CASED BASED QUESTIONS
SUBJECT: MATHEMATICS

## CLASS: IX

## NUMBER SYSTEM

1.(i) 0.000625 is same as
(a) $\frac{1}{1000} \times 625$
(b) $\frac{1}{1000000}+625$
(c) $1000 \times 625$
(d) $\frac{1}{1000000} \times 625$
(ii) If the square of ' $x$ ' is 5 , then square of ' $4 x$ ' will be
(a) 400
(b) 80
(c) 60
(d) 20
(iii) Which of the following is equal to 1 ?
(a) $17^{-2}+17^{2}$
(b) $17^{-2}-17^{2}$
(c) $17^{-2} \times 17^{2}$
(d) $17^{-2} \div 17^{2}$
(iv) If p is a non-zero Rational number, which of the following might NOT be Rational?
a) $\sqrt{3 p}$
(b) $\mathrm{p}^{-3}$
(c) $-\mathrm{p}^{3}$
(d) $3 \div p$
(v) The set of Natural numbers is said to be 'CLOSED' under the operation ' + ' because for any Natural numbers $m$ and $n$, the number $m+n$ is also a Natural number. Under which operations is the set of Integers 'CLOSED'?
(a),,$+- \times$ and $\div$
(b),+- and $\times$ only
(c) + and x only
(d) + and - only
2.

(i) Which letter represent 0 of the number line?
(a) P
(b) R
(c) X
(d) S
(ii) Between which two points does 5.2 lie on this number line?
(a) U and V
(b) T and U
(c) S and T
(d) V and W

## POLYNOMIALS

1. Beti Bacho, Beti Padho (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.
(i) In a school, group of $(x+y)$ teachers, $\left(x^{2}+y^{2}\right)$ girls and $\left(x^{3}+y^{3}\right)$ boys organsied a campaign on Beti Bachao, Beti Padhao. If in the group, there are 10 teachers and 58 girls, then what is the number of boys?
(a) 300
(b) 360
(c) 350
d) 370

(ii) Using the above information, find $x^{2}-y^{2}$, if $x-y=2$
(a) 222
b) 20
c) 21
d) 220
(iii) Which mathematical concept is used here?
(a) Linear equations
b) Triangles
c) Polynomial
d) Area
(iv) $(x-y)^{3}$ equals
(a) $x^{3}-y^{3}-3 x y(x-y)$
(b) $x^{3}+y^{3}-3 x y(x-y)$
(c) $x^{3}-y^{3}+3 x y(x+y)$
(d) $x^{3}+y^{3}-3 x y(x+y)$
2. National Association for the Blind (NAB) aimed to empower and well inform visually challeged population of our country, thus enabling them to lead a life of dignity and productivity. Ravi donated $\left(x^{3}+\frac{1}{x^{3}}\right)$ to NAB. When his cousin asks to tell the amount donated by him, he just gave the below hint.

$$
\left(x+\frac{1}{x}\right)=10
$$

(i) Find the amount donated by Ravi.
(a) 1000
(b) 850
(c) 970
(d) 900
(ii) Find the amount donated by Ravi, if $\left(x+\frac{1}{x}\right)=7$
(a) 522
(b) 422
(c) 222
(d) 322
(iii) $(x+a)(x+b)=x^{2}+$ $\qquad$ $x+a b$
(a) $a+b$
b) $a b$
c) $a-b$ d) $a / b$
(iv) Which mathematical concept is used here?
(a) Lines and angles
b) Polynomial
c) Triangle
d) Circle
3. Fruits are an excellent source of essential vitamins and minerals, and they are high in fiber. Fruits also provide a wide range of health- boosting antioxidants, including flavonoids. Eating a diet high in fruits and vegetables can reduce a person's risk of developing heart disease, cancer, inflammation and

