BOSTON PUBLIC SCHOOL

CLASS-X
SUBJECT-MATHEMATICS (041)
WORKSHEET (2024-25)

Q.1 If HCF (26, 169) = 13, find LCM of (26, 169).

Q.2 What is the largest number which divides 70 and 125 living reminders 5 and 8 respectively.

Q.3 The LCM of two numbers in 9 times their HCF. The sum of LCM and HCF is 500. Find the HCF of two numbers.

Q.4 Find a rational number between $\sqrt{2}$ and $\sqrt{3}$.

Q.5 Prove that $\sqrt{5}$ is an irrational number.

Q.6 Prove that $(\sqrt{2} + \sqrt{5})$ is an irrational number.

Q.7 Three bulbs red, green and yellow flash at intervals of 80 seconds, 90 seconds and 110 seconds. All three flash together at 8:00 a.m. At what time will the three bulbs flash at together again?

Q.8 Find LCM and HCF of 404 and 96 and verify that HCF× LCM=Product of the given two numbers.

Q.9 Army contingent of 616 members isto March behind an army band on 32 members in a parade. The two groups are to march in the same number of columns. What is the maximum number of columns in which they can March?

Q.10 Two numbers are in a ratio 2:3 and their LCM is 180. What is the HCF of these numbers.

Q.11 Show that 6^n cannot and with digit 0 for any natural number 'n'.

Q.12 Find the zeroes of a quadratic polynomial nominal $x^2 - 5x + 6$.

Q.13 One of the zeroes of the quadratic polynomial $x^2 + 3x + k$ is 2. find the value of k.

Q.14 Find a quadratic polynomial whose sum and product of its zeroes of a 5 and 0 respectively.

Q.15 If $\propto$ and β are the zeroes of polynomial $P(x) = 4x^2 - 3x - 7$. Find $\left(\frac{1}{\propto} + \frac{1}{\beta}\right)$.

Q.16 If one zero of the polynomial $P(x) = 6x^2 + 37x - (k - 2)$ is reciprocal of the other, then find the value of k.

Q.17 If $\propto$ and β are roots of the quadratic equation $x^2 + 7x + 10 = 0$, find the quadratic equation whose roots are $\propto^2$ and β^2.

Q.18 Find the quadratic polynominal whose zeros are reciprocals of the zeros of polynomial $f(x) = ax^2 + bx + c$, $a \neq 0$, $c \neq 0$.

Q.19 If $\propto$ and β are the zeroes of quadratic polynomial $(x) = 3x^2 - 5x - 2$, $\frac{\propto^2}{\beta} + \frac{\beta^2}{\propto}$.

Q.20 If $\frac{2}{3} - 3$ and are the zeroes of the polynomial $f(x) = ax^2 + 7x + b$, then find the value of a and b.

Q.21 if $\propto$ and β are the zeroes of the quadratic polynominal $f(x) = x^2 - 5x + 4,$ find the value of $\frac{1}{\propto} + \frac{1}{\beta} - 2 \propto \beta$.

Q.22 Find the zeroes of the quadratic polynominal $x^2 + 7x + 12$ and verify the relation between the zeroes and its coefficients.

Q.23 Find the value of x and y satisfying the two equations $32x + 33y = 34$ and $33x + 32y = 31$.

Q.24 Solve the following pair of equation by the elimination method $\frac{x}{2} + \frac{2y}{3} = -1$ and $x - \frac{y}{3} = 3$.

Q.25 On comparing the ratios $\frac{a_1}{a_2}, \frac{b_1}{b_2}$ and $\frac{c_1}{c_2}$, find out whether the following pair of liner equation are consistent of inconsistent.

$$9x + 3y + 12 = 0$$

$$18x + 6y + 24 = 0$$

Q 26.The path of a train A is a given by the equation $3x + 4y - 12 = 0$ and train B is $6x + 8y - 48 = 0$,is that one represent the situation graphically.

Q.27 The cost of 2 kg apples and 1 kg of grapes on a day was found to be ₹160. After a month the cost of 4 kg of apples and 2 kg of grapes is ₹300. Represent the situation graphically.

