Brain International School
Vikas Puri, New Delhi

REVISION SHEET

SUBJECT: MATHEMATICS **CLASS-IX** **TERM 2**

CHAPTER-1 :NUMBER SYSTEM

1) **$2\sqrt{3}\times\sqrt{3}+1$ is equal to : (A) $2\sqrt{9}$ (B) 6 (C) 7 (D) $4\sqrt{6}$**

2) Which of the following is equal to x

(A) $x^{\frac{12}{7}} - x^{\frac{5}{7}}$ (B) $\sqrt[12]{(x^4)^{\frac{1}{3}}}$ (C) $(\sqrt{x^3})^{\frac{2}{3}}$ (D) $x^{\frac{12}{7}} \times x^{\frac{7}{12}}$

3)

If a = -2 , b = -1, then find $a^{-b} - b^{a}$.

4) If $x = \frac{2-\sqrt{5}}{2+\sqrt{5}}$ and $y = \frac{2+\sqrt{5}}{2-\sqrt{5}}$, find the value of $x^2 - y^2$

5) Determine rational numbers p and q if $\frac{7+\sqrt{5}}{7-\sqrt{5}} - \frac{7-\sqrt{5}}{7+\sqrt{5}} = p - 7\sqrt{5}\,q$.

6) Show that: $\frac{1}{3-\sqrt{8}} - \frac{1}{\sqrt{8}-\sqrt{7}} + \frac{1}{\sqrt{7}-\sqrt{6}} - \frac{1}{\sqrt{6}-\sqrt{5}} + \frac{1}{\sqrt{5}-2} = 5$

CHAPTER-2: POLYNOMIALS

1)

Expand : i) $\left(\frac{1}{x} + \frac{y}{3}\right)^3$

ii) $\left(4 - \frac{1}{3x}\right)^3$

2)

$x + \frac{1}{x} = 3$, find the value of $x^2 + \frac{1}{x^2}$ and $x^3 + \frac{1}{x^3}$.

3)

If $x - 2y = 11$ and $xy = 8$, find the value of $x^3 + 8y^3$.

4)

If $a + b + c = 6$ and $ab + bc + ca = 11$, find the value of $a^3 + b^3 + c^3 - 3abc$.

5)

Using identities, find the product of

i) $(x + 1)(x - 1)(x^2 + 1)(x^4 + 1)$.

ii) $\left(x - \frac{y}{5} - 1\right)\left(x + \frac{y}{5} - 1\right)$.

6) **Calculate the value of $9x^2 + 4y^2$ if $xy = 6$ and $3x + 2y = 12$.**

7) **Find out the values of a and b so that $(2x^3 + ax^2 + x + b)$ has (x + 2) and (2x – 1) as factors.**

8)

Factorise the following

(i) $16p^3q^3 + 54r^3$

(ii) $\frac{a^3}{8} + 8b^3$

(iii) $2\sqrt{2}a^3 + 3\sqrt{3}b^3$

(iv) $8a^4b + \frac{1}{125}ab^4$

(v) $a^7 - 64a$

9)

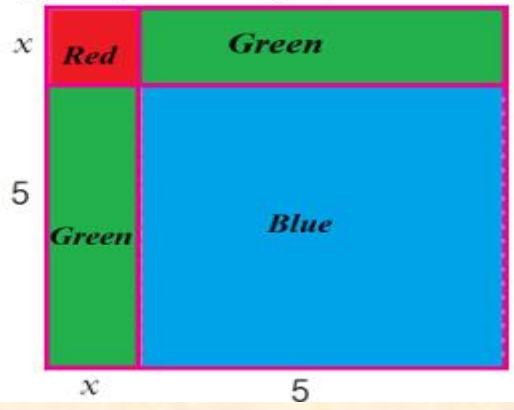
Let R_1 & R_2 are the remainders when the polynomials $f(x) = 4x^3 + 3x^2 - 12ax - 5$ and $g(x) = 2x^3 + ax^2 - 6x - 2$ are divided by (x-1) and (x-2) respectively.
If $3R_1 + R_2 - 28 = 0$, find the value of a.

10) Assertion (A): The value of $(28)^3 + (-15)^3 + (-13)^3$ is 16380.

