1) Perimeter of rectangle is 42 cm. Express this information in the form of a linear equation in 2 variables.

2) Find the value of 'a' so that \(5x + 2ay = 3a\) has a solution \((-4,1)\).

3) Draw the graph of \(2(x+1) = 3(y+1)\). From the graph find the value of \(y\) when \(x = -\frac{3}{2}\).

4) \(P\) is the mid point of the side \(BC\) of \(ABCD\) such that \(\angle BAP = \angle DAP\). Prove that \(AD = 2AB\).

5) In trapezium \(ABCD, AB \parallel DC, E\) is the midpoint of \(AD\) and \(EF \parallel AB\) where \(F\) lies on \(BC\). Prove that \(AB + CD = 2EF\).

6) In the figure \(ABCD\) is a parallelogram in which \(E\&F\) are the midpoints of \(AB\&CD\). If \(GH\) is a line segment that cuts \(AD, EF\) and \(BC\) at \(G, P\& H\) respectively, Prove that \(GP = PH\).

7) In a \(PQRS, SM \perp PQ\) and \(QT \perp SP\). If \(\text{ar}(PQRS) = 48\, \text{cm}^2\), \(PQ = 8\, \text{cm}\) and \(PS = 3\, \text{cm}\), find \(SM\) and \(QT\).

8) In quadrilateral \(ABCD\), a line through \(D\) parallel to \(AC\) meets \(BC\) produced at \(E\). Prove that \(\text{ar}(\triangle ABE) = \text{ar}(\text{quad.} ABCD)\).

9) Given \(\text{ar}(\square ABCD) = 90\, \text{cm}^2\). Find,
   \(i\) \(\text{ar}(\triangle ABE)\), \(ii\) \(\text{ar}(\triangle ABD)\), \(iii\) \(\text{ar}(\triangle BEF)\).

10) In the figure \(D, E\&F\) are respectively the midpoints of \(BC, BD\) and \(AE\) of \(\triangle ABC\). Prove that \(\text{ar}(\triangle AEF) = \frac{1}{8}\text{ar}(\triangle ABC)\).

11) Given three non-collinear points \(A, B\& C\). Prove that there is one and only one circle passes through \(A, B\& C\).

12) In a circle of radius 5 cm. \(AB\& AC\) are two chords such that \(AB = AC = 6\) cm. Find the length of the chord \(BC\).

13) Two chords \(AB\& CD\) of a circle with center \(O\) intersect at \(E\). If \(\angle OEA = \angle OED\). Prove that \(AB = CD\).
14) Find the value $x$ from the following figures.

15) In the figure ABC, AEG and HEC are straight lines. Prove that $\angle AHE$ and $\angle EGC$ are supplementary.

16) In the figure $\angle A = 60^\circ$ and $\angle ABC = 80^\circ$. Find $\angle DPC$ and $\angle BQC$.

17) In the figure, O is the center of the circle and AB $\parallel$ OP. Prove that PC = PB.

18) In the figure P is the center of the circle. Prove that $\angle XPZ = 2(\angle xzy + \angle yxz)$.

19) Construct a triangle with base length 5 cm, sum of the other two sides 7.8 cm and one base angle of 60°.

20) Construct a triangle with base length 7.5 cm, the difference of the other two sides 2.5 cm and one base angle is 45°.

21) Construct $\triangle ABC$ with perimeter 8 cm and the angles in the ratio 3:4:5.

22) Construct $\triangle ABC$, in which BC = 5 cm, $\angle C = 30^\circ$ and AB - AC = 2 cm.

23) A swimming pool is 30 m in length 15 m in breadth and 4 m in deep. Find the cost of cementing its floor and walls at the rate of Rs 12 per m².

24) The cost of papering the four walls of a room at 90 paise/m² is Rs 202.50. The height of the room is 5 m. Find the length and breadth of the room if they are in the ratio 4:1.

25) Water in a canal, 30 dm wide and 12 dm deep, is flowing at a speed of 20 km/hr. How much area will it irrigate in 30 minutes, if 9 cm of standing water is desired?

