

GEN B. C. JOSHI APS, PITHORAGARH

WINTER VACATIONS HOME WORK

CLASS : VI, MATHEMATICS

1. LAB MANUAL ACTIVITIES:

A. To find perimeter and area of plane figures by activity method.

B. To determine the number of lines of symmetry of following shapes by paper folding method:

(i) Square

(ii) Rectangle

(iii) Equilateral triangle

(iv) Isosceles triangle

(v) Rhombus

2. MAINTAIN YOUR MATHS PORTFOLIO.

Tabulate the marks of all subjects obtained by you in UT-2 and draw a bar graph to represent it.

3. SOLVE THE FOLLOWING QUESTIONS IN SEPARATE NOTE BOOK :

***(Note down questions also)

Chapter : 8 - DECIMALS

1. Write $127 + \frac{34}{10} + \frac{12}{100}$ in decimal form.

2. Convert 725 Paisa in rupees.

3. Write the given numbers in place value table.

a) 129.02 b) 1.29.2 c) 12.902 d) 129.02

4. Find the sum of $0.007 + 8.5 + 30.08$

5. Subtract 202.54 m from 250 m.

6. What should be added to 25.5 to get 50?

7. Arrange 12.142, 12.124, 12.104, 12.401 and 12.214 in ascending order.

8. Urmila's school is at a distance of 5 km 350 m from her house. She travels 1 km 70 m on foot and the rest by bus. How much distance does she travel by bus?

9. Express each of the following without using decimals:

- (a)Rs.5.25 (b)8.354 g (c)3.5cm (d)3.05km
(e)7.54m (f)15.005 kg (g)12.05m (h)0.2m

CHAPTER – 9 : DATA HANDLING

1. Throw a dice 40 times and note the number appeared each time, make a table and enter the data using tally marks and find the number that appeared.

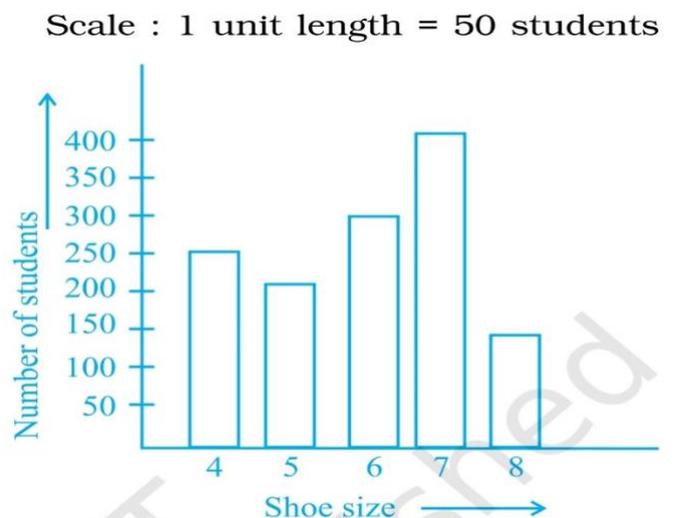
- (a) minimum number of times
(b) maximum number of times
(c) equal number of times

2. Fill in the blanks:

- (i) The data can be arranged in a tabular form using _____ marks.
(ii) A _____ represents data through pictures of objects.
(iii) On the scale of 1 unit length = 10 crore, the bar of length 6 units will represent _____ crore and of units will represent 75 crore.

3. The following bar graph represents the data for different sizes of shoes worn by the students in a school. Read the graph and answer the following questions.

- (a) Find the number of students whose shoe sizes have been collected.
(b) How many students wearing shoe size 6?
(c) What are the different sizes of the shoes worn by the students?
(d) Which shoe size is worn by the maximum number of students?
(e) Which shoe size is worn by minimum number of students?



- (f) State whether true or false:
The total number of students wearing shoe sizes 5 and 8 is the same as the number of students wearing shoe size 6.

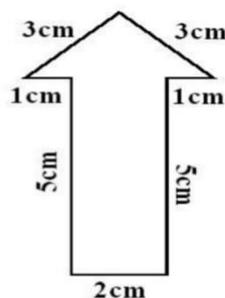
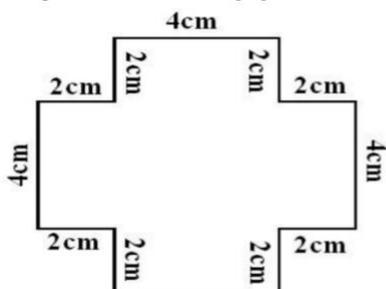
4. Home appliances sold by a shop in one month are given as below:

Home appliance	Number of home appliances
Refrigerator	75
Television	45
Washing Machine	30
Cooler	60
DVD Player	30

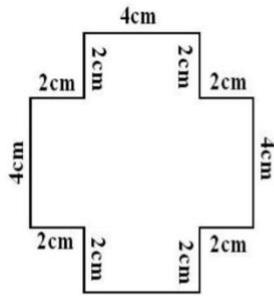
Make a pictograph to represent the above information by using symbol \diamond for each 10 appliances.

Chapter : 10 - MENSURATION

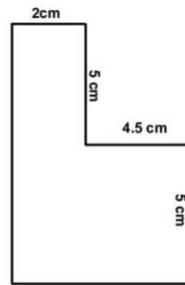
- If the area of rectangle increases from 2 cm^2 to 4 cm^2 the perimeter will
 (a) increase (b) decrease (c) remains same (d) none of these
- The perimeter of regular octagon is 16 cm, the length of each side will be
 (a) 4 cm (b) 2 cm (c) 1 cm (d) 8 cm
- The perimeter of a square is 169 cm. Find its area.
- 1 cm^2 is _____ mm^2
- The total cost of flooring a room at ₹. 8.50 per m^2 is ₹ 510. If the length of the room is 8m, find its breadth.
- What will be the cost of tiling a rectangular plot of area 800 sq.m , if the cost of tiling 100 sq.m is Rs.6.
- Find the perimeter of the following figures:



8. By splitting the following figures into rectangles, find their area.



(i)



(ii)

