birthday hat using a chart paper or buy it from a shop.
- Measure the various parts and calculate the following.

Circumference of the circular base	= $\dots\dots\dots$
Radius of the conical birthday hat (r)	= $\dots\dots\dots$
Slant height of the conical birthday hat (l)	= $\dots\dots\dots$
Vertical height of the conical birthday hat (h)	= $\dots\dots\dots$
Volume of the hat (V)	= $\dots\dots\dots$
Curved surface area (C.S.A.) of the hat	= $\dots\dots\dots$



**Project work-3**

- ☑ Draw three circles with centre O and same radius on colourful chart paper and cut them out.
- ☑ Mark three points A, B and C on the circumference of the first circle.
- ☑ Keep all three circles of same size one on the other, fold along AC and BC and press to make the crease so that angles at the circumference i.e.,  $\angle ACB$  is formed.



- ☑ Draw three circles with centre O on a chart paper.
- ☑ Take three points A, B and C on the circumference.
- ☑ Measure  $\angle AOB$  and  $\angle ACB$  and fill of the following figure.

Figure no.	$\angle AOB$	$\angle ACB$	Result
(i)			
(ii)			
(iii)			

**Conclusion:**

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**Project work-4**

- ☑ Collect the ages of family members of your 15 friends.
- ☑ Display the weights in a frequency distribution table of class of length 10.
- ☑ Calculate:
  - (i) The average weight.
  - (ii) The median weight.
  - (iii) The modal weight.
  - (iv) Compare the average, median and modal weight.

# Practice Question Set

Attempt all the questions:

- A survey was conducted among 80 students of class-X studying in Siddhartha Secondary School regarding the preference of Dashain and Tihar. In the survey it was found that 70 students preferred Dashain, 73 preferred Tihar and 67 preferred both the festivals.

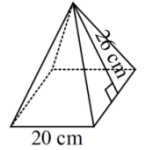
  - If the sets of students who preferred Dashain and Tihar are represented by D and T respectively, write the cardinality of set of students who preferred both the festivals using set notation. [1K]
  - Show the above information in a Venn-diagram. [1U]
  - Find the number of students who preferred neither of these festivals. [3A]
  - Arushi said that the ratio of number of students who preferred only Dashain to only Tihar is 1:2. Justify her statement. [1HA]
- Jujuman deposits Rs 2,00,000 in Laxmi bank for 1 year which pays him annual compound interest at the rate of 10% p.a. Then, he withdraws the amount and immediately deposits in Prabhu bank for 1 year which pays him semi-annual compound interest at the same rate.

  - Write the formula to find the annual compound interest on a sum P at the rate of R% p.a. for T years. [1K]
  - How much compound interest will he get from Laxmi bank? [1A]
  - From which bank will he get more interest and by how much? [2HA]
- Bimal bought a plot of land for Rs 40,50,000 and he immediately built a house on it. The value of land increased at the rate of 10% per annum but the value of the house depreciated at 10% per annum.

  - What does R denote in the formula  $(P_T) = P\left(1 - \frac{R}{100}\right)^T$ ? [1K]
  - Calculate the valuation of his land plot after 2 years. [2U]
  - If the value of the land plot and the house became equal in 2 years, what was his investment for the house? Find it. [2A]
- 2 years ago, the cost of a photocopy machine was Rs. 2,00,000. The value of the machine was depreciated by 10% in the first year and 15% in the second year.

  - When the value of an article depreciates by  $R_1\%$  in the first year and by  $R_2\%$  in the second year, write the formula to calculate its value after 2 years. [1K]
  - Find the value of the photocopy machine after 2 years. [2A]
  - If the value of the machine were annually depreciated by 15% during the last two years, by how much would its present value be more? [1H]

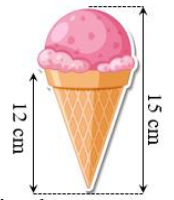
- A square based metallic pyramid has length of base 20 cm and slant height 26 cm.



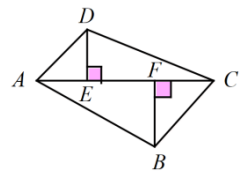
- How many triangular lateral surfaces are there in the pyramid? [1K]
  - Find the vertical height of the pyramid. [1U]
  - Compute the volume of the pyramid. [2A]
- Sujit organized a party on the occasion of his daughter Sujita's first birthday in his family. After meal, each of 100 people, including the family members, took 1/1 cone filled with ice-cream as shown in the picture.

    - Write the formula to find the curved surface area of cone having base radius ' $r$ ' and slant height ' $l$ '. [1K]
    - Find the volume of the ice-cream eaten by each person. [3A]
    - Sujit estimated that 10 cylindrical ice-cream containers of base diameter 12 cm and height 15 cm were enough. Justify his answer. [2HA]
  - From a shop, Rohit bought a water tank with a hemispherical upper part and a cylindrical lower part, for the purpose of his house. The diameter of the base of the tank is 2.1 m and the height is 3.55 m.