Reason(R): If $a + b + c = 0$, then $a^2 + b^2 + c^2 = 3abc$

11) **CASE STUDY QUESTION**

Mahesh formed a square using four pieces of origami, as shown in the figure.



Based on above information answer the following questions.

(i) (a) Write the trinomial which describes the area of the given square. [1]

(b) If area of the square is given by the polynomial $x^2 - 10x + 25$; then what will be the side of the square? [1]

(ii) (a) If $p(y) = y^2 - 2y + 1$, then find the value of $p(y) + p(-y)$. [1]

(b) What is the degree of the trinomial $x^3 + 2x^2 + 3x + 4$? [1]

CHAPTER-3: COORDINATE GEOMETRY

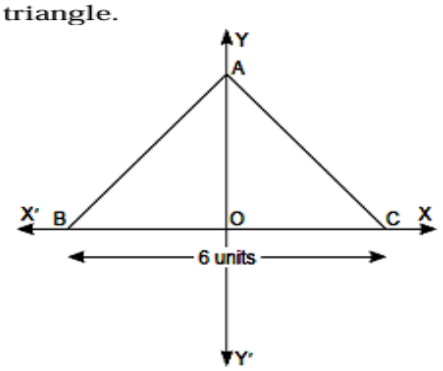
1) Find the coordinates of a point:

(i) whose ordinate is 6 and lies on the y-axis (ii) whose abscissa is –3 and lies on the x-axis.

2) In which quadrant the following points lie? (3, 2), (2, –3), (–4, 4) and (–2, –3)

3)

Point A is chosen on *y*-axis in such a way that ΔABC is an equilateral triangle. The base BC of the ΔABC is shown in the figure. Find the coordinates of (i) the mid-point of BC (ii) the area of the triangle (iii) the vertices of a triangle.



4)P(3, 2) and Q(7, 7) are two points. Perpendiculars are drawn to the x-axis from P and Q meeting the x-axis at L and M respectively. Show working on a graph.

(i) Find the coordinates of L and M. (ii) Find the length of LM.

CHAPTER-4: LINEAR EQUATIONS IN TWO VARIABLES

1) Find the solution of the linear equation $x + 2y = 8$ which represents a point on the: (i) x-axis (ii) y-axis

2) Find the value of a, if the line $3y = ax + 7$, will pass through: (i) (3, 4), (ii) (1, 2), (iii) (2, –3)

3) Write $3x + 2y = 18$ in the form of $y = mx + c$. Find the value of m and c. Is (4, 3) lies on this linear equation?

4) **CASE STUDY QUESTION**

Christmas is celebrated on 25 December every year to remember the birth of Jesus Christ, who Christians believe is the son of God. Santa Claus, also known as the Father of Christmas, is a legendary character originating in western Christian culture and he brings gifts for everyone on Christmas. Let Santa Claus brings 3 chocolates for each child and 2 chocolates for each adult present at the Christmas party at Michael's home along with a Christmas cake. He distributes total 90 chocolates among all.

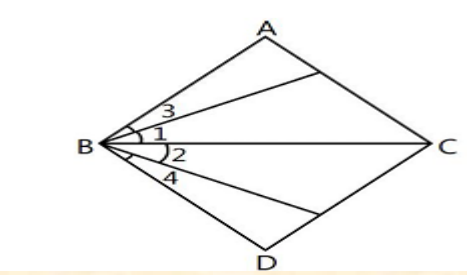
(a) How to represent the above situation in a linear equation in two variables by taking the number of children as x and the number of adults as y? If the number of children is 10, then find the number of adults at the Christmas party.

(b) Find the value of k, if x = 5, y = 1 is a solution of the equation 5x + 7y = k.

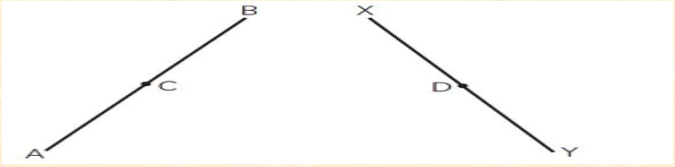
(c) Write the standard form of the linear equation y – x = 7.