Chapter : 11 – ALGEBRA

1. Diameter of circle whose radius is 'r' is
 (a) $r/2$ (b) $2r$ (c) $2 - r$ (d) $2 + r$
2. Which of the following is an equation
 (a) $2x + 3 + 5$ (b) $2x + 3 < 5$ (c) $2x + 3 > 5$ (d) $2x + 3 = 5$
3. The value of variable in the expression is
 (a) fixed (b) not fixed (c) zero (d) one
4. Which of the following is expression with one variable
 (a) $y + 1$ (b) $x + y - 5$ (c) $x + y + z$ (d) 1
5. The age of Siddharth is x years , Sahil is 5 years older than Siddharth therefore Sahils age is
 (a) $5x$ (b) $x - 5$ (c) $x + 5$ (d) $x/5$
 (b)
6. $2x - 3$ may be expressed as
 (a) Ram's age is 3 years less than Shyam's age
 (b) Ram's age is 3 years less than twice Shyam's age.
 (c) Ram's age is 3 years more than twice the Shyam's age.
 (d) Ram's age is 3 years more than Shyam's age.
7. $x + y + z$ is :
 (a) an equation (b) constant (c) a variable (d) an expression
8. Find the number of matchsticks required to make a pattern of T, V, Z, E and A.
9. Find the solution of equation $3x + 2 = 11$
10. How many variables are used in the expression $2x + 3y + 5$

11. Translate each of the following statements into an equation, using x as the variable:

(a) 13 subtracted from twice a number gives 3.

(b) One fifth of a number is 5 less than that number.

(c) Two-third of number is 12.

(d) 9 added to twice a number gives 13.

(e) 1 subtracted from one-third of a number gives 1.

GEN. B.C. JOSHI A.P.S. PITHORAGARH U.K

WINTER VACATION HOME WORK

CLASS 7

SUBJECT MATHEMATICS

A- LAB MANUAL

1. To prove that area of circle of radius r is πr^2 by paper cutting and pasting (Activity 16 Page No.91).
2. To understand the concept of symmetry and find lines of symmetry by paper folding.(Activity 17 Page no 93)

B- MAINTAIN YOUR MATHS PORTFOLIO

1. Find perimeter and area of any 10 objects that are available in your surroundings.
2. Best achievements of current year.

C- SOLVE THE FOLLOWING QUESTIONS IN SEPRATE PRACTICE NOTE BOOK.

COMPARING QUANTITIES

Q1.Out of 15,000 voters in a constituency, 60% voted. Find the number of voters who did not vote.

Q2.Raghu bought an almirah for Rs.6250 and spent Rs.375 on its repairs. Then he sold it for Rs. 6890. Find his gain or loss percent.

Q3. Find the simple interest on Rs. 2500 for 2 years 6 months at 6% per annum.

Q4.A bicycle is purchased for 1800 and is sold at a profit of 12%. What will be the selling price?

Q5.Selling price of a toy car is Rs 540. If the profit made by shopkeeper is 20%, what is the cost price of this toy?

Q6.The king cobra can reach a length of 558 cm. This is only about 60 per cent of the length of the largest reticulated python. Find the length of the largest reticulated python.

Q7.Rajni and Mohini deposited 3000 and 4000 in a company at the rate of 10% per annum for 3 years and 2 years respectively. Find the difference of the amounts received by them.

Q8.If Manohar pays an interest of Rs 750 for 2 years on a sum of Rs 4,500, find the rate of interest.

PRACTICAL GEOMETRY

1. Draw a line AB and take a point P outside it. Draw a line CD parallel to AB and passing through the point P.
2. Draw a line AB and draw another line CD parallel to AB at a distance of 3.5 cm from it.
3. Draw a line 'l' and draw another line 'm' parallel to 'l' at a distance of 4.3 cm from it.
4. Construct a triangle ABC, given that AB = 5 cm, BC = 6 cm and AC = 7 cm.
5. Construct a triangle DEF such that DE = 5 cm, EF = 6 cm, and DF = 7 cm.
6. Draw ΔPQR with PQ = 4 cm, QR = 3.5 cm and PR = 4 cm. What type of triangle is this?
7. Construct ΔABC such that AB = 2.5 cm, BC = 6 cm and AC = 6.5 cm. Measure $\angle B$.
8. Construct a triangle PQR, given that PQ = 3 cm, QR = 5.5 cm and $\angle PQR = 60^\circ$.
9. Construct an isosceles triangle in which the lengths of each of its equal sides is 6.5 cm and the angle between them is 110° .
10. Construct ΔXYZ if it is given that XY = 6 cm, $m\angle ZXY = 30^\circ$ and $m\angle XYZ = 100^\circ$.

RATIONAL NUMBERS

1. Fill in the boxes:

$$(i) \frac{5}{4} = \frac{\square}{16} = \frac{25}{\square} = \frac{-15}{\square}$$

$$(ii) \frac{-3}{7} = \frac{\square}{14} = \frac{9}{\square} = \frac{-6}{\square}$$

2. Reduce to the standard form: (i) $\frac{-45}{30}$ (ii) $\frac{36}{-24}$ (iii) $\frac{-3}{-15}$ (iv) $\frac{-18}{45}$ (v) $\frac{-12}{18}$

3. Find five rational numbers between $\frac{-5}{7}$ and $\frac{-3}{8}$.

4. List three rational numbers between -2 and -1 .

5. Write four more numbers in the following pattern: $\frac{-1}{3}, \frac{-2}{6}, \frac{-3}{9}, \frac{-4}{12}, \dots$

6. Which is greater in each of the following:

$$(i) \frac{2}{3}, \frac{5}{2} \quad (ii) \frac{-5}{6}, \frac{-4}{3} \quad (iii) \frac{-3}{4}, \frac{2}{-3}$$

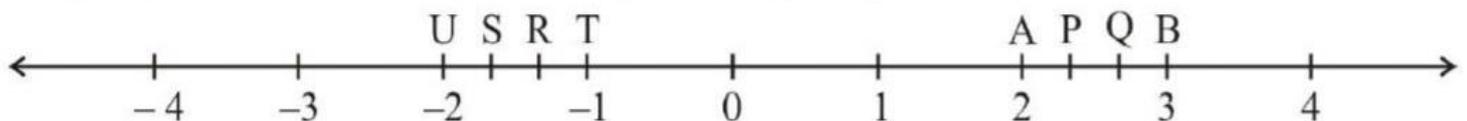
$$(iv) \frac{-1}{4}, \frac{1}{4} \quad \text{and} \quad (v) -3\frac{2}{7}, -3\frac{4}{5}$$

7. Write the following rational numbers in ascending order:

$$(i) \frac{-3}{5}, \frac{-2}{5}, \frac{-1}{5} \quad (ii) \frac{-1}{3}, \frac{-2}{9}, \frac{-4}{3} \quad (iii) \frac{-3}{7}, \frac{-3}{2}, \frac{-3}{4}$$

8. Write the following rational numbers in descending order: $\frac{-1}{3}, \frac{-2}{9}, \frac{-4}{3}$

9. The points P, Q, R, S, T, U, A and B on the number line are such that, $TR = RS = SU$ and $AP = PQ = QB$. Name the rational numbers represented by P, Q, R and S.