Q.28 A fraction becomes $\frac{1}{3}$ when 2 is subtracted from the numerator and its become $\frac{1}{2}$ when 1 is subtracted from the denominator. Find the fraction.

Q.29 A father's is three times the sum of the ages of his two children. After 5 years his age will be two times the sum of their two ages. Find the present age of the father.

 Q.30 Solve for x and y.

   $\frac{ax}{b} - \frac{by}{a} = a + b$ and $ax - by = 2ab$

Q.31 The sum of a two digit number and the number obtained by reversing the order of it digit is 165. If the digits differ by 3, Find the number.

Q.32 Two numbers are in ratio of 1:3 if 5 is added to both the number, the ratio becomes 1:2, find the numbers.

Q.33 A Boat goes 30 km upstreams and 44 km downstreams in a 10 hours. In 13 hours, it can go 40 km upstream and 55 km downstreams. Determine the speed of the streams and that of the boat in still water.

Q.4 Find the discriminant of the quadratic equation $3\sqrt{3}\, x^2 + 10x + \sqrt{3} = 0$.

Q.35 If $x = 3$ Is one root of the quadratic equation $x^2 - 2kx - 6 = 0$, then find the value of k.

Q.36 Find the nature of the roots of the quadratic equation $4x^2 - 5x - 1 = 0$.

Q.37 Find the roots of the following quadratic equation by factorization: $2x^2 - x + \frac{1}{8} = 0$.

Q.38 In a flight of 600 km, an aircraft was slowed due to bad weather. Its average speed for the trip was reduce by 200 km/h and time of flight increased by 30 minutes. Find the original duration of flight.

Q.39 Sum of the areas of two squares is 400 m². If the difference of their perimeters is 16 cm. find the sides of the two squares.

Q.40 The difference of squares of two numbers is 88. If the larger number is 5 less than twice the smaller number find the two numbers.

Q.41 Find the value of k for which the quadratic equation $(k + 4)x^2 + (k + 1)x = 0$ has equal roots. Also find the roots.

Q.42 The sum of two digit number is 8. Determine the number of if sum of their reciprocal is $\frac{8}{15}$.

Q.43 Solve the quadratic equation $x^2 + 2\sqrt{2}\, x - 6 = 0$ for x.

CHAPTER- SURFACE AREA AND VOLUMES

Q.1 The surface area of two spheres are in the ratio 16:9 find. the ratio of their volume.

Q.2 If the surface area of spheres in 616 cm² , find its radius.

Q.3 If the volume of two cones are in the ratio of 1:4 and their diameters are in the ratio of 4:5 then, find the ratio of their heights.

Q.4 A right Triangles with sides 3 cm 4 cm and 5 cm is rotted about the side of 3 cm to form a cone find the volume of cone so formed.

Q.5 Volume and surface area of a solid hemisphere and numerically equal what is the diameter of hemisphere.

Q.6 The volume of a hemisphere is 2425.5 cm³. find it curved surface area. $\left(\pi = \frac{22}{7}\right)$

Q.7 If the total surface area of a solid hemisphere is 462 cm², find its volume.

Q.8 Two cubes each of volume 27 cm³ are joined end to end form of solid. find the surface area of the resulting cuboid.

Q.9 Cylindrical vessel with eternal diameter 10 cm and height 10.5 cm full of water. A solid corn of base diameter 7 cm and height 6 cm is completely immersed in the vessel. Find the volume of water displaced and the volume remaining. $\left(\pi = \frac{22}{7}\right)$

Q.10 The difference between the outer and inner curved surface area of a hollowed right circular cylinder 14 cm long in 88 cm². If the volume of metal used in making the cylinder in 176 cm³, find the outer and inner diameter of the cylinder. $\left(\pi = \frac{22}{7}\right)$

Q.11A tent is in the shape of a cylinder surmounted by a conical top of same diameter. If the height and diameter of cylindrical part are 2.1 m and 3 m respectively and the slant height of conical part in 2.8 cm, find the cost find the cost of canvas needed to make the tent if the canvas is available at the rate of ₹ 500 per sq. metre. $\left(\pi = \frac{22}{7}\right)$

Q.12 A medicine capsule is in the shape of a cylinder of diameter 0.5 cm with hemisphere stucked at each end. the length of the entire capsule is 2 cm. Find the capacity of a capsule.

