

BRAIN INTERNATIONAL SCHOOL

SESSION 2024-25

CLASS: X TERM 1 REVISION SHEET SUBJECT: MATHEMATICS REAL NUMBERS

Q1.If LCM of 12 and 42 is 10m + 4 then value of m is :

(a) 6 (b) 7 (c) 0 (d) 8

Q2. If two positive integers p and q can be expressed as $p = ab^2$ and $q = a^3b$, where a, b being prime numbers, then LCM (p, q) is equal to: (a) ab (b) a^2b^2 (c) a^3b^2 (d) a^3b^3

Q3. If HCF (72, 120) = 24 ,find LCM (72,120)

Q4. Show that the following numbers are irrational :

(i) $2\sqrt{3} + 5$ (ii) $1/\sqrt{3}$

- Q5 The length , breadth and height of room are 8m 25cm , 6m 75cm and 4m 50cm respectively. Determine the longest rod which can measure the three dimensions of the room exactly.
- Q6 Find the LCM of $x^2 4$ and $x^4 16$.
- Q7. Find the HCF of $x^2 3x + 2$ and $x^2 4x + 3$.
- Q8. A person wanted to distribute 96 apples and 112 oranges among poor children in an orphanage. He packed all the fruits in boxes in such a way that each box contains fruits of the same variety, and also every box contains an equal number of fruits.

(i)Find the minimum number of boxes in which all the fruits can be packed.

(ii) Which concept have you used to find it?

- Q 9.A merchant has 175 litres of olive oil and 105 litres of coconut oil. He wants to sell the oil by filling the two oils in tins of equal capacity. What should be the maximum capacity of such a tin?
- Q10. Find the greatest number that will divide 445, 572 and 699 leaving remainders 4, 5 and 6 respectively.

POLYNOMIALS

Q1. What is the degree of the constant polynomial?

- Q2. If the sum of the zeroes of a given polynomial $f(x) = ax^2 + 2x + 3a$ is equal to their product, find the value of a.
- Q3. If 2 is a zero of $x^3 3x^2 10x + 24$, find all other zeroes.
- Q4. If α and β are zeroes of $p(x) = x^2 + px + q$, then find a polynomial having $\frac{1}{\alpha}$ and $\frac{1}{\beta}$ as its zeroes; $q \neq 0$ (Ans: $qx^2 + px + 1$)
- Q5. If α and β are zeroes of the polynomial $f(x) = x^2 p(x+2) c$, then find the value of $(\alpha + 2)(\beta + 2)$

Q6. CASE STUDY

Riddhi throws a stone in the air such that it follows a parabolic path before it lands at P on the ground as depicted by the graph below. (*Note: The figure is not to scale.*)



- i) The above graph is represented by a polynomial where the sum of its zeroes is 1 and the sum of the squares of its zeroes is 25. Find the coordinates of P and Q.
- ii) If one unit on the graph represents 25 metres, how far from Riddhi does the stone land? Show your working.
- iii) Find a quadratic polynomial if the sum and product of its zeroes are $\sqrt{2}$ and $\frac{-3}{2}$ respectively. Also
- iv) Find its zeroes.

PAIR OF LINEAR EQUATIONS IN TWO VARIABLES

Q1. For what value of k, the following pair of equations will have no solution?

x - 2y = 3 and ky + 3x = 1

Q2. Solve the following pair of linear equations by ELIMINATION method

$$x - y + 1 = 0$$

 $3x + 2y - 12 = 0$

Q3. On comparing the ratios $\frac{a_1}{a_2}$, $\frac{b_1}{b_2}$ and $\frac{c_1}{c_2}$, find out whether the lines representing the following pairs of linear equations intersect at a point, are parallel or coincident.

(i) 3x + 45y - 4 = 0 10x + 150y = -8(ii) 12x - 8y + 5 = 03x - 16/5y + 3/5 = 0

Q4. Using substitution method, solve the following pair of equations

$$x + 2y = -1$$
 and $2x - 3y = 12$

Q5. The ratio of incomes of 2 persons is 9:7 and the ratio of their expenditures is 4:3. If each of them saves rupees 2000 per month, find their monthly incomes.

