# DELHI PUBLIC SCHOOL <br> BOKARO STEEL CITY 

## ASSIGNMENT FOR THE SESSION 2013-2014

## Quadrilateral

1. $A B C D$ is a quadrilateral in which $A B=A D$ and $B C=D C$. Prove that $A C$ bisects $\angle A$ and $\angle C$
2. If angles $P, Q, R$ and $S$ of the quadrilateral $P Q R S$ taken in order and in the ratio 3:7:6:4 then show that PQRS is a trapezium.
3. In a quadrilateral $A B C D$, the line segments bisecting $\angle C$ and $\angle D$ meet at $E$. Prove that $\angle \mathrm{A}+\angle \mathrm{B}=2 \angle \mathrm{CED}$
4. If bisectors of $\angle A$ and $\angle B$ of a quadrilateral $A B C D$ intersect each other at $P$, of $\angle B$ and $\angle C$ at Q , of $\angle \mathrm{C}$ and $\angle \mathrm{D}$ at R and $\angle \mathrm{D}$ and $\angle \mathrm{A}$ at S , then show that PQRS is a quadrilateral whose opposite angles are supplementary.
5. In a quadrilateral $A B C D$, the bisectors of $\angle A$ and $\angle B$ meet in a point $P$. If $\angle C=100^{\circ}$ and $\angle D=60^{\circ}$, find the measure of $\angle A P B$.

## PARALLELOGRAM

1. Two adjacent angles of a parallelogram are as $2: 3$. Find the angles
2. Prove that the opposite sides of a parallelogram are equal.
3. Prove that in a parallelogram diagonals bisect each other.
4. $A B C D$ is a parallelogram and line segments $A E$ and $C F$ bisect the angles $A$ and $C$ respectively. Show that AE // CF.
5. Two lines $A C$ and $B D, 5 \mathrm{~cm}$ each bisect each other. If $A, B, C, D$ are joined what type of quadrilateral is formed. Justify your answer.
6. $\quad A B C D$ is a parallelogram in which $A B=2 A D$ and $P$ is the midpoint of $A B$, then Find $\angle C P D$.
7. In a parallelogram $A B C D$, if $A B=2 x+5, C D=y+1 \quad A D=y+5$ and $B C=3 x-4$, then find the ratio of $A B: B C$.
8. $A B C D$ is a parallelogram whose diagonals intersect each other at $O$. A line segment EOF is drawn to meet $A B$ at $E$ and $D C$ at $F$. Prove that $O E=O F$.
9. $A B C D$ is a parallelogram in which $A B$ is produced to $E$ so that $B E=A B$. Prove that $E D$ bisects BC.
10. $\quad \mathrm{PQRS}$ is a rectangle. PR is a diagonal. $\mathrm{QM} \& \mathrm{SN}$ are perpendiculars drawn from $\mathrm{Q} \& \mathrm{~S}$ on PR . Prove that QM = SN.

## Construction of Quadrilaterals.

1. Construct a quadrilateral $A B C D$ given that $A B=3.7 \mathrm{~cm}, B C=3.8 \mathrm{~cm}, C D=4.3 \mathrm{~cm}, \mathrm{DA}=4.6$ cm and $\angle \mathrm{D}=75^{\circ}$
2. Construct a quadrilateral $A B C D$ given that $B C=4.5 \mathrm{~cm}, A B=4 \mathrm{~cm}, \angle B=75^{\circ}, \angle A=90$ and $\angle \mathrm{C}=120^{\circ}$
3. Construct a quadrilateral $A B C D$ in which $A B=B C=5.5 \mathrm{~cm}, C D=4 \mathrm{~cm}, D A=6.3 \mathrm{~cm}$ and $A C$ $=9.4 \mathrm{~cm}$. Measure BD.
4. Construct a quadrilateral ABCD , Where $\mathrm{A}=65^{\circ}, \mathrm{B}=105^{\circ}, \mathrm{C}=75^{\circ}, \mathrm{BC}=5.7 \mathrm{~cm}$ and CD $=6.8 \mathrm{~cm}$.
5. Construct a quadrilateral $P Q R S$ in which $P Q=6 \mathrm{~cm}, \mathrm{QR}=5.6 \mathrm{~cm}, \mathrm{RS}=2.7 \mathrm{~cm}, \angle \mathrm{Q}=45^{\circ}$ and $\angle \mathrm{R}=90^{\circ}$.
6. Construct a parallelogram with diagonals 5.4 cm and 6.2 cm and the angle included by the two diagonals is $45^{\circ}$
7. Construct a parallelogram $A B C D$ using only ruler and compass, such that $A B=6 \mathrm{~cm}, B C=3 \mathrm{~cm}$ and angle $B=45^{\circ}$. Write the steps of construction in brief.
8. Construct a rhombus $A B C D$ using only ruler and compass, such that the side of the rhombus is 4 cm and one of its angles is $30^{\circ}$. Write the steps of construction in brief.
9. Construct a trapezium $A B C D$ in which $A B=6 \mathrm{~cm}, B C=4 \mathrm{~cm}, C D=3.2 \mathrm{~cm} \angle B=75^{\circ}$ and DC//AB.
10. Draw a trapezium $A B C D$ in which $A B / / D C, A B=7 \mathrm{~cm}, B C=5 \mathrm{~cm}, A D=6.5 \mathrm{~cm}$ and $\angle B=60^{\circ}$