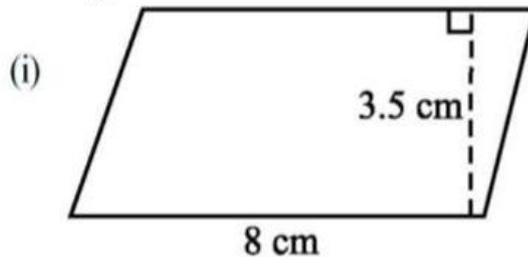


10. Give four rational numbers equivalent to:

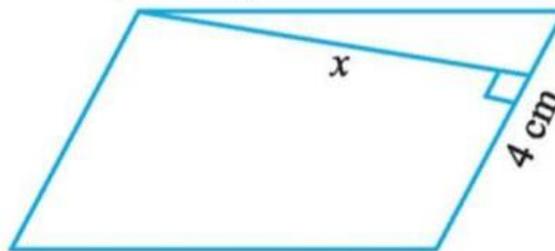
$$(i) \frac{-2}{7} \quad (ii) \frac{5}{-3} \quad (iii) \frac{4}{9}$$

PERIMETER AND AREA

1. A door-frame of dimensions $3\text{ m} \times 2\text{ m}$ is fixed on the wall of dimension $10\text{ m} \times 10\text{ m}$. Find the total labour charges for painting the wall if the labour charges for painting 1 m^2 of the wall is Rs 2.50.
2. The area of a rectangular sheet is 500 cm^2 . If the length of the sheet is 25 cm , what is its width? Also find the perimeter of the rectangular sheet.
3. Anu wants to fence the garden in front of her house, on three sides with lengths 20 m , 12 m and 12 m . Find the cost of fencing at the rate of Rs 150 per metre.
4. A wire is in the shape of a square of side 10 cm . If the wire is rebent into a rectangle of length 12 cm , find its breadth. Which encloses more area, the square or the rectangle?
5. The area of a square and a rectangle are equal. If the side of the square is 40 cm and the breadth of the rectangle is 25 cm , find the length of the rectangle. Also, find the perimeter of the rectangle.
6. In a parallelogram ABCD, $AB = 7.2\text{ cm}$ and the perpendicular from C on AB is 4.5 cm .
7. Find the area of following parallelograms:



8. One of the sides and the corresponding height of a parallelogram are 4 cm and 3 cm respectively. Find the area of the parallelogram.
9. Find the height ' x ' if the area of the parallelogram is 24 cm^2 and the base is 4 cm .



10. The two sides of the parallelogram ABCD are 6 cm and 4 cm . The height corresponding to the base CD is 3 cm . Find the (i) area of the parallelogram. (ii) the height corresponding to the base AD.
11. Find BC, if the area of the triangle ABC is 36 cm^2 and the height AD is 3 cm .
12. What is the circumference of a circle of diameter 10 cm (Take $\pi = 3.14$)?

GEN. B.C. JOSHI A.P.S. PITHORAGARH U.K
WINTER VACATION HOME WORK
CLASS VIII MATHEMATICS

A- LAB MANUAL

1. To learn about the laws of exponents for rational bases.
2. To find the curved surface area of a cylinder with the help of paper.

B- MAINTAIN YOUR MATHS PORTFOLIO.

1. Make a map of our school with proper scale in A4 size white sheet.

C- SOLVE THE FOLLOWING QUESTIONS IN SEPRATE PRACTICE NOTE BOOK.

Mensuration

- 1.Q 1 Find the volume of a cuboid whose length is 8 cm, breadth 6 cm and height 3.5 cm.
- 2.Find the altitude of a trapezium, the sum of the lengths of whose bases is 6.5 cm and whose area is 26 cm².
- 3.Find the height of a cuboid whose volume is 275 cm³ and base area is 25 cm².
- 4.Find the area of a rhombus whose diagonals are of measurements 6 cm and 8 cm.
- 5.Find the volume of the cylinder whose base diameter is 14 cm and height is 10 cm.
- 6.Find the area of a triangle whose base is 4 cm and altitude is 6 cm.
- 7.Find the total surface area of a cube whose volume is 343 cm³.
- 8.Find the side of a cube whose surface area is 2400 cm².
- 9.How many bricks will be required for a wall which is 8 m long, 6m high and 22.5 cm thick, if each brick measures 25 cm 11.25 cm 6 cm?
- 10.The diameter of garden roller is 1.4 m and it is 2 m long. How much area will it cover in 5 revolutions?
- 11.Find the volume of a cuboid whose length is 8 cm, width is 3 cm and height is 5 cm.
- 12.A cylindrical tank has a capacity of 5632 m³. If the diameter of its base is 16 m, find its depth.
- 13.Find the volume of 64 cubes whose one side is 4 cm.
- 14.Find the volume of a cylinder whose base radius is 14 cm and height is 35 cm.
- 15.Find the area of a parallelogram whose measurements are given in the following figure.
- 16.Find the total surface area of a cylinder whose base radius is 8 cm and height is 14 cm.
- 17.Find the area of a rhombus whose diagonals are of lengths 20 cm and 16 cm.
- 18.Find the height of cuboid whose volume is 490 cm³ and base area is 35 cm².