Q6.Kavya wants to construct a rectangular garden for children and others to play. The area of this rectangle remains the same if the length is increased by 7m and breadth is decreased by 3m. The area remains unaffected if the length is decreased by 7m and breadth is increased by 5m. Find dimensions of the rectangular garden.

Q7. Solve the following pair of linear equations graphically.

$$2\mathbf{x} - \mathbf{y} = 2 \qquad \qquad 4\mathbf{x} - \mathbf{y} = 8$$

QUADRATIC EQUATIONS

- Q1.For what value of k, is -2 a root of the equation $3x^2 + 4x + 2k=0$
- Q2. Find the nature of the roots of the quadratic equation $4x^2 12x 9 = 0$.
- Q3. State whether the following quadratic equations have two distinct real roots. Justify your answer.

(a)
$$(x+4)^2 - 8x = 0$$
 (b) $\sqrt{2x^2} - \frac{3}{\sqrt{2}}x + \frac{1}{\sqrt{2}} = 0$

Q4. Find the roots of the following quadratic equations using the quadratic formula.

(a)
$$6a^2x^2$$
- 7abx- $3b^2=0$, $a\neq 0$

(b)
$$x^2 - 3\sqrt{5x} + 10 = 0$$

- (c) $abx^2 + (b^2 ac)x bc = 0$
- Q5. Find the roots of the equation $6x^2 + 7x 10$ (Answer: 5/6 and -2)

Q6. Sum of the areas of two squares is $640m^2$. If the difference of their perimeters is 64m,

find the sides of the two squares.

- Q7. A train covers a distance of 90 km at a uniform speed. Had the speed been 15 km/h more it would have taken 30 minutes less for the journey. Find the original speed of the train and duration of the journey.
- Q8.If the list price of a toy is reduced by rupees 2, a person can buy 2 toys more for rupees 360. Find the original price of the toy.
- Q9. Rupees 6500 were divided equally among a certain number of persons . Had there been 15 more persons , each would have got rupees 30 less. Find the original number of persons.
- Q10.Write the set of values of k for which the quadratic equation $2x^2 + kx + 8 = 0$ has real roots. Ans($k \le -8$ and $k \ge 8$)

ARITHMETIC PROGRESSIONS

Q1. How many terms of the series 54, 51, 48..... be taken so that, their sum is 513?

Q2. Which one of the term AP, 8, 14, 20, 26...... will be 72 more than its 41st term?

Q3.How many multiplies of 5 lie between 50 and 250?

Q4.How many 3 digit numbers are divisible by 9?

Q5.Is – 156 a term of the AP: 17, 14, 11, 8....?

- Q6.In an AP, the sum of the first ten terms is -150 and the sum of its next ten terms is -550. Find the AP.
- Q7. The 4th term of an AP is three times the first and the 7th term exceeds twice the third term by 1.Find the first term and the common difference.
- Q8. Find the first term of an AP having 9 terms whose last term is 28 and sum of all terms is 144.
- Q9. 360 bricks are stacked in the following manner:

30 bricks in the bottom row, 29 in the next row 28 in the row next to it and so on .In how many rows are the 360 bricks placed and how many bricks are there in the top row?

Q10. If $a_n = 2n - 3$ then the common difference of the A.P is

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

Q11. The common difference of following AP is

3, $3 + \sqrt{2}$, $3 + 2\sqrt{2}$, $3 + 3\sqrt{2}$, ... (a) 3 (b) 2 (c) $\sqrt{2}$ (d) $2\sqrt{2}$

Q12.CASE STUDY

A high-quality PE curriculum enables all students to enjoy and succeed in many kinds of physical activity. They develop a wide range of skills and the ability to use tactics, strategies and compositional ideas to perform successfully. When they are performing, they think about what they are doing, they analyse the situation and make decisions. They also reflect on their own and others' performances and find ways to improve upon them. As a result, they develop the confidence to take part in different physical activities and learn about the value of healthy, active lifestyles.

Your friend Veer wants to participate in a 200m race. He can currently run that distance in 51 seconds and with each day of practice it takes him 2 seconds less. He wants to do in 31 seconds .