CHAPTER-5: INTRODUCTION TO EUCLID'S GEOMETRY

1) In the given figure, we have ∠1 = ∠ 2, ∠ 3 = ∠ 4. Show that ∠ ABC = ∠ DBC. State the Euclid's axiom used.



2) In the figure, we have: AC = XD, C is the midpoint of AB and D is the mid-point of XY. Using an Euclid's axiom, show that AB = XY.



3) If x + y = 10, then x + y + z = 10 + z. Euclid's which axiom illustrates this statement?

4) Euclid stated that all right angles are equal to each other in the form of:
(a) an axiom (b) a definition (c) a postulate (d) a proof

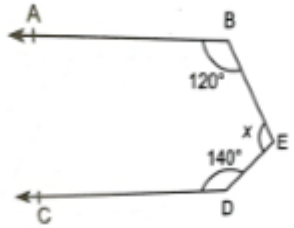
5)

Assertion(A): If a point C be the mid-point of a line segment AB, then the relation among AC, BC and AB is AC = CB = $\frac{1}{2}$ AB.

Reason(R): If appoint P be the mid-point of MN and C is the mid-point of MP, then the relation between MC and MN is MC = $\frac{1}{4}$ MP.

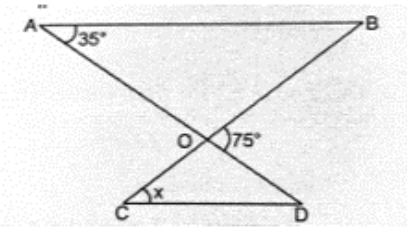
CHAPTER-6:LINES AND ANGLES

1) In the given figure, AB ‖ CD. Find the value of x.



2)

In the given figure , find the value of x if AB ‖ CD.



3)

An angle is 30˚ more than one-half of its compliment. Find the angle in degrees.

4)

An angle is 20° more than three times the given angle. If the two angles are supplementary, then the angles are

(a) $\frac{70^0}{4}, \frac{290^0}{4}$ (b) 40°, 140° (c) 60°, 120° (d) 40°, 50°

5) **Assertion (A):** Two adjacent angles always form a linear pair.

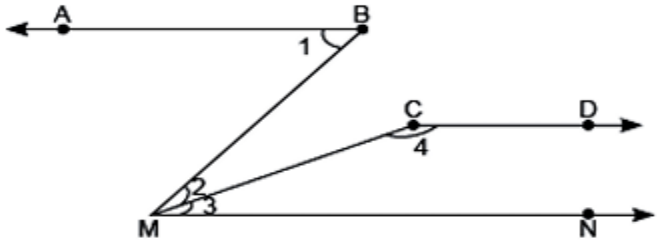
Reason (R): In a linear pair of angles, two non-common arms are opposite rays.

6)**Assertion (A):** If two interior angles on the same side of a transversal intersecting two parallel lines are in the ratio 5 : 4, then the greater of the two angles is 100 degree.

Reason (R): If a transversal intersects two parallel lines, then the sum of the interior angles on the same side of the transversal is 180 degree.

7.

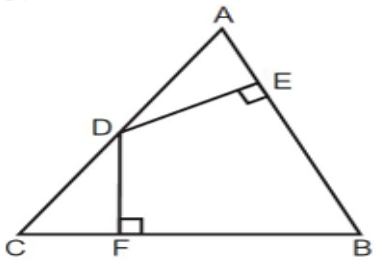
In the given figure, ∠1 = 55°, ∠2 = 20°, ∠3 = 35° and ∠4 = 145°. Prove that AB ‖ CD.



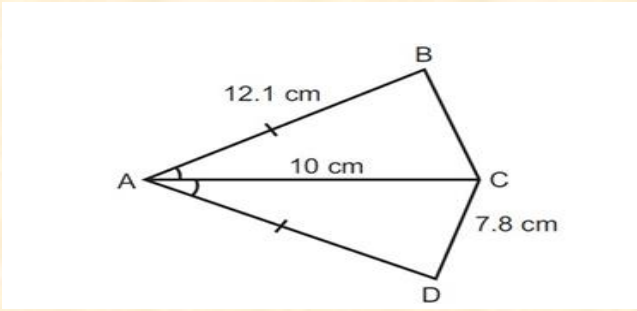
CHAPTER-7: TRIANGLES

1)

In ΔABC, D is a point on side AC such that DE = DF and AD = CD and DE ⊥ AB at E and DF ⊥ CB at F, then prove that AB = BC.