19. The diagonal of a quadrilateral shaped field is 24 cm and perpendicular dropped on it from the remaining opposite vertices are 6 m and 12 m. Find the area of the field.
20. A godown is in the form of a cuboid of measures 60 m 40 m 20 m . How many cuboidal boxes can be stored in it if the volume of one box 0.8 m³?
21. The internal measures of a cuboidal room are 10 m 8 m 4 m . Find the total cost of whitewashing four walls of a room, if the cost of white washing is Rs 5 per m².
22. Find the area of a rhombus whose side is 5 cm and its altitude is 4 cm. If one of its diagonal is 8 cm long, find the length of the other diagonal.
23. In a building there are 4 cylindrical pillars. The radius of each pillar is 21 cm and height is 5m. Find the curved surface area of four pillars.
24. A rectangle piece of metal sheet 11 m x 4 m is folded without overlapping to make a cylinder of height 4 m. Find the volume of the cylinder.
25. The perimeter of a trapezium is 52 cm. Its non-parallel sides are 10 cm each and the distance between two parallel sides is 8 cm. Find the area of the trapezium.
26. A rectangular paper of width 7 cm is rolled along its width and a cylinder of radius 20 cm is formed. Find the volume of the cylinder.
27. A tin is in a cylindrical shape whose base has a diameter of 14 cm and height 20 cm. A label is placed around the surface of the container. If the label is placed 2 cm from top and bottom, what is the area of the label?



PRACTICE QUESTIONS
CLASS VIII: CHAPTER - 12
EXPONENTS AND POWERS

1. Express:
 - (i) 729 as a power of 3
 - (ii) 128 as a power of 2
 - (iii) 343 as a power of 7
 - (iv) 256 as a power 2.
2. Which one is greater 2^3 or 3^2 ?
3. Which one is greater 8^2 or 2^8 ?
4. Express the following numbers as a product of powers of prime factors:
 - (i) 72 (ii) 432 (iii) 1000 (iv) 16000
5. Express each of the following numbers using exponential notation:
 - (i) 512 (ii) 343 (iii) 729 (iv) 3125
6. Simplify:
 - (i) $(-4)^3$ (ii) $(-3) \times (-2)^3$ (iii) $(-3)^2 \times (-5)^2$ (iv) $(-2)^3 \times (-10)^3$
7. Compare the following numbers:
 - (i) 2.7×10^{12} ; 1.5×10^8 (ii) 4×10^{14} ; 3×10^{17}
8. Simplify and write in exponential form:
 - (i) $2^5 \times 2^3$
 - (ii) $p^3 \times p^2$
 - (iii) $4^3 \times 4^2$
 - (iv) $a^3 \times a^2 \times a^7$
 - (v) $5^3 \times 5^7 \times 5^{12}$
 - (vi) $(-4)^{100} \times (-4)^{20}$
9. Simplify and write in exponential form:
 - (i) $2^9 \div 2^3$
 - (ii) $10^8 \div 10^4$
 - (iii) $9^{11} \div 9^7$
 - (iv) $20^{15} \div 20^{13}$
 - (v) $7^{13} \div 7^{10}$
10. Express the following terms in the exponential form:
 - (i) $(2 \times 3)^5$ (ii) $(2a)^4$ (iii) $(-4m)^3$



11. Simplify and write the answer in exponential form:

(i) 6^{2^4}

(ii) $(2^2)^{100}$

(iii) $(7^{50})^2$

(iv) $(5^3)^7$

12. Expand: (i) $\left(\frac{3}{5}\right)^4$ (ii) $\left(\frac{4}{7}\right)^5$

13. Write exponential form for $8 \times 8 \times 8 \times 8$ taking base as 2.

14. Simplify and write the answer in the exponential form.

(i) $\left(\frac{3^7}{3^2}\right) \times 3^5$ (ii) $2^3 \times 2^2 \times 2^5$ (iii) $(6^2 \times 6^4) \div 6^3$

(iv) $\left[(2^2)^3 \times 3^6\right] \times 5^6$ (v) $8^2 \div 2^3$

15. Simplify:

(i) $\frac{12^4 \times 9^3 \times 4}{6^3 \times 8^2 \times 27}$ (ii) $2^3 \times a^3 \times 5a^4$ (iii) $\frac{2 \times 3^4 \times 2^5}{9 \times 4^2}$

16. Express each of the following as a product of prime factors only in exponential form:

(i) 108×192 (ii) 270 (iii) 729×64 (iv) 768

17. Simplify:

(i) $\frac{(2^5)^2 \times 7^3}{8^3 \times 7}$ (ii) $\frac{25 \times 5^2 \times t^8}{10^3 \times t^4}$ (iii) $\frac{3^5 \times 10^5 \times 25}{5^7 \times 6^5}$

18. Simplify and write the answer in the exponential form:

(i) $(2^5 \div 2^8)^5 \times 2^{-5}$

(ii) $(-4)^{-3} \times (5)^{-3} \times (-5)^{-3}$

(iii) $\frac{1}{8} \times (3)^{-3}$

(iv) $(-3)^4 \times \left(\frac{5}{3}\right)^4$

19. Simplify:

(i) $\left\{\left(\frac{1}{3}\right)^{-2} - \left(\frac{1}{2}\right)^{-3}\right\} \div \left(\frac{1}{4}\right)^{-2}$

(ii) $\left(\frac{5}{8}\right)^{-7} \times \left(\frac{8}{5}\right)^{-5}$



20. Simplify:

$$(i) \frac{25 \times t^{-4}}{5^{-3} \times 10 \times t^{-8}} (t \neq 0)$$

$$(ii) \frac{3^{-5} \times 10^{-5} \times 125}{5^{-7} \times 6^{-5}}$$

21. Find m so that $(-3)^{m+1} \times (-3)^5 = (-3)^7$

22. Find the value of m for which $5^m \div 5^{-3} = 5^5$.

23. Write the following numbers in standard form.

(i) 0.000000564 (ii) 0.0000021 (iii) 21600000

(iv) 15240000 (v) 6020000000000000

24. Express the following numbers in standard form.

(i) 0.000000000000000000000035

(ii) 4050000000000

(iii) 5100000000000000000

(iv) 0.00000000000000000000000000625

(v) 0.0000000000000001257

25. Express the following numbers in usual form.

(i) 3.52×10^5 (ii) 7.54×10^{-4} (iii) 3×10^{-5} (iv) 5.25×10^{-7} (v) 8.525×10^9

26. Express the number appearing in the following statements in standard form.

(i) 1 micron is equal to $\frac{1}{1000000}$ m.

(ii) Charge of an electron is 0.000,000,000,000,000,16 coulomb.