Based on the above information, answer the following questions



Write the Arithmetic Progression (AP) for the given situation .	1 M
Find the n th term of the AP.	1M
What is the minimum number of days he needs to practice till his goal is achieved	2M

TRIANGLES

Q1. If triangles ABC and DEF are similar and AB=4 cm, DE=6 cm, EF=9 cm and FD=12 cm, the perimeter of triangle ABC is:

(a) 22 cm (b) 20 cm (c) 21 cm (d) 18 cm

Q2.If ABC and DEF are two triangles and AB/DE=BC/FD, then the two triangles are similar if

(a) $\angle A = \angle F$ (b) $\angle B = \angle D$ (c) $\angle A = \angle D$ (d) $\angle B = \angle E$

Q3.Which of the following are not similar figures?

(a) Circles (b) Squares (c) Equilateral triangles (d) Isosceles triangles

Q4.If in two triangles ABC and PQR, AB/QR = BC/PR = CA/PQ, then

(a) $\triangle PQR \sim \triangle CAB$ (b) $\triangle PQR \sim \triangle ABC$

(c) $\Delta CBA \sim \Delta PQR$ (d) $\Delta BCA \sim \Delta PQR$

Q5.In triangles ABC and DEF, $\angle B = \angle E$, $\angle F = \angle C$ and AB = 3 DE. Then, the two triangles are

(a) congruent but not similar (b) similar but not congruent

(c) neither congruent nor similar (d) congruent as well as similar

Q6.It is given that $\triangle ABC \sim \triangle DFE$, $\angle A = 30^\circ$, $\angle C = 50^\circ$, AB = 5 cm, AC = 8 cm and DF = 7.5 cm. Then, the following is true:

(a) $DE = 12 \text{ cm}, \angle F = 50^{\circ}$ (b) $DE = 12 \text{ cm}, \angle F = 100^{\circ}$

(c) $EF = 12 \text{ cm}, \angle D = 100^{\circ}$ (d) $EF = 12 \text{ cm}, \angle D = 30^{\circ}$

Q7.Which of the following is not a similarity criterion for two triangles?

(a) AAA (b) SAS (c) SSS (d) ASA

Q8.In ABC, DE || AB. If CD = 3 cm, EC = 4 cm, BE = 6 cm, then DA is equal to (a) 7.5 cm (b) 3 cm (c) 4.5 cm (d) 6 cm Q9. If in triangles ABC and DEF,ABDE=BCFD, then they will be similar, if

(a) $\angle B = \angle E$ (b) $\angle A = \angle D$ (c) $\angle B = \angle D$ (d) $\angle A = \angle F$

Q10. D and E are respectively the midpoints on the sides AB and AC of a triangle ABC

and BC = 6 cm. If DE || BC, then the length of DE (in cm) is

(A) 2.5 (B) 3 (C) 5 (D) 6

Q11. ABCD is a trapezium in which AB|| DC and P, Q are points on AD and BC

respectively such that PQ \parallel DC. If PD = 18 cm, BQ = 35 cm and QC = 15 cm, then

AD =

(A) 55cm (B) 57cm (C) 60cm (D) 62cm

Q12. If ABCD is parallelogram, P is a point on side BC and DP when produced meets AB produced at L, then

(A) DP/BL = DC/PL (B) DP/PL = DC/BL (C) DP/PL = BL/DC (D) DP/PL = AB/DC

Q13. $\triangle PQR$ is shown below. ST is drawn such that $\angle PRQ = \angle STQ$. If ST divides



Q14.

Anas and Rishi observed the two given triangles and said the following: Anas: ΔPQR is similar to ΔCBA

Rishi: $\triangle PQR$ is congruent to $\triangle CBA$ Which of them is/are correct?

(a) Only Anas (b) Only Rishi (c) Both Anas and Rishi

(d) Neither of them, as two scalene triangles can never be similar or congruent.



(Note: The figures are not to scale.)

Q15.Shown below are two right triangles. (*Note: The figure is not to scale.*) Find the length of the unknown side marked '?'. Show your work.