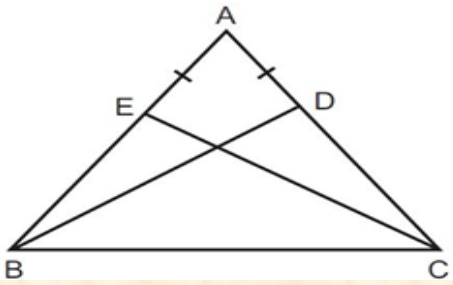


2) Find the perimeter of the quadrilateral ABCD (as shown in the figure), if ∠CAB = ∠CAD and also AB = AD.



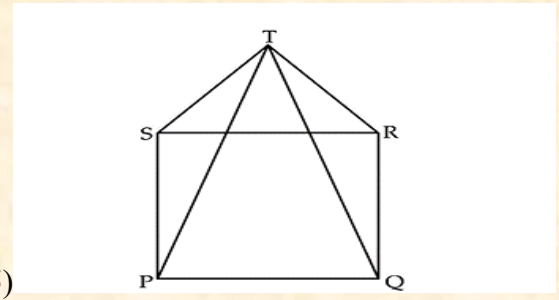
3)

ABC is an isosceles triangle with AB = AC and BD and CE are its two medians. Show that BD = CE.



4) In figure, PQRS is a square and SRT is an equilateral triangle. Prove that (i) PT = QT(ii) ∠TQR = 15°.

5)



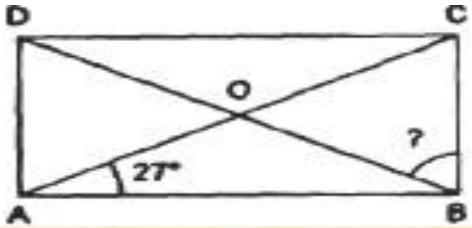
Ritish wants to prove that ΔFGH ≅ ΔJKL using SAS rule. He knows that FG = JK and FH= JL. What additional piece of information does he need?

(a) ∠F = ∠J (b) ∠H = ∠L (c) ∠G = ∠K (d) ∠F = ∠G

CHAPTER-8: QUADRILATERALS

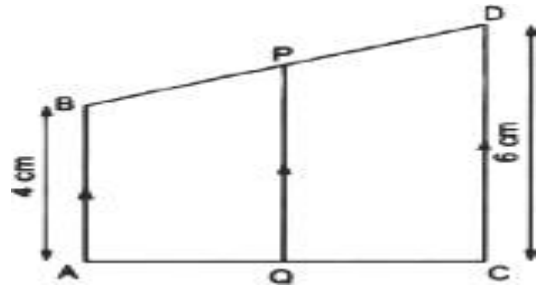
1) The adjoining figure is a rectangle whose diagonals AC and BD intersect at O. If ∠OAB = 27°, then find ∠OBC.

3 Marks)



2) In the adjacent figure, AB || QP || CD, Q is the mid point of AC. If AB = 4 cm and CD = 6cm then find PQ.

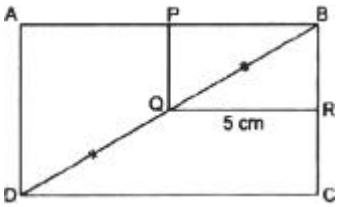
4 Marks)



3) In the adjoining figure, ABCD and PQRB are rectangles where Q is the mid point of BD.

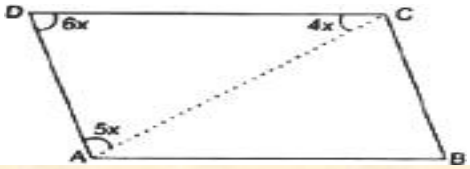
If QR = 5 cm, then find the length of AB.

4 Marks)

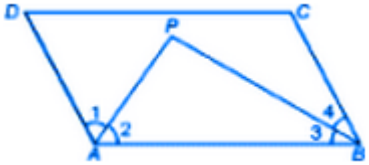


4) In the adjoining figure, ABCD is a ||gm. Find the angles A, B, C and D.

3 Marks)



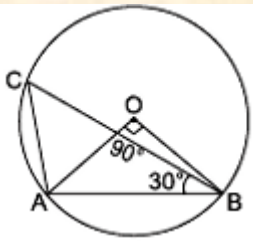
5) In a parallelogram ABCD, bisectors of consecutive angles A and B intersect at P. Prove that ∠APB = 90°



CHAPTER-9: CIRCLES

1)Given a circle of radius 5 cm and centre O. OM is drawn perpendicular to the chord XY. If OM = 3 cm, then length of chord XY is (a) 4 cm (b) 6 cm (c) 8 cm (d) 10 cm

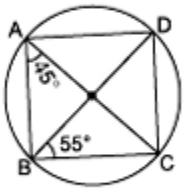
2) In figure, ∠AOB = 90° and ∠ABC = 30°, then ∠CAO is equal to



(a) 30° (b) 45° (c) 90° (d) 60°

3)

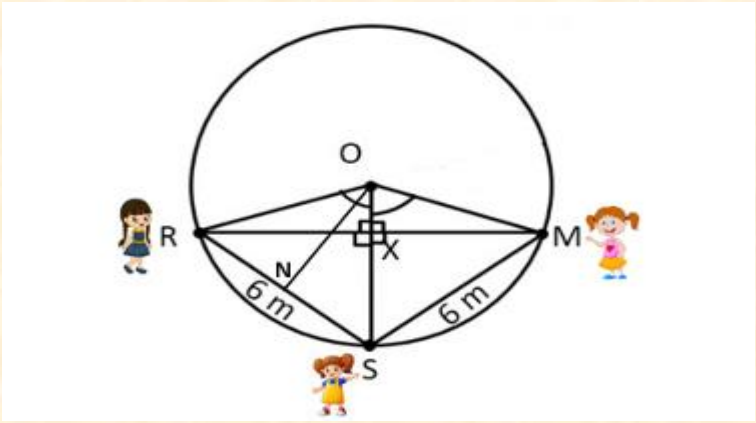
In the given figure, ∠DBC = 55°, ∠BAC = 45° then ∠BCD is



(a) 45° (b) 55° (c) 100° (d) 80°

4)**CASE STUDY QUESTION**

Three girls Reshma, Salma and Mandip are playing a game by standing on a circle of radius 5m drawn in a park. Reshma throws a ball to Salma, Salma to Mandip, Mandip to Reshma. The distance between Reshma and Salma and between Salma and Mandip is 6m each. In the given below figure Reshma's position is denoted by R, Salma's position is denoted by S and Mandip's position is denoted by M.

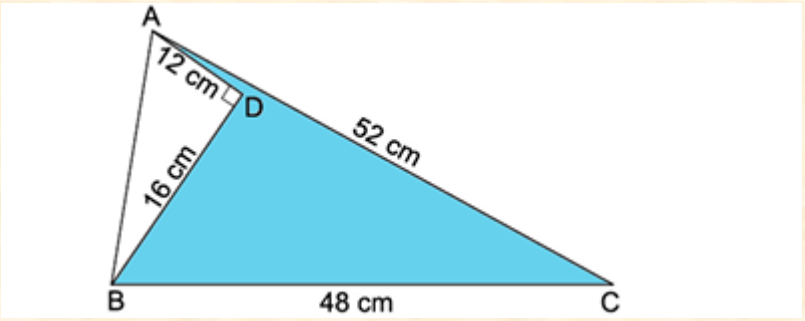


(i) Find the area of the triangle ORS. [2]

(ii) What is the distance between Reshma and Mandip? [2]

CHAPTER-10: HERON'S FORMULA

1) Find the area of the shaded region in the figure given below.



2) The perimeter of a triangle is 50 cm. One side of the triangle is 4 cm longer than the smallest side and the third side is 6 cm less than twice the smallest side. Find the area of the triangle.

3) The area of an equilateral triangle with side $4\sqrt{3}$ cm is

(a) 20 cm^2 (b) $20\sqrt{3}$ cm^2 (c) 18.784 cm^2 (d) 20.784 cm^2

4) The base of a right triangle is 8 cm and hypotenuse is 10 cm. Its area will be

(a) 24 cm^2 (b) 40 cm^2 (c) 48 cm^2 (d) 80 cm^2

5) If the side of rhombus is 10 cm and one diagonal is 12 cm, then area of rhombus is

(a) 96 cm^2 (b) 48 cm^2 (c) 72 cm^2 (d) 80 cm^2

CHAPTER-11: SURFACE AREAS AND VOLUMES

1) Curved surface area of a cone is 308 cm^2 and its slant height is 14 cm. Find its total surface area. **(ans: 462 cm^2)**

2) The diameters of two cones are equal. If their slant heights are in the ratio 7:4, find the ratio of their curved surface area. **(ans: 7 : 4)**

3) T)he radius and height of a cone are in the ratio 4 : 3. The area of the base is 154 cm^2. Find the area of the curved surface. (Use $\pi = 22/7$) **(ans: 192.5 cm^2)**

4) The volumes of two spheres are in the ratio 64 : 27. Find their radii, if the sum of their radii is 21 cm. **(ans : 12cm And 9cm)**

5) **CASE STUDY QUESTION**

Mathematics teacher of a school took his 9th standard students to show Taj Mahal. It was a part of their Educational trip. The teacher had interest in history as well. He narrated the facts of Taj Mahal to the students. Then the teacher said in this monument one can find combination of solid figures. There are 4 pillars which are cylindrical in shape. Also, 2 domes at the back side are hemispherical. One big dome is at the centre. It is the finest example of the symmetry. (Use $\pi = 22/7$)

(i) How much cloth material will be required to cover 2 small domes each of radius 4.2 metres? (ans: **221.76 m^2**)

(ii) Write the formula to find the volume of one pillar (including hemispherical dome)

(iii) Find the volume of the hemispherical dome which is situated at the centre if its base radius is 7 m
(ans: **718.66 m^3**)

(iv) What is the lateral surface area of all 4 pillars if height of each pillar is 14 m and base radius is 1.4 m (without dome)? (Ans: **591.36 m^2**)

CHAPTER-12: STATISTICS

Q1) The class marks of a frequency distribution are given as follows: 15, 20, 25, ... The class corresponding to the class mark 20 is (a) 12.5–17.5 (b) 17.5–22.5 (c) 18.5–21.5

Q2)

To draw a histogram to represent the following frequency distribution:

Class Interval	5 – 10	10 – 15	15 – 25	25 – 45	45 – 75
Frequency	6	12	10	8	15

The adjusted frequency for the class 25–45 is

(a) 6 (b) 5 (c) 3 (d) 2

Q3)

Draw a frequency polygon for the following distribution:

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
No. of marks	7	10	6	8	12	3	2	2

Q4)

The marks obtained (out of 100) by a class of 80 students are given below:

Marks	10 – 20	20 – 30	30 – 50	50 – 70	70 – 100
Number of students	6	17	15	16	26

Construct a histogram to represent the data above.

Q5)

Construct a frequency polygon for the following frequency distribution.

Weight (in kg)	40 - 45	45 - 50	50 - 55	55 - 60	60 - 65	65 - 70
No. of people	15	25	28	15	12	5

Q6)**CASE STUDY QUESTION**

In order to monitor and reduce reckless driving on Delhi roads, authorities have taken proactive measures by installing advanced speed-monitoring cameras at strategic locations prone to over speeding. These cameras aim to enhance road safety and ensure compliance with traffic regulations. Below is a frequency distribution table representing the speeds of cars observed passing through a specific monitoring spot on a particular day in Delhi. This data provides insights into driving patterns and helps identify areas where enforcement or awareness campaigns may be required.

Speed (in km/h)	Numbers of four-wheeler
30 – 40	3
40 – 50	6
50 – 60	25
60 – 70	65
70 – 80	50
80 – 90	28
90 – 100	14

(a) Draw a Histogram for the frequency distribution table. (2)

(a) Draw a frequency polygon using Histogram for the frequency distribution table. (2)