(iii) Size of a bacteria is 0.0000005 m

(iv) Size of a plant cell is 0.00001275 m

(v) Thickness of a thick paper is 0.07 mm

(vi) Mass of Uranus = 86,800,000,000,000,000,000,000 kg

(vii) Mass of the Earth = 5,976,000,000,000,000,000,000 kg

(viii) Distance of Sun from the centre of our Galaxy = 300,000,000,000,000,000 m

(ix) Sun is located 300,000,000,000,000,000 m from the centre of our Milky Way Galaxy.

(x) The distance between Sun and Saturn is 1,433,500,000,000 m

27. Express the following numbers in standard form.

(i) 0.000035 (ii) 4050000

28. In a stack there are 5 books each of thickness 20mm and 5 paper sheets each of thickness 0.016 mm. What is the total thickness of the stack.

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PRACTICE QUESTIONS
CLASS VIII: CHAPTER - 09
ALGEBRAIC EXPRESSIONS

1. Identify, in the following expressions, terms which are not constants. Give their numerical coefficients: $xy + 4$, $13 - y^2$, $13 - y + 5y^2$, $4p^2q - 3pq^2 + 5$
 2. (a) What are the coefficients of x in the following expressions? $4x - 3y$, $8 - x + y$, $y^2x - y$, $2z - 5xz$
(b) What are the coefficients of y in the following expressions? $4x - 3y$, $8 + yz$, $yz^2 + 5$, $my + m$
 3. Classify the following expressions as a monomial, a binomial or a trinomial: a , $a + b$, $ab + a + b$, $ab + a + b - 5$, xy , $xy + 5$, $5x^2 - x + 2$, $4pq - 3q + 5p$, 7 , $4m - 7n + 10$, $4mn + 7$.
 4. Collect like terms and simplify the expression: $12m^2 - 9m + 5m - 4m^2 - 7m + 10$
 5. Add and subtract
 - (i) $m - n$, $m + n$
 - (ii) $mn + 5 - 2$, $mn + 3$
 6. Subtract $24ab - 10b - 18a$ from $30ab + 12b + 14a$.
 7. From the sum of $2y^2 + 3yz$, $-y^2 - yz - z^2$ and $yz + 2z^2$, subtract the sum of $3y^2 - z^2$ and $-y^2 + yz + z^2$.
 8. Classify the following polynomials as monomials, binomials, trinomials.
 $-z + 5$, $x + y + z$, $y + z + 100$, $ab - ac$, 17
 9. Add:
 1. $t - 8tz$, $3tz - z$, $z - t$
 2. $7mn + 5$, $12mn + 2$, $9mn - 8$, $-2mn - 3$
 3. $a + b - 3$, $b - a + 3$, $a - b + 3$
 4. $14x + 10y - 12xy - 13$, $18 - 7x - 10y + 8xy$, $4xy$
 5. $5m - 7n$, $3n - 4m + 2$, $2m - 3mn - 5$
 10. Add: $7xy + 5yz - 3zx$, $4yz + 9zx - 4y$, $-3xz + 5x - 2xy$.
 11. Subtract $5x^2 - 4y^2 + 6y - 3$ from $7x^2 - 4xy + 8y^2 + 5x - 3y$.
 12. Subtract $4a - 7ab + 3b + 12$ from $12a - 9ab + 5b - 3$
 13. Subtract $3xy + 5yz - 7zx$ from $5xy - 2yz - 2zx + 10xyz$
 14. Subtract $4p^2q - 3pq + 5pq^2 - 8p + 7q - 10$ from $18 - 3p - 11q + 5pq - 2pq^2 + 5p^2q$
 15. (a) What should be added to $x^2 + xy + y^2$ to obtain $2x^2 + 3xy$?
(b) What should be subtracted from $2a + 8b + 10$ to get $-3a + 7b + 16$?
 16. What should be taken away from $3x^2 - 4y^2 + 5xy + 20$ to obtain $-x^2 - y^2 + 6xy + 20$?
 17. (a) From the sum of $3x - y + 11$ and $-y - 11$, subtract $3x - y - 11$.
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(b) From the sum of $4 + 3x$ and $5 - 4x + 2x^2$, subtract the sum of $3x^2 - 5x$ and $-x^2 + 2x + 5$.

18. What should be the value of a if the value of $2x^2 + x - a$ equals to 5, when $x = 0$?

19. Simplify the expression and find its value when $a = 5$ and $b = -3$.

$$2(a^2 + ab) + 3 - ab$$

20. If $p = -10$, find the value of $p^2 - 2p - 100$

21. Construct

- (a) 3 binomials with only x as a variable;
- (b) 3 binomials with x and y as variables;
- (c) 3 monomials with x and y as variables;
- (d) 2 polynomials with 4 or more terms.

22. Find the volume of each rectangular box with given length, breadth and height.

	length	breadth	Height
(i)	$2ax$	$3by$	$5cz$
(ii)	m^2n	n^2p	p^2m
(iii)	$2q$	$4q^2$	$8q^3$

23. Find the product (i) $2x(3x + 5xy)$ (ii) $a^2(2ab - 5c)$

24. Simplify the expressions and evaluate them as directed:

(i) $x(x - 3) + 2$ for $x = 1$, (ii) $3y(2y - 7) - 3(y - 4) - 63$ for $y = -2$

25. Subtract $3pq(p - q)$ from $2pq(p + q)$.

26. Add

(i) $5m(3 - m)$ and $6m^2 - 13m$ (ii) $4y(3y^2 + 5y - 7)$ and $2(y^3 - 4y^2 + 5)$

27. Add: $p(p - q)$, $q(q - r)$ and $r(r - p)$

28. Add: $2x(z - x - y)$ and $2y(z - y - x)$

29. Subtract: $3l(l - 4m + 5n)$ from $4l(10n - 3m + 2l)$

30. Subtract: $3a(a + b + c) - 2b(a - b + c)$ from $4c(-a + b + c)$

31. Simplify

(i). $(a + b)(2a - 3b + c) - (2a - 3b)c$.

(ii). $(x + y)(2x + y) + (x + 2y)(x - y)$

(iii). $(a + b + c)(a + b - c)$

32. Multiply the binomials.

(i) $(2pq + 3q^2)$ and $(3pq - 2q^2)$

(ii) $\left(\frac{3}{4}a^2 + 3b^2\right)$ and $4\left(a^2 - \frac{2}{3}b^2\right)$

(iii) $(y - 8)$ and $(3y - 4)$.