diabetes. Radhika's mother gave her some money to buy Papaya from the market at the rate of $(x+10)$ per kg.
(i) Which mathematical concept is used here?
(a)Lines and angles
(b) Polynomial
(c) Triangle
(d) Circle
(ii) If Radhika purchases $(x-22)$ kg papaya, what amount she has to pay?
(a) $(x+10)(x+12)$
(b) $(x+10)(x-22)$
(c) $(x+10)(x+22)$
(d) $(x-10)(x-22)$
(iii) If the apples are sold at the rate of $(x-22)$ per kg, then how much she has to pay for $x$ kg?
(a) $x^{2}-22$
(b) $x^{2}-22 x$
(c) $x^{2}-10 x$
(d) $2 x-22$
(iv) What are the factors of the polynomial, if $p(x)=x^{2}-32 x+220$ ?
(a) $(x+10)(x+12)$
(b) $(x+10)(x-22)$
(c) $(x+10)(x+22)$
(d) $(x-10)(x-22)$
4. Container terminals are the terms designated for the intermediate destination facilities that enable shipping containers to switch methods of transport en route to their final destination.
(i) Which one of the following is cannot be a polynomial of the container?
(a) $4 x^{2}+2 x-1$
(b) $y+\frac{3}{y}$
(c) $x^{3}-1$
(d) $y^{2}+5 y+1$
(ii) If the area of a rectangular base of the container is ( $3 x^{2}$ $+x-2$ ) square metres, its width is $(1+x) m$. What is the length of the base?

(a) $3 x+2$
(b) $3 x-2$
(c) $x+2$
(d) $x-3$
(ii) The height and width of the container are same. The container's height is 3 m more than their width, then the volume of the container is $7 x^{3}+19 x^{2}-6 x$ cu. $m$. What is its length in $m$ ?]
(a) $7 x+3$
b) $7 x-2$
c) $6 x+3$
d) $6 x-2$
Q. 4 Write the coefficient of $x^{2}$ in the polynomial of Q3.
a) 7
b) 6
c) 19

$$
\text { d) }-19
$$

## COORDINATE GEOMETRY

1. There is a square park ABCD in the middle of Zoo Road colony in Guwahati. Four children Deepak, Ashok, Arjun and Deepa went to play with their balls. The colour of the ball of Ashok, Deepak, Arjun and Deepa are red, blue, yellow and green respectively.
All four children roll their ball from centre point O in the direction of $\mathrm{XOY}, X^{\prime} \mathrm{OY}, X^{\prime} \mathrm{OY}^{\prime}$ and $\mathrm{XOY}^{\prime}$. Their balls stopped as shown in the adjacent image.

Answer the following questions:
i) What are the coordinates of the ball of Ashok?
a) $(4,4)$
b) $(3,3)$
c) $(4,3)$
d) $(3,4)$
ii) What are the coordinates of the ball of Deepa?
a) $(2,-3)$
b) $(3,2)$
c) $(2,3)$
d) $(2,2)$
iii) What the line $\mathrm{XOX}^{\prime}$ is called?
a) $y$-axis
b) ordinate
c) $x$-axis
d) origin
iv) What the point $O(0,0)$ is called?
a) $y$-axis b)ordinate
c) $x$-axis
d)origin
v) What is the ordinate of the ball of Arjun?
a) -3
b) 3
c) 4
d) 2
2. Alia and Shagun are friends living on the same street in Ahomgaon. Shogun's house is at the intersection of one street with another street on which there is a library. They both study in the same school and that is not far from Shagun's house. Suppose the school is situated at point 0, i.e., the origin, and Alia's house is at A. Shoguns house is at B and library is at C. Based on the above information, answer the following question
i) How far is Alia's house from Shagun's house?
a) 3 units
b) 4 units
c) 5 units
d) 2 units
ii) How far is the library from Shagun's house?
a) 3 units
b) 2 units
c) 5 units
d) 4 units
iii) How far is the library from Alia's house?
a) 2 units
b) 3 units
c) 4 units
d) None of these
iv) Which of the following is true?
(a) ABC forms a scalene triangle
(b) ABC forms an isosceles triangle
(c) ABC forms an equilateral triangle
(d) None of these