26) The ratio of the C.S.A and T.S.A of cylinder is 1:2. If the TSA is 616 cm² find the volume of the cylinder.

27) The difference between the outer surface area and inner surface area of a cylindrical metallic pipe 14 cm long is 44 cm². If the pipe is made of 99 cm³ of metal, find the outer and inner radii of the pipe.

28) A piece of paper having the form of a quadrant of a circle of diameter 28 cm is rolled up so as to form a cone. Find the i) radius of the base ii) curved surface area and iii) volume of the cone.

29) Three solid spheres of iron whose diameters are 2 cm, 12 cm and 16 cm respectively are melted into a single solid sphere. Find the T.S.A. of the new sphere.
30) A solid wooden toy is in the shape of a right circular cone mounted on a hemisphere. If the radius of the hemisphere is 4.2 cm and the total height of the toy is 10.2 cm, find the volume of the wooden toy.

31) The daily maximum temperature (in degree Celsius) recorded in a certain city during the month of November are as follows.
Represent this information in the form of a Frequency distribution table with class size 1°C. Also draw a histogram for the same.

32) Following is the distribution of ages (in years) of two groups of teachers in a school.

<table>
<thead>
<tr>
<th>Age (in years)</th>
<th>Group A</th>
<th>Group B</th>
</tr>
</thead>
<tbody>
<tr>
<td>55 - 60</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>50 - 55</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>45 - 50</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>40 - 45</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td>35 - 40</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>30 - 35</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>25 - 30</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>20 - 25</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Represent the above data by means of a frequency polygon for each group on the same axes.

33) Draw a histogram to represent the following frequency distribution

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Workers</td>
<td>7</td>
<td>10</td>
<td>27</td>
<td>15</td>
<td>12</td>
<td>12</td>
<td>8</td>
</tr>
</tbody>
</table>

34) Find the missing frequency 'k' of the following data if its mean is 16.

<table>
<thead>
<tr>
<th>x</th>
<th>5</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>25</th>
</tr>
</thead>
<tbody>
<tr>
<td>f</td>
<td>2</td>
<td>8</td>
<td>k</td>
<td>10</td>
<td>5</td>
</tr>
</tbody>
</table>

35) The mean of 5 nos. is 28. If one of the nos. is excluded, the mean gets reduced by 2.
Find the excluded number.

36) The weight of 10 students (in Kg.) are 55, 51, 60, 52, 42, 38, 49, 63, 47, and 35.
Find the median weight. If the weight 63 Kg. is replaced by 36 Kg., find the new median weight.

37) For what value of p, the mode of the following data is 5?
1, 2, 5, 7, 5, 2, 7, 5, 9, 2, 3, p, 11

38) Arrange the following nos. in a frequency distribution table and then find the mean, median and mode of the data.
7, 4, 3, 5, 6, 3, 3, 2, 4, 3, 4, 3, 4, 3, 2, 2, 4, 3, 5, 4, 3, 4, 3, 4, 3, 1, 2, 3

39) A bag contains cards numbered from 1 to 100. A card is drawn at random from the bag.
Find the probability that the card bears a number which is a
i) multiple of 5
ii) multiple of 6
iii) multiple of both 5 & 6
40) Three coins are tossed simultaneously 200 times and the outcomes are shown below.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>3 heads</th>
<th>2 heads</th>
<th>1 head</th>
<th>no head</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>23</td>
<td>72</td>
<td>77</td>
<td>28</td>
</tr>
</tbody>
</table>

Find the probability of getting,
(i) exactly 2 heads  (ii) at least one head  (iii) at most one head

41) M C Q :

1) Length of the longest rod that can be kept in a cuboidal room of dimensions 10 m x 10 m x 5 m is
   A) 5 m   B) 10 m   C) 15 m   D) 12 m

2) Volume of a cube is 1000 cm$^3$. Its surface area is
   A) 400 cm$^2$   B) 100 cm$^2$   C) 600 cm$^2$   D) 6000 cm$^2$