## Trapezium

1. $A B C D$ is a trapezium in which $B C=10 \mathrm{~cm}, A B=5 \mathrm{~cm}, D C=11 \mathrm{~cm}$ and $A B$ parallel to $D C$. Find the area of the trapezium.
2. $A B$ and $D C$ are the parallel sides of a trapezium $A B C D$ and $\angle A D C=90^{\circ}$. Given that $A B=$ $15 \mathrm{~cm}, \mathrm{DC}=40 \mathrm{~cm}$ and the diagonal $\mathrm{AC}=41 \mathrm{~cm}$, Calculate the area of the trapezium.
3. The parallel sides of a trapezium are 12 cm and 36 cm respectively. Its non parallel sides are each equal to 15 cm . Find the area of the trapezium.

## AREA

1. Verify Euler's formula for a) Square pyramid b) Pentagonal prism c) tetrahedron
2. The area of a rhombus is equal to the area of a triangle whose base and the corresponding altitude are 24.8 cm and 16.5 cm respectively. If one of the diagonal of the rhombus is 22 cm , find the length of the other diagonal.
3. The floor of a rectangular hall has a perimeter 250 m . If the cost of paining the four walls at the rate of Rs. 10 per $\mathrm{m}^{2}$ is Rs. 1500 . Find the height of the hall.
4. A room is half as long again as it is broad. The cost of carpeting the room at Rs $3.25 \mathrm{per} \mathrm{m}^{2}$ is Rs 175.50 and the cost of papering the walls at Rs. 1.40 per $\mathrm{m}^{2}$ is Rs.240.80. If 1 door and 2 windows occupy $8 \mathrm{~m}^{2}$, find the dimensions of the room.
5. A river 2 m deep and 45 m wide is flowing at the rate of 3 km per hour. Find the volume of water that runs into the sea per minute.

## Volume and surface area.

1. A hollow cylindrical pipe is 21 dm long. Its outer and inner diameters are 10 cm and 6 cm respectively. Find the volume of copper used in making the pipe.
2. The height of a right circular cylinder is 10.5 m . Three times the sum of the areas of its two circular faces is twice the area of the curved surface. Find the volume of the cylinder.
3. The volume of a metallic cylindrical pipe is $748 \mathrm{~cm}^{3}$. Its length is 14 cm and its external radius is 9 cm . Find its thickness.
4. A well of inner diameter 14 m is dug to a depth of 15 m . Earth taken out of it has been evenly spread all around it to a width of 7 m to form an embankment. Find the height of the embankment.
5. A cloth having an area of $165 \mathrm{~m}^{2}$ is shaped into a cylindrical tent of radius 5 m . How many students can sit in the tent if a student occupies $5 / 7 \mathrm{~m}^{2}$ ? Find the volume of air for each student.
6. The difference between inside and outside surfaces of cylindrical tube 14 cm long is $88 \mathrm{sq} . \mathrm{cm}$. If the volume of the tube is 176 cubic cm . find the inner and outer radii of the tube.
7. The area of three adjacent faces of a cuboidal box are $120 \mathrm{~cm}^{2}, 72 \mathrm{~cm}^{2}$ and $60 \mathrm{~cm}^{2}$ respectively. Find the volume of the box.
8. The total surface area of a hollow cylinder which is open from both sides is $4620 \mathrm{~cm}^{2}$, area of base ring is $115.5 \mathrm{~cm}^{2}$ and height 7 cm . Find the thickness of the cylinder.
9. A closed cylinder has diameter 8 cm and height 10 cm . Find its total surface area and volume.
10. A cylindrical bucket, 28 cm in diameter 72 cm high is full of water. The water is emptied into
a rectangular tank, 66 cm long and 28 cm wide. Find the height of the water level in the tank.
11. A cylindrical tube, open at both ends, is made of metal. The internal diameter of the tube is 10.4 cm and its length is 25 cm . The thickness of the metal is 8 mm everywhere. Calculate the volume of the metal.

## RATIO AND PROPOTION

1. The extension in an elastic string varies directly as the weight hung on it. If a weight of 150 g produces an extension of 2.8 cm , what weight would produce an extension of 19.6 cm ?
2. A group of 120 men had provisions for 200 days. After 5 days, 30 men died due to an epidemic. How long will the remaining food lost?
3. 1200 soldiers in a fort had enough food for 28 days. After 4 days. Some soldiers were transferred to another fort and thus the food lasts for an extra 32 days. How many soldiers left the fort?
4. If 12 men or 15 woman can finish a piece of work in 66 days. How long will 2 men and 3 woman take to finish the work?
5. If 5 men or 7 women earn Rs. 525 per day, how much would 7 men and 13 women earn per day?
6. In an army camp of 1400 men, there is enough food to last for 18 days if each man consumes 396 g per day. How many men should leave the camp so that the same food may last for 21 days with each man having 432 g per day.