## Scale

$x$-axis: $1 \mathrm{~cm}=1$ unit $y$-axis: $1 \mathrm{~cm}=1$ unit

3. A satellite image of a colony is shown below. In this view, a particular house is pointed out by a flag, which is situated at the point intersection of the x and $y$-axes. If we go 2 cm east and 3 cm north from the house, then we reach a Grocery store. If we go 4 cm west and 6 cm south from the house, then we reach an Electrician's shop. If we go 6 cm east and 8 cm south from the house, then we reach a food cart. If we go 6 cm west and 8 cm north from the house, then we reach a bus stand.


Based on the above information, answer the following questions.
(i) The distance between the grocery store and food cart is
(a) 12 cm
(b) 15 cm
(c) 18 cm
(d) none of these
(ii) The distance of the bus stand from the house is
(a) 5 cm
(b) 10 cm
(c) 12 cm
(d) 15 cm
(iii) If the grocery store and electrician's shop lie on a line, the ratio of the distance of house from grocery store to that from electrician's shop, is
(a) 3.2
(b) 2.3
(c) 1.2
(d) 2.1
(iv) The ratio of distances of the house from the bus stand to the food cart is
(a) 1.2
(b) 2.1
(c) 1.1
(d) none of these
(v) The coordinates of positions of bus stand, grocery store, food cart, and electrician's shop form a
(a) rectangle
(b) parallelogram
(c) square
(d) none of these
4. In the given Fig. (ii), the points B, C, D, E, G, H, L, M and O are marked. On the basis of the figure, answer the following questions:
(i) What is the name of the point where horizontal and the vertical lines intersect in the Cartesian plane?
(a) Centre
(b) median
(c) origin
(d) $x$ and $y$-axis
(ii) The point identified by the coordinates $(-3,-5)$
(a) C
(b) D
(c) E
(d) H
(iii) The abscissa of the point $D$.
(a) 2
(b) -3
(c) 5
(d) 6
(iv) The ordinate of the point H .
(a) 2
(b) -3
(c) 5
(d) 6
(v) The coordinates of the point M .
(a) $(-3,-5)$
(b) $(0,-5)$
(c) $(-3,0)$
(d) $(-5,-3)$


## Pair of Linear Equations in Two Variables

1. Deepak bought 3 notebooks and 2 pens for Rs. 80 . His friend Ram said that the price of each notebook could be Rs. 25. Then three notebooks would cost Rs.75, the two pens would cost Rs. 5 and each pen could be for Rs. 2.50. Another friend Ajay felt that Rs. 2.50 for one pen was too little. It should be at least Rs. 16. Then the price of each notebook would also be Rs.16.
Lohith also bought the same types of notebooks and pens as Aditya. He paid 110 for 4 notebooks and 3 pens. Later, Deepak guess the cost of one pen is Rs. 10 and Lohith guess the cost of one notebook is Rs. 30.
(i) Form the pair of linear equations in two variables from this situation by taking cost of one notebook as Rs. $x$ and cost of one pen as Rs. $y$.
(a) $3 x+2 y=80$ and $4 x+3 y=110$
(b) $2 x+3 y=80$ and $3 x+4 y=110$
(c) $x+y=80$ and $x+y=110$
(d) $3 x+2 y=110$ and $4 x+3 y=80$
(ii) Which is the solution satisfying both the equations formed in (i)?
(a) $\mathrm{x}=10, \mathrm{y}=20$
(b) $\mathrm{x}=20, \mathrm{y}=10$
(c) $\mathrm{x}=15, \mathrm{y}=15$
(d) none of these
(iii) Find the cost of one pen?
(a) Rs. 20
(b) Rs. 10
(c) Rs. 5
(d) Rs. 15
(iv) Find the total cost if they will purchase the same type of 15 notebooks and 12 pens.
(a) Rs. 400
(b) Rs. 350
(c) Rs. 450
(d) Rs. 420
(v) Find whose estimation is correct in the given statement.
(a) Deepak
(b) Lohith
(c) Ram
(d) Ajay
2. Amit is planning to buy a house and the layout is given below. The design and the measurement has been made such that area of each bedroom is 30 sq.m and kitchen is 35 sq.m.