STATISTICS

Q.1 Find the class-marks of the class 10 - 25 and 35-55.

Q.2 Write down the medium class of the following frequency distribution

C.I	0-10	10-20	20-30	30-40	40-50	50-60	60-70
F	4	4	8	10	12	8	4

Q.3 If the value of mean and mode are 30 and 15, respectively find median.

Q.4 What is the relation between mean median and mode.

Q.5 The following table shows the weighs (in gm) of a sample of 100 potatoes taken for a large consignment.

Weight(in gm)	50-60	60-70	70-80	80-90	90-100	100-110	110-120	120-130
Frequency	8	10	12	16	18	14	12	10

determine the median.

Q.6 The table below shows the distribution of marks obtained by student in an examination calculate the median marks.

Marks less than	10	20	30	40	50	60	70	80	90	100
Frequency	5	10	30	60	105	180	270	355	390	400

Q.7 What is the mean of the following data?

C.I	50-60	60-70	70-80	80-90	90-100
Frequency	8	6	12	11	13

Q.8 The table below shows the distribution of marks obtained by student in an examination. calculate the value of x if the mean marks in 18.

Marks	5	10	15	20	25	30
No. of Students	6	4	6	12	x	4

Q.9 The marks obtained by 120 students in a Mathematics test are given below:

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
No. of students	5	9	16	22	26	18	11	6	4	3

calculate the median.

Q.10 The table below shows the daily profits (in₹) of 100 shops calculate the mode.

Profit	0-100	100-200	200-300	300-400	400-500	500-600
No. of shops	12	18	27	20	17	6

Q.11 Find the mean of the following distribution

C.I	20-30	30-40	40-50	50-60	60-70	70-80
Frequency	10	6	8	12	5	9

Q.12 If the Arithmetic mean of the following frequency distribution is 54, determine of the value of P.

CLASS	0-20	20-40	40-60	60-80	80-100
Frequency	7	P	10	9	13

Q.13 If the Arithmetic mean of the following frequency distribution is 62.8 and the sum of all frequency in 50. Determine the value of f_1 and f_2 .

CLASS	0-20	20-40	40-60	60-80	80-100	100-120	Total
Frequency	5	f_1	10	f_2	7	8	50

Q.14 The marks obtained by 120 students in a Mathematics test are given below:Median = 43.08

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
No. of	5	9	f_1	f_2	26	18	11	6	4	3

Students											

PROBABILITY

Q.1 Find the probability of getting an even number while a die is thrown once.

Q.2 Two dice are thrown together. Find the probability of getting the same number on both dice.

Q.3 A bag contains 4 red and 6 black balls. A ball is taken out of the bag at random. What is the probability of getting a black ball?

Q.4 A card is drawn out from a well-shuffled deck of 52 cards. What is the probability of getting a black king?

Q.5 Two different coins are tossed simultaneously. Find the probability of getting at least one head.

Q.6 A letter of ENGLISH alphabet in chosen at random. Determine the probability that the chosen letter is a consonant.

Q.7 A card is drawn out from a well shuffled Deck of 52 cards. What is the probability of getting (i) a red Queen   (ii) a black King   (iii) a queen or a Jack?

Q.8 Two dice are thrown simultaneously. Find the probability that the sum of the number appearing on the two dice is more than 9.

Q.9 Find the probability that a number selected at random from the numbers 1 to 25 is not a prime number.

Q.10 A card is drawn at random from a well shuffled pack of 52 cards. Find the probability that the card is neither a red card nor a Jack.

Q.11 What is the probability that a number selected at random from the number 3,4,5,6,7,8,9 is a multiple of 4.

Q.12 A dice is thrown once. Find the probability of getting a number:

(i) Less than three   (ii) more than four.

Q.13 A card is drawn at random from a shuffled pack of 52 cards. Find the probability of drawing a (i) face card (ii) a card which is neither a king nor a red card.

Q.14 A box contains 3 blue, 2 White and 4 red marbles. If a marble is drawn out at random from the box, what is the probability that it will not be a white Marble?