COORDINATE GEOMETRY

Q1.The points (-1, -2), (1, 0), (-1, 2), (-3, 0) form a quadrilateral of type:

(a) Square (b) Rectangle (c) Parallelogram (d) Rhombus

Q2.If the distance between the points A(2, -2) and B(-1, x) is equal to 5, then the value of x is:

(a) 2 (b) -2 (c) 1 (d) -1

Q3.The midpoint of a line segment joining two points A(2, 4) and B(-2, -4) is

(a) (-2, 4) (b) (2, -4) (c) (0, 0) (d) (-2, -4)

Q4.The distance between the points P(0, 2) and Q(6, 0) is

(a) $4\sqrt{10}$ (b) $2\sqrt{10}$ (c) $\sqrt{10}$ (d) 20

Q5.The point which divides the line segment of points

P(-1, 7) and (4, -3) in the ratio of 2:3 is:

(a) (-1, 3) (b) (-1, -3) (c) (1, -3) (d) (1, 3)

Q6.The ratio in which the line segment joining the points P(-3, 10) and Q(6, -8) is divided by O(-1, 6) is:

(a) 1:3 (b) 3:4 (c) 2:7 (d) 2:5

Q7. The area of a rhombus whose vertices are (3, 0), (4, 5),

(-1, 4) and (-2,-1) taken in order, is:

(a) 12 sq.units (b) 24 sq.units (c) 30 sq.units (d) 32 sq. units

Q8.The distance of the point P(-6, 8) from the origin is

(a) 8 units (b) $2\sqrt{7}$ units (c) 10 units (d) 6 units

Q9.The perimeter of a triangle with vertices (0, 4), (0, 0) and (3, 0) is

(a) 5 (b) 12 (c) 11 (d) $7 + \sqrt{5}$

Q10. If the distance between the points (x, -1) and (3, 2) is 5, then the value of x is

(a) -7 or -1 (b) -7 or 1 (c) 7 or 1 (d) 7 or -1

Q11. Find the point on X-axis which is equidistant from the points (-2, 5) and (2, -3).

Q12. Find the distance of the point P (2, 3) from the x axis.

Q13.If P ($\frac{a}{3}$, 4) is the mid point of the line segment joining the points Q(-6,5) and R(-2,3), then find the value of a. (2)

Q14.Find a relation between x and y such that the point (x, y) is equidistant from the points (7, 1) and (3, 5).

Q15.Find the ratio in which the line segment joining the points (-3, 10) and (6, -8) is divided by (-1, 6).

Q16.If A(-2, 1), B(a, 0), C(4, b) and D(1, 2) are the vertices of a parallelogram ABCD, find the values of a and b.

Q17.Use distance formula to show that the points A(-2,3), B(1,2) and C(7,0) are collinear.

Q18. Find the ratio in which P(4, m) divides the line segment joining the points A(2, 3) and B(6, -3). Hence, find m.

Q19. CASE STUDY



SOME APPLICATIONS OF TRIGONOMETRY

Q1. From the top of a building 60 m high , the angles of depression of the top and bottom of a

tower are observed to be 30° and 60° . Find the height of the tower.

Q2. An observer , 1.6 m tall , is 45 meters away from a tower. The angle of elevation from his eye to the top of the tower is 30° . Determine the height of the tower.

Q3.The angle of elevation of an aeroplane from a point on the ground is 45° .After flying for 15 seconds, the elevation changes to 30° . If the aeroplane is flying at a height of 2500 meters, find the speed of the aeroplane.

Q4. The angle of elevation of a jet fighter from a point A on the ground is 60° . After a flight of 15 seconds, the angle of elevation changes to be 30° . If the jet is flying at a speed of 720 km/hour, find the constant height at which the jet is flying.

Q5. A boy whose eye level is 1.3m from the ground, spots a balloon moving with the wind in a horizontal line at some height from the ground. The angle of elevation of the balloon from the eyes of the boy at an instant is 60° . After two seconds, the angle of elevation reduces to 30° . If the speed of the wind is $29\sqrt{3}$ m/s, then find the height of the balloon from the ground.

Q6. From the top of a hill 200m high, the angles of depression of the top and bottom of a pillar are 30° and 60° respectively. Find the height of the pillar and its distance from the hill. (Given: $\sqrt{3}=1.73$)

Q7. The shadow of a tower, when the angle of elevation of the sun in 45° is found to be 10 metres longer than when it was 60° . Find the height of the tower.

Q8. From a window p metres high above the ground in a street, the angles of elevation and depression of the top and the foot of another house on opposite side of the street are α and β respectively. Show that the height of the opposite house, in metres, is p (1 + tan α cot β).