Based on the above information, answer the following questions:

(i) Form a linear equations in two variables from this situation in terms of $x$ and $y$
(ii) Find the length of the outer boundary of the layout.
(iii) Find the area of living room in the layout.
(iv) Find the area of bathroom in the layout.
(vi) Find the cost of laying tiles in kitchen at the rate of Rs. 50 per sq.m.

## INTRODUCTION TO EUCLID'S GEOMETRY

Q. 1 A school organized an educational trip to a museum. Almost all the students of class IX went to the museum with their teachers of Mathematics. They saw many pictures of mathematicians and read about the contributions in the field of Mathematics. After visiting the museum the teacher asked the following questions to the students.

i. Name the mathematician who is visible in the last picture.
a) Pythagoras
b) Thales
c) Euclid
d)None of these
ii. Pythagoras was a famous pupil of
a) Thales
b) Euclid
c) Both a and b
d) None of these
iii. 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
iv. Which postulate can be related with the pillars of the building?
a) 1
b) 3
c) 4
d) 5
Q. 2 The map shows three cities Conlen (C), Stratford (S), and Texhoma ( T ) on a straight highway.
i. Which of the following is true for the length of the highway between them?
a) The length of the highway between C and S is equal to the length of the highway between S and T .

b) The length of the highway between C and S is three-fourth of the length of the highway between S and T .
c) The length of the highway between S and T is the sum of the lengths of the highway between CT and CS.
d) The length of the highway between C and T is the sum of the lengths of the highway between CS and ST.
ii. Two highways 287 and 15 intersect at a point S . Which of the following is true for the distance between the two lines as they travel beyond point S ?
a) The distance becomes constant.
b) The distance increases continuously.
c) The distance decreases continuously.
d) The distance increases and decreases depending upon the intersection point.
iii. Two Highways run parallel to each other for 20 km . Which of the following statements is most likely to be true regarding them?
a) Both highways are of the same length.
b) There can be no link road between them.
c) The highways make an angle $90^{\circ}$ with each other.
d) The distance between the two highways remains almost the same in the state.
iv. 'Lines are parallel if they do not intersect' is stated in the form of
a) an axiom
b) definition
c) postulate
d) a proof

## LINES AND ANGLES

Q. 1 The game of billiards is played with balls placed on a rectangular table. One ball is struck with the end of a stick, called a cue. The ball bounces into other balls and reflects off the sides of the table. In a real game, the ball may spin, but for mathematical purposes, it is considered that the ball travels in a straight line with the same reflection and incidence angles. On a billiard table $A B C D$, the ball placed at $O$ is struck with the cue.

1. What is the value of $\angle \mathrm{a}+\angle \mathrm{d}$ ?
A) $90^{\circ}$
B) $180^{\circ}$
C) $120^{\circ}$
D) Not determinable
2. What is the value of $\angle \mathrm{b}+\angle \mathrm{c}$ ?
A) $45^{\circ}$
B) $90^{\circ}$
C) $180^{\circ}$