    - To find the external total surface area of the closed tank, the surface area of which part must be calculated? [1K]
    - Find the external surface area of hemispherical part of the tank. [1U]
    - Find the external surface area of the tank. [2A]
    - Compare the cost of plastering the hemispherical part and cylindrical part of the tank at the rate of Rs 250 per sq. m [1HA]



- Amit has a farm in the shape of quadrilateral as shown in the figure, in which  $BF \perp AC$ ,  $DE \perp AC$ ,  $AC = 48$  m,  $BF = 30$  m and  $DE = 25$  m. He planted paddy in the farm on 15<sup>th</sup> Asar.



- Calculate the area of the farm. [2U]
- Find the total cost of 3 male labourers at the rate of Rs 1000 per male labourer and 4 female labourers at the rate of Rs 2.5 per square meter for sowing the paddy in the field. [1HA]

9. The following data shows the number of patients infected from dengue and viral fever, and admitted in a hospital during 10 days.

	1 <sup>st</sup> day	2 <sup>nd</sup> day	3 <sup>rd</sup> day	...
No. of patients admitted due to dengue	10	15	20	...
No. of patients admitted due to viral fever	3	6	12	...

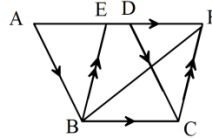
- (a) Due to which disease, the number of patients admitted in the hospital are in the arithmetic series? [1K]  
 (b) How many patients due to dengue were admitted in 10 days? [2U]  
 (c) Due to which disease, the number of patients admitted in the hospital is more during 10 days and by how much? [2HA]

10. If  $A = \frac{x-1}{x+1}$ ,  $B = \frac{x+1}{x-1}$  and  $C = \frac{4x}{1-x^2}$  are any three algebraic expressions.

- (a) For what value of  $x$ , the expression  $A$  becomes undefined? [1K]  
 (b) Find the lowest term of the sum  $A + B$ . [2U]  
 (c) Show that:  $B + C = A$ . [1A]

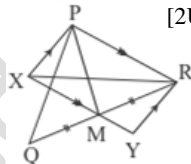
11. (a) Simplify:  $\frac{a}{a-x} + \frac{x}{a+x} + \frac{2ax}{x^2-a^2}$  [3A]  
 (b) Solve:  $4^x - 3 \times 2^x + 2 = 0$  [3A]

12. In the given figure,  $\square ABCD$ ,  $\square EBCF$  and  $\triangle FBC$  are on the same base  $BC$  and between the same parallel lines  $AF$  and  $BC$ .



- (a) Write the relationship between  $\square ABCD$  and  $\square EBCF$ . [1K]  
 (b) Prove that: Area of  $\triangle FBC = \frac{1}{2}$  area of  $\square ABCD$ . [2U]

- (c) In the adjoining figure,  $PX \parallel RY$ ,  $PR \parallel XY$  and  $M$  is the mid-point  $QR$ .



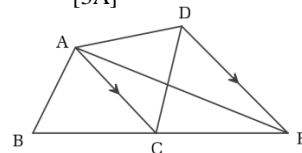
Prove that the area of triangle  $PQR$  and the parallelogram  $PXYR$  are equal in area. [2HA]

13. In a circle;  $O$  is the centre. The angle at the centre  $\angle AOB$  and the angle at the circumference  $\angle ACB$  are standing on the same arc  $AB$ .

- (a) Write the relationship between  $\angle AOB$  and  $\angle ACB$ . [1K]  
 (b) If  $\angle AOB = (7x)^\circ$  and  $\angle ACB = (3x + 5)^\circ$ , what is the value of  $x$ ? [1U]  
 (c) Experimentally verify that the relationship between  $\angle AOB$  and  $\angle ACB$ . (Two circles of radii at least 3 cm are necessary). [2A]

14. (a) Construct a square  $ABCD$  having each side 5 cm. Construct a parallelogram equal in area to the rectangle and having one side of 6 cm. [3A]

- (b) In the diagram given alongside,  $AC \parallel DE$ , write the relation of quadrilateral  $ABCD$  and  $\triangle ABE$  with reason. [1HA]



15. The table given below shows marks obtained by the students at a math examination.

Marks obtained	40-50	50-60	60-70	70-80	80-90
No. of students	2	6	8	10	4

- (a) In the formula  $M_d = L + \left(\frac{N/2 - c.f.}{f}\right) \times i$ ; what does  $f$  denote? [1K]  
 (b) Calculate the median mark from the given data. [2U]  
 (c) Find the average mark from the given data. [2A]  
 (d) Spandan said that the number of students lying in  $Q_3$  class is 25% more than the students lying in the median class. Evaluate her statement. [1HA]

16. The data given below represents the monthly expenses (in thousands) of a few numbers of families of Jaleshwar municipality.

Monthly expense (in Rs)	No. of families
10000-15000	3
15000-20000	8
20000-25000	10
25000-30000	7
30000-35000	4

- (a) Write the formula to find the mean of continuous data. [1K]  
 (b) Construct the  $fm$  table. [1U]  
 (c) Calculate the average expense from the above data. [1A]  
 (d) By how much would the average expense be changed when the number of families with monthly expense classes (10000 – 15000) and (30000 – 35000) were interchanged? [2HA]