33. Using the formula of $(a + b)^2$, find (i) $(2x + 3y)^2$ (ii) 103^2

34. Find the product.

- (i) $(5 - 2x)(3 + x)$ (ii) $(x + 7y)(7x - y)$
(iii) $(a^2 + b)(a + b^2)$ (iv) $(p^2 - q^2)(2p + q)$

35. Using the formula of $(a + b)(a - b)$, find (i) $\left(\frac{3}{2}m + \frac{2}{3}n\right)\left(\frac{3}{2}m - \frac{2}{3}n\right)$ (ii) $983^2 - 17^2$
(iii) 194×206

36. Using the formula of $(a - b)^2$, find (i) $(4p - 3q)^2$ (ii) $(4.9)^2$

37. Use the Identity $(x + a)(x + b) = x^2 + (a + b)x + ab$ to find the following:

- (i) 501×502 (ii) 95×103

38. Show that.

(i) $\left(\frac{4}{3}m - \frac{3}{4}n\right)^2 + 2mn = \frac{16}{9}m^2 + \frac{9}{16}n^2$

(ii) $(9p - 5q)^2 + 180pq = (9p + 5q)^2$

(iii) $(a - b)(a + b) + (b - c)(b + c) + (c - a)(c + a) = 0$

39. Using identities, evaluate.

- (i) 72^2 (ii) 199^2 (iii) 103^2 (iv) 999^2 (v) 5.1^2
(vi) 296×304 (vii) 77×83 (viii) 9.2^2 (ix) 10.5×9.5

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HOLIDAY HOMEWORK WINTER VACATION (2021-22)

CLASS- 9

MATHEMATICS

1. COMPLETE THE UNDERMENTIONED LAB MANUAL ACTIVITIES IN YOUR LAB MANUAL WORK BOOK.

a) Activity 17 (Quadrilateral formed by joining the mid-points of sides of a Quadrilateral)

b) Activity 18 (Mid-point point Theorem)

c) Activity 25 (Property of Cyclic Quadrilateral)

2. COMPLETE PORTFOLIO OF THE SUBJECT.

3. SOLVE THE FOLLOWING WORKSHEET IN A SEPERATE NOTEBOOK.

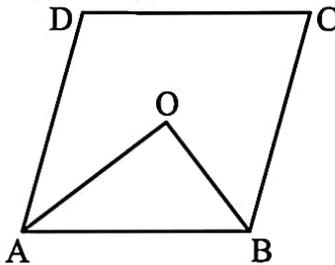
POLYNOMIALS

1. Which of the following is not a polynomial?
(a) $x^2 + \sqrt{2}x + 3$ (b) $x^2 + \sqrt{2}x + 6$ (c) $x^3 + 3x^2 - 3$ (d) $6x + 4$
2. The degree of the polynomial $3x^3 - x^4 + 5x + 3$ is
(a) -4 (b) 4 (c) 1 (d) 3
3. Zero of the polynomial $p(x) = a^2x$, $a \neq 0$ is
(a) $x = 0$ (b) $x = 1$ (c) $x = -1$ (d) $a = 0$
4. Which of the following is a term of a polynomial?
(a) $2x$ (b) $\frac{3}{x}$ (c) $x^{\sqrt{x}}$ (d) \sqrt{x}
5. If $p(x) = 5x^2 - 3x + 7$, then $p(1)$ equals
(a) -10 (b) 9 (c) -9 (d) 10
6. Factorisation of $x^3 + 1$ is
(a) $(x + 1)(x^2 - x + 1)$ (b) $(x + 1)(x^2 + x + 1)$
(c) $(x + 1)(x^2 - x - 1)$ (d) $(x + 1)(x^2 + 1)$
7. If $x + y + 2 = 0$, then $x^3 + y^3 + 8$ equals
(a) $(x + y + 2)^3$ (b) 0 (c) $6xy$ (d) $-6xy$
8. If $x = 2$ is a zero of the polynomial $2x^2 + 3x - p$, then the value of p is
(a) -4 (b) 0 (c) 8 (d) 14
9. $x + \frac{1}{x}$ is
(a) a polynomial of degree 1 (b) a polynomial of degree 2
(c) a polynomial of degree 3 (d) not a polynomial
10. Integral zeroes of the polynomial $(x + 3)(x - 7)$ are
(a) -3, -7 (b) 3, 7 (c) -3, 7 (d) 3, -7
11. The remainder when $p(x) = 2x^2 - x - 6$ is divided by $(x - 2)$ is
(a) $p(-2)$ (b) $p(2)$ (c) $p(3)$ (d) $p(-3)$
12. If $2(a^2 + b^2) = (a + b)^2$, then
(a) $a + b = 0$ (b) $a = b$ (c) $2a = b$ (d) $ab = 0$
13. If $x^3 + 3x^2 + 3x + 1$ is divided by $(x + 1)$, then the remainder is
(a) -8 (b) 0 (c) 8 (d) $\frac{1}{8}$
14. The value of $(525)^2 - (475)^2$ is
(a) 100 (b) 1000 (c) 100000 (d) -100

-
15. If $a + b = -1$, then the value of $a^3 + b^3 - 3ab$ is
(a) -1 (b) 1 (c) 26 (d) -26
16. The value of $(2 - a)^3 + (2 - b)^3 + (2 - c)^3 - 3(2 - a)(2 - b)(2 - c)$ when $a + b + c = 6$ is
(a) -3 (b) 3 (c) 0 (d) -1
17. If $\frac{a}{b} + \frac{b}{a} = 1$, ($a \neq 0, b \neq 0$), then the value of $a^3 - b^3$ is
(a) -1 (b) 0 (c) 1 (d) $\frac{1}{2}$
18. If $x = \frac{1}{2 - \sqrt{3}}$, then the value of $(x^2 - 4x + 1)$ is
(a) -1 (b) 0 (c) 1 (d) 3
19. The number of zeroes of the polynomial $x^3 + x - 3 - 3x^2$ is
(a) 1 (b) 2 (c) 0 (d) 3
20. If $(x + 2)$ and $(x - 2)$ are factors of $ax^4 + 2x - 3x^2 + bx - 4$, then the value of $a + b$ is
(a) -7 (b) 7 (c) 14 (d) -8