D) Not determinable
3. If the normal drawn at M and N meet at X , then what is the value of $\angle \mathrm{MXN}$ and reflex $\angle \mathrm{MXN}$ ?
A) $90^{\circ}, 180^{\circ}$
B) $180^{\circ}, 90^{\circ}$
C) $90^{\circ}, 270^{\circ}$
D) $270^{\circ}, 90^{\circ}$
4. Which of the following will satisfy to prove the statement that $O M \| P N$ ?
A) Corresponding angles axiom
B) Alternate Interior Angles theorem
C) Co interior angles theorem
D) Converse of Co-interior angles theorem.
Q. 2 BSE stands for a disease called Bovine Spongiform Encephalopathy. " Bovine" means that the disease affects cows, "spongiform" refers to the way the brain from a sick cow looks spongy under a microscope, and "encephalopathy" indicates that it is a disease of the brain. This disease is commonly called "mad cow disease." A farmer has a field ABCD formed by two pair of parallel roads as shown below in which $l \| m$ and $p \| q$. His four cows had been suffering from BSE. Thus, he tied them at four corners of the field ABCD .
5. If $\angle C A D=52^{\circ}$ then find $\angle A C B$
A) $42^{\circ}$
B) $128^{\circ}$
C) $52^{\circ}$
D) $45^{\circ}$
6. If we join BD such that BD meet AC at O and $\angle B O C=30^{\circ}$, then what is the measure of $\angle A O D$ ?
A) $60^{\circ}$
B) $45^{\circ}$
C) $30^{\circ}$
D) $90^{\circ}$
7. If $\angle B=45^{\circ}$, then $\angle D$ is $\qquad$
A) $50^{\circ}$
B) $45^{\circ}$
C) $50^{\circ}$
D) $40^{\circ}$
8. $\angle A B C+\angle B C D=180^{\circ}$
A) Alternate interior angles are supplementary
B) Allied angles are supplementary

C) Corresponding angles are supplementary
D) None of the above
Q. 3 Once four students from class IX were selected for plantation of flower plants in the school garden. The selected students were Veenit, Riyan, Dilip and Riya. Veenit planted a narcissus plant at P, then Riyan planted a hibiscus plant at Q. Further, Dilip was called to plant any flowering plant at M. He planted a rose there. Now it was a turn of Riya. She was told to plant a flowering different from the three planted one. So, she planted a tulip plant at N. There was a pipeline XY intersecting PQ at A and MN at B and $\angle A B N=60^{\circ}$.

Answer the following questions:

1. What is the value of $y$ ?
A) $50^{\circ}$
B) $70^{\circ}$
C) $60^{\circ}$
D) $120^{\circ}$
2. What is the value of ?
A) $100^{\circ}$
B) $120^{\circ}$
C) $60^{\circ}$
D) $45^{\circ}$
3. What is the value of $(p+q+a+z) / 6$ ?

A) $60^{\circ}$
B) $120^{\circ}$
C) $180^{\circ}$
D) $100^{\circ}$
4. Which of the following statements is correct?
A) $y+z=180^{\circ}$ as $y$ and $z$ are alternate interior angles.
B) $a=p$ as $a$ and $p$ are corresponding angles.
C) $p=b$ as $p$ and $b$ are alternate interior angles.
D) $b=x$ as $b$ and $x$ are corresponding angles.

## HERON'S FORMULA

1. The triangular side walls of a flyover have been used for advertisements. The sides of the walls are $13 \mathrm{~m}, 14$ m and 15 m . The advertisements yield an earning of Rs 2000 per $\mathrm{m}^{2}$ a year. A company hired one of its walls for 6 months.

Fig 1:

(i) The semi-perimeter $\mathbf{s}$ of a triangle having sides $a, b, c$ can be derived by
(A) $a+b+c$
(B) $\frac{a+b+c}{2}$
(C) $\frac{a+b+c}{3}$
(D) none of these
(ii) In this case, the value of $s$ is
(A) 42 m
(B) 21 m
(C) 14 m
(D) 7 m
(iii) The area of the one triangular side wall of the flyover is
(A) $84 \mathrm{~m}^{2}$
(B) $42 \mathrm{~m}^{2}$
(C) $21 \mathrm{~m}^{2}$
(D) $168 \mathrm{~m}^{2}$
(iv) Rent of the wall for $1 \mathrm{~m}^{2}$ for 6 months will be
(A) Rs 500
(B) Rs 1000
(C) Rs 2000
(D) 2500
(v) Rent of the entire wall for 6 months will be
(A) Rs 21,000
(B) Rs 42,000
(C) Rs 64,000
(D) Rs 84,000
2. A square tile has a design at its centre having 8 triangles of same dimensions as shown in the Fig. (iv). The person spends Rs 1.60 per $\mathrm{cm}^{2}$ for polishing the design. On the basis of the figure, answer the following questions:
(i) What is the value of $s$ (semi perimeter) for each triangle?
(a) 31 cm
(b) 32 cm
(c) 33 cm
(d) 34 cm