## Bar Graph

1. The following table shows that the favorite sports of 250 students of a school. Represent the data by a bar graph.

| Sports | Cricket | Foot ball | Tennis | Badminton | Swimming |
| :--- | :--- | :--- | :--- | :--- | :--- |
| No of students | 75 | 35 | 50 | 25 | 65 |

2. Given below is a table which shows the year wise strength of a school. Represent this data by a bar graph.

| Year | $2001-02$ | $2002-03$ | $2003-04$ | $2004-05$ | $2006-07$ |
| :--- | :---: | :---: | :---: | :---: | :---: |
| No of students | 800 | 975 | 1100 | 1400 | 1625 |

3. The air distances of four cities from Delhi (in km) are given below. Represent the data by a bar graph.

| City | Kolkata | Mumbai | Chennai | Hyderabad |
| :--- | :--- | :--- | :--- | :--- |
| Distance from Delhi in Km | 1340 | 1100 | 1700 | 1220 |

4. The following is the distribution of weights in kg of 52 persons:

| Weight in kg | $30-40$ | $40-50$ | $50-60$ | $60-70$ | $70-80$ |
| :--- | :---: | :---: | :---: | :---: | :---: |
| Persons | 10 | 15 | 17 | 6 | 4 |

5. What is the lower limit of class $50-60$ ?
6. Find the class mark of the classes $40-50,50-60$
7. What is the class size?

## Pie Chart

1. The number of students in a school speaking different languages is given below. Present the data in a pie chart

| Language | Hindi | English | Marathi | Bengali | Tamil |
| :--- | :--- | :--- | :--- | :--- | :--- |
| No of students | 40 | 12 | 9 | 7 | 4 |

2. The number of hours spend by a school boy on various activities on a working day are given below.

| Activity | School | Homework | Play | Sleep | Others |
| :--- | :--- | :--- | :--- | :--- | :--- |
| No of hours | 8 | 4 | 3 | 7 | 2 |

3. Draw a pie chart for the following data of the investment pattern in a five year plan:

| Agriculture | Irrigation | Small industries | Transport | Power | Social service |
| :---: | :---: | :---: | :---: | :---: | :---: |
| $14 \%$ | $16 \%$ | $29 \%$ | $17 \%$ | $16 \%$ | $8 \%$ |

## Probability

1. A coin is tossed 500 times and we get head;285times, tail;215 times, when a coin is tossed at random, what is the probability of getting i) a head ii) a tail?
2. Two coins are tossed 400 times and we get two heads; 112 times, one head : 160 times, zero head : 128 times when two coins are tossed at random, what is the probability of getting i) 2 heads ii) One head iii) 0 head.
3. Three coins are tossed 200 times and we get three heads: 39 times, two heads 58 times, one head; 67 times, 0 head ; 36 times. When three coins are tossed at random what is the probability of getting i) 3 heads ii ) 1 head iii) 0 head iv) 2 heads.
4. Two coins are tossed simultaneously 500 times, we get two heads 105 times, one head 275 times and no head 120 times. Find the probability of getting i) 2 tails ii) one tails iii) 2 heads.
5. All kings, jacks and diamonds have been removed from a pack of cards and the remaining cards are well shuffled. A card is drawn at random. Find the probability that it is (i) a red queen (ii) a face card (iii) a diamond (iv) a black card.
6. The shoppers who come to a departmental store are marked as : man(M), woman(W), boy (B)or girl (G). The following list gives the shoppers who came during the first hour in the morning:

W W M W G W M W B W G M W M B GBW GWMGWMWGMWBWMWGWMWGM W B G W M W W M W G W M W G W M W G W M W W. Make a frequency distribution table using tally marks.
7. A box contains 17 cards numbered $1,2,3,4, \ldots \ldots$. A card is drawn at random from the box. Find the probability that the number on the card is i) odd ii) even iii) prime iv) divisible by 3 v ) divisible by 2 and 3 both vi) divisible by 4 or 7 vii) divisible by 2 or 3 .
8. Numbers 2 to 10 are written on separate slips( one number on one slip), kept in a box and mixed well. One slip is chosen from the box without looking onto it. What is the probability of. i) getting a number 6 ? ii) getting a prime number iii) getting a number greater than 5 ?

## Graph

1. Plot the following points on the graph paper and name the quadrant or axis in which it lies

$$
(4,-2)(-1,3)(0,-1)(5,-2)(2,1)(-5,-3) \text { and }(-2,0)
$$

2. Draw the graph of the following equations.
i) $3 x+2 y=5$
ii) $y-3 x=2$