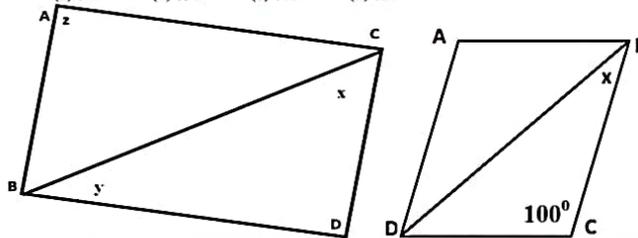
QUADRILATERALS

- Given four points A, B, C, D such that three points A, B, C are collinear. By joining these points in order, we get
(a) a straight line (b) a triangle (c) quadrilateral (d) none of these
- In quadrilateral ABCD, $AB = BC$ and $CD = DA$, then the quadrilateral is a
(a) parallelogram (b) rhombus (c) kite (d) trapezium
- Given a triangular prism, then what can we conclude about the lateral faces.
(a) faces are rectangular (b) faces are parallelogram
(c) faces are trapeziums (d) square
- The bisectors of the angles of parallelogram enclose a
(a) parallelogram (b) rhombus (c) rectangle (d) square
- Which if the following quadrilateral a rhombus?
(a) diagonals bisect each other (b) all the four sides are equal
(c) diagonals bisect opposite angles (d) one angle between the diagonals is 60° .
- Consecutive angles of parallelogram are
(a) equal (b) supplementary (c) complementary (d) none of these
- Given a rectangle ABCD and P, Q, R, S midpoints of AB, BC, CD and DA respectively. Length of diagonal of rectangle is 8 cm, the quadrilateral PQRS is
(a) parallelogram with adjacent sides 4 cm (b) rectangle with adjacent sides 4 cm
(c) rhombus with side 4 cm (d) square with side 4 cm
- In parallelogram ABCD, bisectors of angles A and B intersect each other at O. The value of $\angle AOB$ is:
(a) 30° (b) 60° (c) 90° (d) 120°



- If an angle of a parallelogram is two-third of its adjacent angle, the smallest angle of the parallelogram is
(a) 108° (b) 54° (c) 72° (d) 81°

- If the degree measures of the angles of quadrilateral are $4x$, $7x$, $9x$ and $10x$, what is the sum of the measures of the smallest angle and largest angle?
(a) 140° (b) 150° (c) 168° (d) 180°
- In the figure ABCD is a parallelogram, what is the sum of the angle x , y and z ?
(a) 140° (b) 150° (c) 168° (d) 180°



CLASS IX: CHAPTER – 10 CIRCLES

- Distance of chord AB from the centre is 12 cm and length of the chord is 10 cm. Then diameter of the circle is
A. 26 cm B. 13 cm C. $\sqrt{244}$ cm D. 20 cm
 - Two circles are drawn with side AB and AC of a triangle ABC as diameters. Circles intersect at a point D. Then
A. $\angle ADB$ and $\angle ADC$ are equal B. $\angle ADB$ and $\angle ADC$ are complementary
C. Points B, D, C are collinear D. none of these
 - The region between a chord and either of the arcs is called
A. an arc B. a sector C. a segment D. a semicircle
 - A circle divides the plane in which it lies, including circle in
A. 2 parts B. 3 parts C. 4 parts D. 5 parts
 - If diagonals of a cyclic quadrilateral are the diameters of a circle through the vertices of a quadrilateral, then quadrilateral is a
A. parallelogram B. square C. rectangle D. trapezium
 - Given three non collinear points, then the number of circles which can be drawn through these three points are
A. one B. zero C. two D. infinite
- Distance of chord AB from the centre is 12 cm and length of the chord is 10cm. Then diameter of the circle is
- In a circle with centre O, AB and CD are two diameters perpendicular to each other. The length of chord AC is
A. 2 AB B. $\sqrt{2}$ AB C. $\frac{1}{2}$ AB D. $\frac{1}{\sqrt{2}}$ AB
 - If AB is a chord of a circle, P and Q are the two points on the circle different from A and B, then
A. $\angle APB = \angle AQB$
B. $\angle APB + \angle AQB = 180^\circ$
C. $\angle APB + \angle AQB = 90^\circ$
D. $\angle APB + \angle AQB = 180^\circ$

CONSTRUCTIONS

- In a pair of set, squares, one if with angles are
(a) $30^{\circ}, 60^{\circ}, 90^{\circ}$ (b) $30^{\circ}, 30^{\circ}, 45^{\circ}$ (c) $75^{\circ}, 25^{\circ}, 80^{\circ}$ (d) $65^{\circ}, 15^{\circ}, 100^{\circ}$
- In a pair of set, squares, the other is with angles
(a) $45^{\circ}, 45^{\circ}, 90^{\circ}$ (b) $30^{\circ}, 50^{\circ}, 100^{\circ}$ (c) $60^{\circ}, 60^{\circ}, 60^{\circ}$ (d) none of these
- To draw the perpendicular bisector of line segment AB, we open the compass
(a) more than $\frac{1}{2}AB$ (b) less than $\frac{1}{2}AB$ (c) equal to $\frac{1}{2}AB$ (d) none of these
- To construct an angle of $22\frac{1}{2}^{\circ}$, we
(a) bisect an angle of 60° (b) bisect an angle of 30°
(c) bisect an angle of 45° (d) none of these
- To construct a triangle we must know at least its _____ parts.
(a) two (b) three (c) one (d) five
- For which of the following condition the construction of a triangle is not possible:
(a) If two sides and angle included between them is not given
(b) If two sides and angle included between them is not given
(c) If its three sides are given
(d) If two angles and side included between them is given
- Construction of a triangle is not possible if:
(a) $AB + BC < AC$ (b) $AB + BC = AC$ (c) both (a) and (b) (d) $AB + BC > AC$
- With the help of ruler and compass it is not possible to construct an angle of
(a) 37.5° (b) 40.5° (c) 22.5° (d) 67.5°
- The construction of a triangle ABC given that $BC = 3$ cm, $\angle C = 60^{\circ}$ is possible when difference of AB and AC is equal to
(a) 3.2 cm (b) 3.1 cm (c) 3 cm (d) 2.8 cm
- The construction of a triangle ABC, given that $BC = 6$ cm, $\angle = 45^{\circ}$ is not possible when the difference of AB and AC is equal to
(a) 6.9 cm (b) 5.2 cm (c) 5.0 cm (d) 4.0 cm.
- Construction of a triangle is not possible if:
(a) $AB - BC < AC$ (b) $AB - BC = AC$ (c) both (a) and (b) (d) $AB - BC > AC$
- To construct an angle of 15° , we
(a) bisect an angle of 60° (b) bisect an angle of 30°
(c) bisect an angle of 45° (d) none of these