(ii) What is the area of a triangle in the design?
(a) $200 \mathrm{~cm}^{2}$
(b) $204 \mathrm{~cm}^{2}$
(c) $208 \mathrm{~cm}^{2}$
(d) $212 \mathrm{~cm}^{2}$
(iii)What area of each square tile is covered by the design?
(a) $1632 \mathrm{~cm}^{2}$
(b) $1362 \mathrm{~cm}^{2}$
(c) $1236 \mathrm{~cm}^{2}$
(d) $1623 \mathrm{~cm}^{2}$
(iv) What amount the person spends on polishing the design on 50 tiles?
(a) Rs $1,30,050$
(b) Rs 1, 30, 560
(c) Rs 1, 50, 000
(d) Rs 1, 75, 000
(v) Which of the following formulae has been used to determine the area of each triangle?
(a) $\frac{1}{2} \times b \times h$
(b) $\sqrt{s(s-a)(s-b)(s-c)}$
(c) $\frac{\sqrt{3}}{4}$ (side $)^{2}$
(d) none of these
3. A triangular park ABC has sides $120 \mathrm{~m}, 80 \mathrm{~m}$ and 50 m (see Fig. 12.7). A gardener Dhania has to put a fence all around it and also plant grass inside. How much area does she need to plant?

## Find the following:


a) The perimeter of the fencing
b) Area of the garden
c) The cost of fencing it with barbed wire at the rate of 20 per meter leaving a space 3 m wide for a gate on one side.
4. Kamla has a triangular field with sides $240 \mathrm{~m}, 200 \mathrm{~m}, 360 \mathrm{~m}$, where she grew wheat. In another triangular field with sides 240 $\mathrm{m}, 320 \mathrm{~m}, 400 \mathrm{~m}$ adjacent to the previous field, she wanted to grow potatoes and onions. She divided the field into two parts by joining the mid-point of the longest side to the opposite vertex and grew potatoes in one part and onions in the other part.

## Find the following:

a) Area of potatoes
b) Area of onions
c) How much area (in hectares) has been used for wheat, potatoes, and onions? $\left(1\right.$ hectare $\left.=10000 \mathrm{~m}^{2}\right)$
5. Students of a school staged a rally for cleanliness campaign. They walked through the lanes in two groups. One group walked through the lanes $\mathrm{AB}, \mathrm{BC}$ and CA; while the other through AC, CD and DA (see Fig. 12.12). Then they cleaned the area enclosed within their lanes. If $\mathrm{AB}=9 \mathrm{~m}, \mathrm{BC}=40 \mathrm{~m}, \mathrm{CD}=15 \mathrm{~m}, \mathrm{DA}=$ 28 m and $\angle \mathrm{B}=90^{\circ}$.


## Answer the following

a) What is the length of AC ?
b) How much area is cleaned by first group?
c) How much area is cleaned by second group?
d) Which group cleaned more area and by how much?
e) Find the total area cleaned by the students.
6. Sanya has a piece of land which is in the shape of a rhombus as shown in the figure. She wants her one daughter and one son to work on the land and produce different crops. She divided the land in two equal parts. The perimeter of the land is 400 m and one of the diagonals is 160 m .

Answer the following

a) What is the side of the rhombus shaped field?
b) Find the semi-perimeter of each part of land
c) Which formula do you use to find the area of each part? State it.
d) How much area each of them will get for their crops?