Triangle [Ch. - 6]

1. If a line is draw parallel to one side of a triangle to intersect the other two side in distinct point then the other two sides are divided in the same ratio.
2. If a line divides any two sides of a triangle in the same ratio then the line must be parallel to the third side.
3. In the given figure, in Δ ABC, DE ll BC, so that AD = (4x – 3)cm, AE = (8x – 7)cm, BD = (3x – 1)cm and CE = (5x – 3). Find the value of x.
4. In the given figure, DF ll AE and DE ll AC. Prove that BF/FE = BE/EC.
5. In the given figure, DE ll OQ and DF ll OR. Show that EF ll QR.
6. In the given figure, AB ll DE and BD ll EF. Prove that $DC^2 = CF \times AC$.
7. ABCD is a trapezium in which AB ll DC and it's diagonals intersect each other at the point O. Prove that AO/OC = BO/OD.
8. X and y are points on the side AB and AC respectively of a triangle ABC such that AX/A B = 1/4, AY = 2cm and YC = 6cm. Find whether XY ll BC.
9. In the given figure, side BC of triangle ABC is intersect at D and O is any point on AD. BO and CO produced meet AC and AB at E and F respectively, and AD is produced to X, so that D is a midpoint of OX. Prove that AO : AX = AF : AB and so that EF ll BC.
10. ABCD is a parallelogram in which P is the midpoint of DC and Q is a point on AC such that CQ = 1/4 AC. If PQ produced meets BC at R. Prove that R is the midpoint of BC.
11. Prove that the ratio of the perimeters of two similar triangles is the same as the ratio of their corresponding sides.
12. In given figure, if ΔABE congruent ΔACD, show that ΔADE ~ ΔABC.
13. In the given figure, PA,QB and RC each is perpendicular to AC such that PA = x, RC = y, QB = z, AB = a and BC = b. Prove that 1/x + 1/y = 1/z
14. In the given figure, E is a point on side CB produced of an isosceles ΔABC with AB = AC. If AD and EF are perpendicular to BC and AC respectively. Prove that ΔABD~ΔECF.
15. Midpoint m of side CB of a parallelogram ABCD, the line BM is drawn intersecting AC in L and AD produced in E. Prove that EL = 2 BL.
16. In the given figure, angle 1 = angle 2 and AC/BD = CB/CE.

CIRCLE
1. In the given figure, AB is a chord of length 9.6 cm of a circle with centre O and radius 6 cm the tangents at A and B intersect at P. Find the length of PA.
2. Two tangents PA and PB are drawn to a circle with centre O from an external point P. Prove that angle APB = 2 angle OAB.
3. In the given figure, O is the centre of two concentric circle. AB is a chord of the longer circle touching the smaller circle at C. Prove that AC = BC.
4. Prove that the tangent draw at the ends of a diameter of a circle are paralle
5. A circle is inscribed in a triangle ABC touching BC, CA and AB at P,Q and R respectively as shown in the given figure. If AB=10 cm, AQ=7 cm and CQ=5 cm, then find the length of BC.
6. A circle is touching the side of BC of triangle ABC at P and touching AB and AC produced at Q and R respectively. prove that AQ = ½(perimeter of Δ ABC).
7. In the given figure, Δ ABC is a right triangle with AB=6 cm and AC=8 cm. A circle with centre O has been in scribed inside the triangle calculate the value of r the radius of the inscribed circle.
8. Prove that the parallelogram circumscribing a circle is a rhombus.
9. From a point P, two tangents PA and PB drawn to a circle C (O,r). If OP = 2r. Show that triangle APB is an equilateral triangle
10. In the given figure, O is the centre of a circle. BOA is its diameter and the tangent at the point P meets BA extended at T. If angle PBO = 30°. Find angle PTA.
11. In the given figure, O is the centre of a circle. PQL and PRM are the tangents at the points Q and R respectively and S is a point on the circle such that angle SQL = 50° and angle SRM = 60°. Find angle QSR.

12. In the given figure, O is the centre of two concentric circle of radii 5 cm and 3 cm from an external point P. The tangents PA and PB are drawn to the circle. If PA= 12 cm. Find PD.

13. In the given figure, if AB = AC, prove that BE = CE.

14. A quadrilateral ABCD is drawn to circumscribe a circle. Prove that AB + CD = AD + BC.