INTRODUCTION TO TRIGONOMETRY

Q 1. If tan A=4, find the value of $\frac{5 \sin A - 3 \cos A}{5 \sin A + 2 \cos A}$

- Q2. If cosecA=13/12, find the value of cot A + tan A
- Q3. In a \triangle ABC which is right angled at B, BC=7cm and AC-AB=1cm.

Find the value of: $\cos A - \sin A$

Q4. If tanA = 2, Evaluate sec A $sinA + tan^2 A$ -cosec A

Q5. Evaluate: $tan^{2}60^{\circ} + 4sin^{2}45^{\circ} + 3sec^{2}30^{\circ} + 5cos^{2}90^{\circ}$

 $cosec30^\circ + sec60^\circ - cot^230^\circ$

Q6. If $sin(A+B) = \sqrt{3}/2$ and cos(A-B) = 1 then find A and B

Q7. Prove the following identities :

(i)
$$(\sin A + \frac{1}{\sin A})^2 + (\cos A + \frac{1}{\cos A})^2 - (\tan^2 A + \cot^2 A) = 7$$

(ii) $\sqrt{\frac{1+\sin A}{1-\sin A}} + \sqrt{\frac{1-\sin A}{1+\sin A}} = 2 \sec A$

Q8.

Shown below is a solved trigonometric problem.

$$\frac{\csc \theta + \cot \theta - 1}{\csc \theta - \cot \theta + 1}$$

$$= \frac{\csc \theta + \cot \theta - (\cot^2 \theta - \csc^2 \theta)}{\csc \theta - \cot \theta + 1} \quad (\text{step 1})$$

$$= \frac{\cot \theta + \csc \theta - (\cot \theta - \csc \theta)(\cot \theta + \csc \theta)}{\csc \theta - \cot \theta + 1} \quad (\text{step 2})$$

$$= \frac{(\cot \theta + \csc \theta)(1 - \cot \theta + \csc \theta)}{\csc \theta - \cot \theta + 1} \quad (\text{step 3})$$

$$= \cot \theta + \csc \theta \quad (\text{step 4})$$

In which step is there an error in solving?

(a) Step 1(b) Step 2(c) Step 3(d) There is no error.

PROBABILITY

Q1.One card is drawn from a well shuffled deck of 52 cards. Find the probability of drawing

(i) an ace (ii) '10 of spades' (iii) '2' of a black suit.

Q2.A bag contain 18 balls out of which x are white.

- (i) If one ball is drawn at random, what is the probability that it will be a white ball?
- (ii) If 6 more white balls are put in the bag, the probability of drawing a white ball be thrice than that. Find x.
- Q3.A card is drawn at random from a pack of 52 playing cards . Find the probability that the card drawn is neither a queen nor a jack.
- Q4.A letter is chosen at random from the letters of the words' ASSASSINATION'. Find the probability that the letter chosen is a (i) vowel (ii) consonant.

Q5.In a simultaneous throw of a pair of dice, find the probability of getting

(a)7 as a sum (b) a doublet of odd numbers (c) not a doublet

- (d) an odd number on the first dice (e) a doublet of prime n
- Q6. Cards bearing numbers 1,3,5,...., 35 are kept in a bag. A card is drawn at random from the bag. Find the probability of getting a card bearing.

(i) a prime number less than 15 (ii) a number divisible by 3 and 5

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) The point on x- axis (-7,0) is equidistant from (2.-5) and (-2,9).

(Reason) Equal distance point on x- axis is find by using mid-point formula.

Q2) Assertion:

If the co-ordinates of the mid-points of the sides AB and AC of \triangle ABC are D(3,5) and

E(-3,-3) respectively, then BC = 20 units.

Reason :

- The line joining the mid points of two sides of a triangle is parallel to the third side and equal to half of it.
- Q3)Assertion: If $sin(\theta + 30^\circ) = cos \theta$ and θ is acute then $\theta = 30^\circ$

Reason : $sin(90^\circ - \theta) = cos \theta$.

Q4) Assertion(A) : The product of two consecutive positive integers is always divisible

by 2.

Reason (R): 13245675 is a composite number

Q5) Assertion (A) : If the pair of linear equations 3x + y = 3 and 6x + ky = 8 does not have a solution, then the value of k = 2.

Reason(R): If a pair of equations has no solution then $\frac{a_1}{a_2} \neq \frac{b_1}{b_2} = \frac{c_1}{c_2}$