3) Volume of a hemisphere is $88\sqrt{21}$ cm$^3$. Its radius is
   A) 21 cm   B) 7\sqrt{3} cm   C) 3\sqrt{7} cm   D) \sqrt{21} cm

4) Which of the following is not true for a parallelogram?
   A) opposite sides are equal   B) opposite angles are equal
   C) opposite angles are bisected by diagonals   D) diagonals bisect each other

5) The ratio of the angles of a quadrilateral is 3 : 7 : 6 : 4, then the quadrilateral is a
   A) Trapezium   B) Parallelogram   C) Rhombus   D) Kite

6) O is the center of the circum circle of $\triangle$ABC and $\angle OAB = 40^\circ$ then $\angle ACB =
   A) 40^\circ$   B) 20$^\circ$   C) 100$^\circ$   D) 50$^\circ$

7) AD is the diameter of a circle of radius 17 cm and AB is a chord of the same circle of length 30 cm.
   Then distance of AB from the center of the circle is
   A) 17 cm   B) 15 cm   C) 4 cm   D) 8 cm

8) Graph of the linear equation $ax + by + c = 0$ is a straight line passing through the origin if
   A) $a = b = c$   B) $a = b$   C) $a = b = 0$   D) $c = 0$

9) If a linear equation has (-3, 3), (0, 0) and (1, -1) as three of its infinite solutions.
   Then it is of the form
   A) $-3x + y = 0$   B) $x + y = 0$   C) $y - x = 0$   D) $x + y + 3 = 0$
10) The mean of 3 consecutive nos. is 3, their median is

A) 3  B) 4  C) 5  D) 6

11) If the class mark and class size of a class are 9 and 4 respectively, then the lower limit of the class is

A) 5  B) 7  C) 4.5  D) 11

12) A coin is tossed twice. The probability of getting at least one head is

A) 1/2  B) 3/4  C) 1/4  D) 3/8

Answers/ Hints

1) x + y - 21 = 0  2) -20  3) 0

4) Hint: Prove \( \angle BPA = \frac{1}{2} \angle A \) and \( AB = BP \Rightarrow AD = 2 AB \)

5) Hint: Prove F is the mid point of BC by using mid point theorem. Find the length of EF.

6) Hint: Prove \( AD \parallel EF \parallel BC \) and use equal intercept theorem.

7) 6 cm, 16 cm  8) Hint: ar. (\( \triangle ACE \)) = ar. (\( \triangle ACD \)) add ar. (\( \triangle ABC \)) on both sides

9) i) 90 cm^2  ii) 45 cm^2  iii) 45 cm^2

10) Hint: Use the result, median divides a triangle into two triangles of equal area.

12) 9.6 cm  13) Hint: Draw OP \perp AB & OQ \perp CD and prove \( \triangle OPE \equiv \triangle OQE \).

14) i) 30^0  ii) 27 \( \frac{3}{4} \)  iii) 115^0  iv) 40^0

15) Hint: Join BE, BG & BH and prove \( \angle EGC + \angle AHE = 180^0 \)

16) 40^0  20^0

17) Hint: Join OB. Prove \( \angle COP = \angle BOP and \triangle COP \equiv \triangle BOP \)

18) Hint: Show 2 \( \angle xzy = \angle xpy \) and 2 \( \angle yxz = \angle ypz \) and add the two equations.

23) 9720.  24) 18 m, 4.5 m  25) 400000 m^2  26) 1078 cm^3

27) 2.5 cm, 2 cm  28) 3.5 cm, 154 cm^2, 175.2 cm^3  29) 1018.28 cm^2  30) 266.11 cm^3

34) 15  35) 36  36) 50 Kg, 48 Kg  37) 5

38) 3.47, 3, 3

39) \( \frac{1}{5} \), \( \frac{4}{25} \), \( \frac{3}{100} \)  40) \( \frac{9}{25} \), \( \frac{43}{50} \), \( \frac{21}{40} \)

41) M C Q:
