BRAIN INTERNATIONAL SCHOOL

SESSION 2024-25

CLASS: IX **TERM 1 REVISION SHEET** **SUBJECT: MATHEMATICS**

NUMBER SYSTEM

Q1. Insert 10 rational numbers between $\frac{-5}{3}$ and $\frac{6}{13}$.

Q2. Express the following into p/q form:

i) $0 \cdot 333\ldots$ Ans: $\frac{1}{3}$

ii) $0 \cdot 57575757\ldots$ Ans: $\frac{19}{33}$

iii) $2 \cdot 4178178178178178\ldots..$ Ans: $\frac{12077}{4995}$

Q3. Examine whether the following are rational or irrational numbers.

i) $3+\sqrt{3}$ ii) $(5)^{\frac{1}{3}}(25)^{\frac{1}{3}}$ iii) $\sqrt{7}\times\sqrt{343}$ iv) $\sqrt{\frac{13}{117}}$ v) $\sqrt{8}\times\sqrt{2}$

vi) $9.121212\ldots$ vii) $\frac{11}{9}$ viii) 4.213689156 ix) π x)
$5+2\sqrt{23}-\sqrt{25}-\sqrt{92}$

Q 4. Simplify the following:

i) $\frac{\sqrt{72}}{5\sqrt{72}+3\sqrt{288}-2\sqrt{648}}$ Ans: 1/5

ii) $\frac{\sqrt{5}+\sqrt{3}}{\sqrt{80}+\sqrt{48}-\sqrt{45}-\sqrt{27}}$ Ans: 1

iii) $\left(2\sqrt{2}+3\sqrt{3}\right)\left(2\sqrt{2}-3\sqrt{3}\right)$ Ans: -19

iv) $\left(2\sqrt{8}-3\sqrt{2}\right)^2$ Ans: 2

Q5. Represent $\sqrt{2}, \sqrt{3}\ and\ \sqrt{5}$ on the real number line.

Q6. Find the value of a and b if

i) $\dfrac{3+\sqrt{2}}{3-\sqrt{2}} = a + b\sqrt{2}$ $\quad Ans: a = \dfrac{11}{7}\ and\ b = 6/7$

ii) $\dfrac{4+3\sqrt{5}}{4-3\sqrt{5}} = a + b\sqrt{5}$ Ans: a = - 61/29 and b = - 24/ 29

Q7. If $x = 3 + 2\sqrt{2}$, find the value of

i) $x + \dfrac{1}{x}$ $\quad Ans:\ 6$

ii) $x^2 + \dfrac{1}{x^2}$ Ans: 34

iii) $x^3 - \dfrac{1}{x^3}$ $\quad Ans:\quad 140\sqrt{2}$

Q8. Prove : $\dfrac{2^{30} + 2^{29} + 2^{28}}{2^{31} + 2^{30} - 2^{29}} = \dfrac{7}{10}$

$Q9\ \ Prove: \dfrac{1}{1 + x^{a-b}} + \dfrac{1}{1 + x^{b-a}} = 1$

$Q10.\ Prove: \left(\dfrac{x^l}{x^m}\right)^{\frac{1}{lm}} \cdot \left(\dfrac{x^m}{x^n}\right)^{\frac{1}{mn}} \cdot \left(\dfrac{x^n}{x^l}\right)^{\frac{1}{nl}} = 1$

POLYNOMIALS

Q1. Classify the following as constant, linear, quadratic, cubic and quadric polynomials .

i) $x - x^3$

ii) $y^4 - y$

iii) $y + y^2 + 4$

iv) $\sqrt{2}x - 1$

v) $(2x-5)(2x^2-3x+1)$

vi) 77

Q2. For the polynomial P(x)= $\frac{x^3+2x^2+3x}{x}+4x^6+2x+8$, find the

i) The degree of the polynomial

ii) The coefficient of x

iii) The constant term

iv) The coefficient of x^2

Q3. Which of the following expression are polynomial? In case of a polynomial, write its degree.

i) $x^5-2x^3+x+\sqrt{3}$

ii) $y^3+\sqrt{3y^2}$

iii) $\frac{x^{\frac{3}{2}}}{\sqrt{x}}+9x^2-1$

iv) $x^{-2}+2x+3$

v) $x^4-x^{\frac{3}{2}}+x-3$

vi) $\frac{x-x^3}{x}$

vii) $\frac{x+1}{x+2}$

Q4. Check whether q(x) is a multiple of g(x) or not.

i) $q(x)=2x^3-11x^2-4x+5 \ \ and \ \ g(x)=2x+1$

ii) $q(x)=3x^3+7x$ and $g(x)=7+3x$

iii) $q(x)=12x^3-13x^2-5x+7$ and $g(x)=2+3x$

Q5. Divide $P(x)=x^3+x^2+2x+3$ by $g(x)=x+2$. Also find P(-2) .What do you observe

Q6. If the polynomials $(2x^3+ax^2+3x+5)$ and (x^3+x^2-2x+a) leaves the same remainder when divided by (x-2), find the value of "a" and also remainder in each case.

Q7. The polynomials $P(x)=x^4-2x^3+3x^2-ax+b$ when divided by (x-1) and (x+1) leaves the remainder 5 and 9 respectively. Find the value of and b. Hence, find the remainder when p(x) is divided by (x-2).

Q8. Find the zero(es) of the following polynomials:

i) $p(x)=x^2+x-6$

ii) $p(x)=2x^2+5x-3$

iii) $P(x) = x^3 + 5x^2 - 14x$

iv) $P(x) = x^3 + 6x^2 - 9x - 14$

Q9. Factorize the following:

i) $\left(x^2 - \frac{y^2}{100}\right)$

ii) $49x^2 - \frac{1}{4}$

iii) $x^4 + 4$

iv) $x^4 + 3x^2 + 4$

v) $2 - 50x^2$

vi) $x^2 + 5\sqrt{3}x + 12$

vii) $\sqrt{2}x^2 + 9x + 4\sqrt{2}$

viii) $4a^2 + 9b^2 + 16c^2 + 12ab - 24bc - 16ca$

ix) $16x^2 + 4y^2 + 9p^2 - 16xy - 12yp + 24xp$

x) $27 - 125a^3 - 135a + 225a^2$

xi) $1 + 64x^3$

xii) $(2a + 3b)^3 - (2a - 3b)^3$

Q10. Find the value of following using suitable identity:

i) $\left(\frac{1}{2}\right)^3 + \left(\frac{1}{3}\right)^3 - \left(\frac{5}{6}\right)^3$

ii) $\frac{59 \times 59 \times 59 - 9 \times 9 \times 9}{59 \times 59 + 59 \times 9 + 9 \times 9}$

(iii) $(999)^2$

(iv) $(101)^3$

(v) $15^3 - 10^3$

Q11. If a , b ,c are all nonzero and a + b + c = 0 , prove that

$$\frac{a^2}{bc} + \frac{b^2}{ca} + \frac{c^2}{ab} = 3$$

Q12. If $\frac{a}{b} + \frac{b}{a} = 1$ then find the value of $(a^3 - b^3)$.

Q13. If $(x + y + z) = 9$ and $xy + yz + zx = 23$, find the value $x^3 + y^3 + z^3 - 3xyz$.

CASE STUDY

Beti Bachao, Beti Padhao (BBBP) is a personal campaign of the Government of India that aims to generate awareness and improve the efficiency of welfare services intended for girls.

In a school, a group of $(x + y)$ teachers, $(x^2 + y^2)$ girls, and $(x^3 + y^3)$ boys organized a campaign on "**Beti Bachao, Beti Padhao".**

(i) Which Mathematical concept is used here?

(ii) Write the correct identities to be used here.

(iii) If in the group, there are 10 teachers and 58 girls, then what is the number of boys?

(iv) Find $(x^2 – y^2)$, if $(x – y) = 23$ and number of teachers are 10?

COORDINATE GEOMETRY

Q1 Draw the line X'OX AND YOY' as axes on the plane of a graph paper and plot the points given below:

i)	A(5,3)	v) E(-6,-4)
ii)	B(-3,2)	vi) F(8,0)
iii)	C(-5,-4)	vii) G(3,5)
iv)	D(2,-6)	viii) H(0, -5/2)

Q2 In which quadrant do the given points lie?

i) (4, -2)

ii) (-3,7)

iii) (-1,-2)

iv) (3,6)

Q3 On which axis do the given points lie?

i) (7,0) (ii)(0, -3) (iii) (0,6) (iv)(-5,0)

Q4 The three vertices of a triangle ABC are A(1, 4) , B(-2, 2) and C (3,2) . Plot these points on the graph and calculate the area of triangle ABC.

Q5 The three vertices of a square ABCD are A (3,2) , B (-2,2) and D (-3,3) . Plot these points on a graph paper and hence, find the coordinates of C. Also find the area of square ABCD.

Q6 Find the distance of point (8,3) from x axis.

Q7 The three vertices of the rectangle ABCD are A(2,2), B(-3,2) and C(-3,5) . Plot these points on a graph paper and find the coordinates of D. Also, find the area of rectangle ABCD.

Q8 Plot the points: B(5,3),E(5,1) ,S(0,1) and T(0,3).

i) Join the points and name the figure obtained.

ii) Find the area of figure

Q9 Find the distance of the point P(4,0) from the origin .

Q10 A rectangular field of length 10 units and breadth 8 unit. One of its vertex lie on the origin. The longer side is along x- axis and one of its vertices lie in first quadrant. Find all the vertices.

LINEAR EQUATION IN TWO VARIABLES

Q1 Write each of the following equations in the form of ax+by+c=0 and indicate the values of a, b ,c in each case .

i) 3=2x+y

ii) 3x-8=5y

iii) X=4y

iv) $\frac{x}{3} - \frac{y}{2} = 5$

v) $4y - 3 = \sqrt{2}x$

vi) $\pi x + y = 6$

vii) $\frac{x}{2} - \frac{y}{3} = \frac{1}{6} + y$

viii) $3x - y = x - 1$

Q2 If the points A(3,5) and B(1,4) lies on the graph of line ax + by=7 , find the value of a .

Q3 If the graph of equation $2x + ky = 10k$ intersect x-axis at point (5,0) find the value of K.

Q4 If $x = 3k + 2$ and $y = 2k - 1$ is a solution of the equation $4x - 3y = -1$ find the value of k.

Q5 Find five different solution of each of following equations:

i) $2x - 3y = 6$

ii) $\frac{2x}{5} + \frac{3y}{10} = 3$

iii) $3y = 4x$

Q6. Find out the coordinate of the points where the line 2x+3y=6 intersect the x-axis and y – axis .

LINES AND ANGLES

Q1 Find the measure of angle which is 24^omore than its complement.

Q2 Two supplementary angles are in the ratio of 3:2. Find the angles

Q3 The supplement of an angle is one-third of the given angle. Find the measure of the given angle and its supplement.

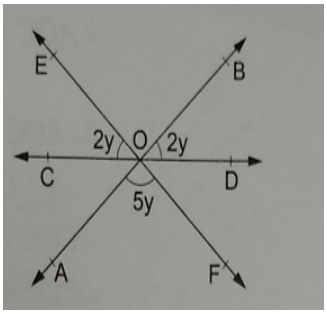
Q4 Find the value of x for which the angles $(2x-5)^0$ and $(x-10)^0$ are the complementary angles.

Q5 Find the angle whose supplement is four times its complement.

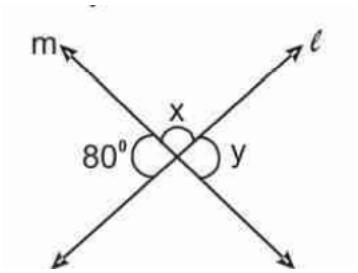
Q6 Calculate $\angle AOC, \angle BOC, \text{ and } \angle AOE$ in the adjoining figure it is being given that $\angle COD = 90°, \angle BOE = 72°$ and AOB is a straight line.

Q7 In the given figure, AB , CD and EF are the three lines concurrent at O.

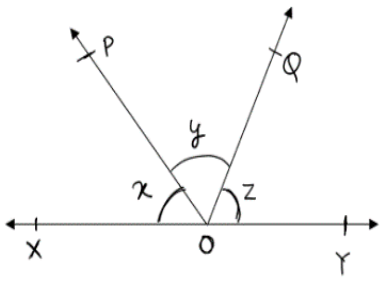
Find the value of y.



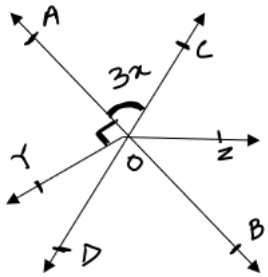
Q8 Find the values of x and y in the following figure.



Q9 In the adjoining figure x:y:z= 5:4:6 . If XOY is a straight line , find the value of x , y and z .



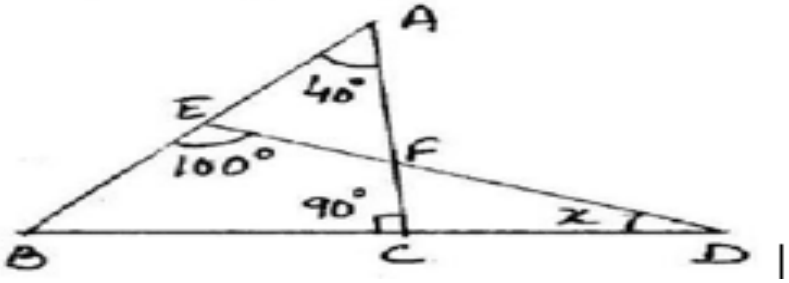
Q 10 If two straight lines intersect each other in such a way that one of the angle formed is of 90^0 .Show that each of the remaining angles measure 90^0 .



Q11. AB and CD are lines which intersect at O. OD is bisector of $\angle BOY(see\ figure)$. Find x

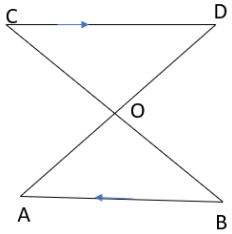
Q12.

Find x, in the given figure:



TRIANGLES

Q1 In the adjoining figure , AB||CD and O is the mid point of AD.



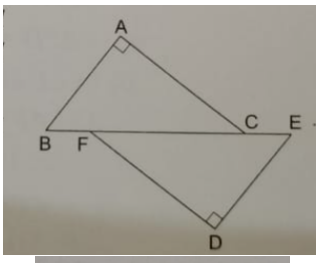
Show that

i) $\Delta AOB \cong \Delta DOC$

ii) O is the mid point of BC

.

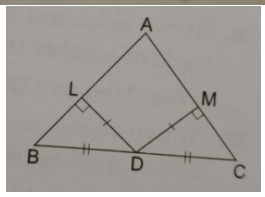
Q2) In the given figure BA ⊥AC and DE⊥DF such that AB= DE and BF=EC. Show that $\Delta ABC \cong \Delta DEF$



Q3) In an isosceles ΔABC with AB=AC , D and E are points on BC such that BE=CD . Show that AD=AE.

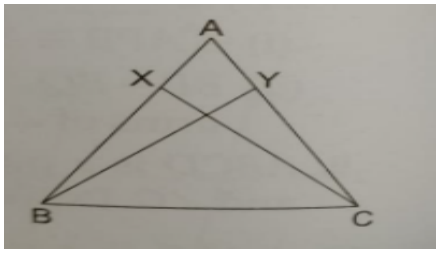
Q4) In $\Delta ABC(see\ figure)$, D is the mid point of BC. If DL ⊥AB and DM⊥ AC

such that DL=DM, prove that AB=AC .



Q5) In the adjoining figure , X and Y are respectively two points on equal sides AB and AC of ΔABC such that AX=AY.

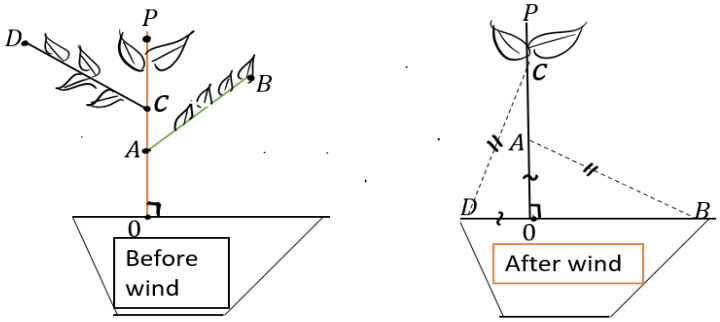
Prove that CX=BY.



Q6)In an isosceles triangle prove that altitude from the vertex bisects the base .

CASE STUDY

Q7) In a nursery , the branches of a plant bent down due to heavy wind. The branches bent down and touches the base of the plant as depicted in given figure. Branches AB and CD are of equal length. Due to wind, they bent down so as to form two triangles such that DO =AO . The main branch PO is standing vertically.



Based on the above information, answer the following questions:

*(i)*State the criteria used for congruency *in* ΔAOB and ΔDOC

(ii)If the width of the pot which is DB =7 cm and OC= 6 cm ,Find the length of branch CD.

(iii) Find the area of ΔAOB.

(iv)If the points A and C trisect the main branch OP , then find the length of the main branch OP.

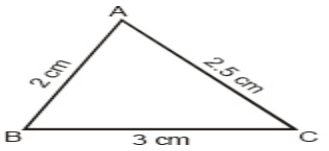
Multiple Choice Questions

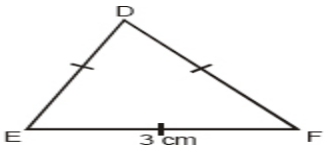
1. Choose the correct statement
   (a) a triangle has two right angles
   (b) all the angles of a triangle are more than 60°
   (c) an exterior angle of a triangle is always greater than the opposite interior angles
   (d) all the angles of a triangle are less than 60°

2. In two triangles, ABC and PQR, ∠A = 30°, ∠B = 70°, ∠P = 70°, ∠Q = 80° and AB = RP, then
   (a) ΔABC ≅ ΔPQR (b) ΔABC ≅ ΔQRP
   (c) ΔABC ≅ ΔRPQ (d) ΔABC ≅ ΔRQP

3. In two triangles ABC and DEF, AB = DE, BC = DF and AC = EF, then
   (a) ΔABC ≅ ΔDEF (b) ΔABC Δ ΔEFD
   (c) ΔABC ≅ ΔFDE (d) none of these

4. Are the given triangles congruent?





(a) yes (b) no (c) can't say

5. Given two right angles triangles ABC and PRQ, such that ∠A = 20°, ∠Q = 20° and AC = QP. Write the correspondence if triangles are congruent.

(a) ΔABC≅ ΔPQR (b) ∠ABC ≅ ΔPRQ

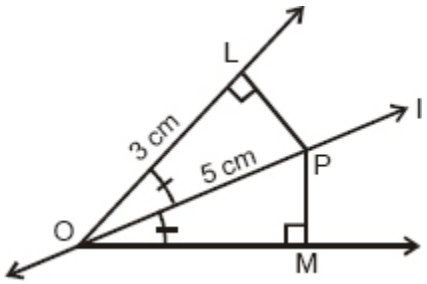
(c) ∠ABC ≅ ΔRQP (d) ΔABC ≅ ΔQRP

6. In a triangle PQR if ∠QPR = 80° and PQ = PR, then ∠R and ∠Q are

(a) 80°, 70° (b) 80°, 80°

(c) 70°, 80° (d) 50°, 50°

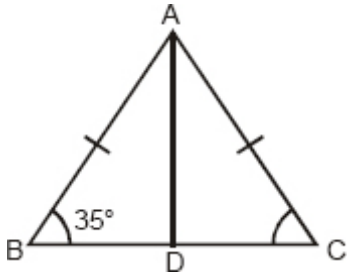
7. In the given figure, find PM



(a) 3 cm (b) 5 cm

(c) 4 cm (d) 2 cm

8. In the given figure, AD is the median then ∠BAD is



(a) 35° (b) 70°

(c) 110° (d) 55°

QUADRILATERALS

1. Find the measures of all the angles of a parallelogram if one angle is 24° less than twice the smallest angle.

2 . In ΔABC, P, Q and R are midpoints of sides BC, CA and AB respectively.

If AC = 26 cm, BC = 29 cm and AB = 30 cm,

find the perimeter of the quadrilateral ARPQ.

3. l, m and n are three parallel lines intersected by transversals p and q such that l , m and n cut off equal intercepts

AB and BC on p. Show that l, m and n cut off equal intercepts DE and EF on q also. (Equal intercept theorem)

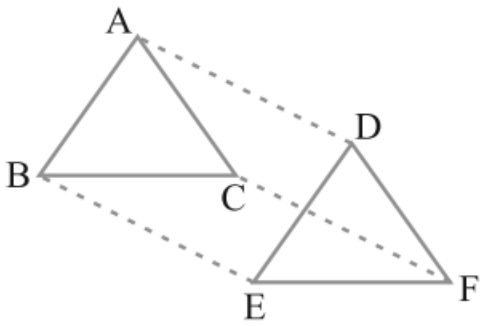
4.Show that the bisectors of any two consecutive angles of a parallelogram intersect at right angle.

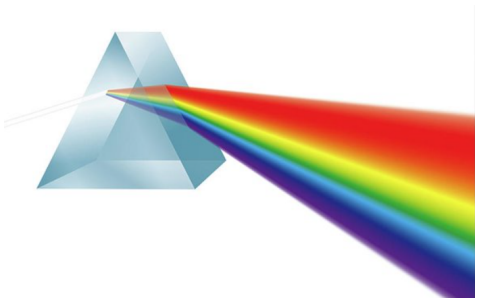
5. ABCD is a parallelogram . AB is produced to E such that AB = BE. Prove that ED bisects BC.

CASE STUDY

A science teacher is performing an activity on "Refraction of white light into VIBGYOR " .

To perform the activity successfully, a perfect prism is required such that the three faces must be parallelograms and rest of the two faces be congruent triangles as shown in the figures.





Based on the above information, answer the following questions:

(a) If AD ∥ BE , so for ADEB to be a parallelogram, then

(i) AB =DE (ii) ∠A=∠D (iii)) ∠A=∠E (iv) AD = BE

(b) If ADEB and ADFC are parallelograms , then BECF is also a parallelogram as

(i) AD =BC and AD =CF => BE=CF ; AD ∥BE and AD ∥ CF => BE ∥ CF

(ii) AC =BE and AD =CF => BC=CF ; AD ∥BE and AD ∥ CF => BC ∥ CF

(iii) AD =BE and AD =CF => BE=CF ; AD ∥BE and AD ∥ CF => BE ∥ CF

(iv) AD =CF and BE =CF => BE=CF ; AD ∥BE and AB ∥ BE => BE ∥ AB

(c) If ADEB , ADFC and BEFC are parallelogram then $\Delta ABC \cong \Delta DEF$ by

(i) SAS (ii) ASA (iii) SSS (iv) RHS

(d) If area of ΔABC is 28 cm^2 , then the height correspond to base EF of ΔDEF if EF = 14 cm is

(i) 5 cm (ii) 6 cm (iii) 8 cm (iv) 4 cm

ASSERTION AND REASON BASED MCQS

DIRECTION: In the question numbers 19 and 20, a statement of **Assertion(A**) is followed by a statement of **Reason (R).** Choose the correct option.

(a) Both Assertion and Reason are true and Reason is a correct explanation of Assertion.

(b) Both Assertion and Reason are true but Reason is not a correct explanation of Assertion.

(c) Assertion is true and Reason is false

(d) Assertion is false and Reason is true.

Q1. Assertion (A) : The expression $3x^4 - 4x^{\frac{3}{2}} + x^2$ is not a polynomial because the term $-4x^{\frac{3}{2}}$ contains a rational power of x .

Reason(R): The highest exponent in various terms of an algebraic expression in one variable is called its degree.

Q2. Assertion (A): The rationalised form of $\frac{1}{\sqrt{7}-2}$ is $\sqrt{7}+2$.

Reason (R): The conjugate of $\sqrt{7}-2$. is $\sqrt{7}+2$.

Q3. Assertion: Point A(-2, -4) lies on III quadrant
Reason: A point both of whose coordinates are negative lies in III quadrant

Q4. Assertion**:** The point (0,4) lies on y-axis.
Reason**:** The x co-ordinate of the point on y-axis is zero.

Q5. Assertion **:** The points (-1, 2) and (2,- 1) are at different positions in the coordinate plane.
Reason**:** Point (-1,2) lies in Il-quadrant and (2,- 1) lies in IV quadrant

Q6,Assertion: The perpendicular distance of the point A(3, 4) from the y-axis is 4

Reason: The perpendicular distance of a point from y-axis is called its x-coordinate.

Q7. Assertion : There are infinite number of lines which passes through (3, 2).
Reason: A linear equation in two variables has infinitely many solutions.

Q8.Assertion: $x + y = 3$ is the equation of a line passing through the origin.
Reason: $y = 2x$ is the equation of a line passing through the origin.

Q9.Assertion : The point (2, 2) is the solution of $x + y = 4$.
Reason**:** Every point which satisfy the linear equation is a solution of the equation.

Q10. Assertion : If the diagonals of a parallelogram ABCD are equal, then $\angle ABC = 900$.
Reason : If the diagonals of a parallelogram are equal, it becomes a rectangle.