SURFACE AREAS AND VOLUMES

1. A joker's cap is in the form of cone of base radius 7 cm and height 24 cm. The area of sheet to make 10 such caps is
(a) 5500 cm^2 (b) 6500 cm^2 (c) 8500 cm^2 (d) 3500 cm^2
2. The curved surface area of a hemisphere of radius 'r' is
(a) $2\pi r^2$ (b) $4\pi r^2$ (c) $3\pi r^2$ (d) $5\pi r^2$
3. The total surface area of a hemisphere of radius 'r' is
(a) $2\pi r^2$ (b) $4\pi r^2$ (c) $3\pi r^2$ (d) $5\pi r^2$
4. The curved surface area of a sphere of radius 7 cm is:
(a) 516 cm^2 (b) 616 cm^2 (c) 716 cm^2 (d) 880 cm^2
5. The curved surface area of a hemisphere of radius 21 cm is:
(a) 2772 cm^2 (b) 2564 cm^2 (c) 3772 cm^2 (d) 4772 cm^2
6. The curved surface area of a sphere of radius 14 cm is:
(a) 2464 cm^2 (b) 2428 cm^2 (c) 2464 cm^2 (d) none of these.
7. The curved surface area of a sphere of diameter 14 cm is:
(a) 516 cm^2 (b) 616 cm^2 (c) 716 cm^2 (d) 880 cm^2
8. Total surface area of hemisphere of radius 10 cm is
(a) 942 cm^2 (b) 940 cm^2 (c) 842 cm^2 (d) 840 cm^2
9. The radius of a spherical balloon increases from 7 cm to 14 cm as air is being pumped into it. The ratio of surface area of the balloon in the two cases is:
(a) 4 : 1 (b) 1 : 4 (c) 3 : 1 (d) 1 : 3
10. A matchbox measures 4 cm x 2.5 cm x 1.5 cm. The volume of packet containing 12 such boxes is:
(a) 160 cm^3 (b) 180 cm^3 (c) 160 cm^2 (d) 180 cm^2
11. A cuboidal water tank is 6 m long, 5 m wide and 4.5 m deep. How many litre of water can it hold?
(a) 1350 liters (b) 13500 liters (c) 135000 liters (d) 135 liters
12. A cuboidal vessel is 10 m long and 8 m wide. How high must it be made to hold 380 cubic metres of a liquid?
(a) 4.75 m (b) 7.85 m (c) 4.75 cm (d) none of these
13. The capacity of a cuboidal tank is 50000 litres. The length and depth are respectively 2.5 m and 10 m. Its breadth is
(a) 4 m (b) 3 m (c) 2 m (d) 5 m
14. A godown measures 40 m x 25 m x 10 m. Find the maximum number of wooden crates each measuring 1.5 m x 1.25 m x 0.5 m that can be stored in the godown.
(a) 18000 (b) 16000 (c) 15000 (d) 14000

GEN BC JOSHI A.P.S. PITHORAGARH U.K.

WINTER VACATION HOMEWORK

CLASS – XI MATHEMATICS

A - LAB MANUAL

1. To find the values of sine and cosine functions in second, third and fourth quadrants using their values in the first quadrant.
2. To interpret geometrically the meaning of $i = -1$ and its integral powers.
3. To construct a parabola.

B – ACTIVITY (TO BE DONE IN SCRAP BOOK)

1. Draw the graph of 6 different trigonometric functions in scrap file.

C – SOLVE THE QUESTIONS GIVEN below.

1. Find the equations of the lines parallel to axes and passing through $(-2, 3)$.
 2. Find the slope of the line, which makes an angle of 30° with the positive direction of y-axis measured anticlockwise.
 3. Find the equation of the line whose perpendicular distance from the origin is 4 units and the angle which the normal makes with positive direction of x-axis is 15° .
 4. Point R (h, k) divides a line segment between the axes in the ratio 1: 2. Find equation of the line.
 5. Find the equations of the lines, which cut-off intercepts on the axes whose sum and product are 1 and -6 , respectively.
 6. Find the equation of the line parallel to y-axis and drawn through the point of intersection of the lines $x - 7y + 5 = 0$ and $3x + y = 0$.
 7. Find the value of p so that the three lines $3x + y - 2 = 0$, $px + 2y - 3 = 0$ and $2x - y - 3 = 0$ may intersect at one point.
 8. If p and q are the lengths of perpendiculars from the origin to the lines $x \cos\theta - y \sin \theta = k \cos 2\theta$ and $x \sec \theta + y \operatorname{cosec} \theta = k$, respectively, prove that $p^2 + 4q^2 = k^2$.
 9. Find the image of the point $(3, 8)$ with respect to the line $x + 3y = 7$ assuming the line to be a plane mirror.
 10. A line is such that its segment between the lines $5x - y + 4 = 0$ and $3x + 4y - 4 = 0$ is bisected at the point $(1, 5)$. Obtain its equation.
-

1. Find the equation of the line where length of the perpendicular segment from the origin to the line is 4 and the inclination of the perpendicular segment with the positive direction of x-axis is 30° .
2. Find the distance between the lines $3x + 4y = 9$ and $6x + 8y = 15$.
3. Find the reflection of the point $(4, -13)$ about the line $5x + y + 6 = 0$.
4. Find the equation of the lines which passes through the point $(3, 4)$ and cuts off intercepts from the coordinate axes such that their sum is 14.
5. Find the points on the line $x + y = 4$ which lie at a unit distance from the line $4x + 3y = 10$.
6. If the line joining two points $A(2, 0)$ and $B(3, 1)$ is rotated about A in anticlock wise direction through an angle of 15° . Find the equation of the line in new position.
7. For what values of a and b the intercepts cut off on the coordinate axes by the line $ax + by + 8 = 0$ are equal in length but opposite in signs to those cut off by the line $2x - 3y + 6 = 0$ on the axes.
8. Find the equation to the straight line passing through the point of intersection of the lines $5x - 6y - 1 = 0$ and $3x + 2y + 5 = 0$ and perpendicular to the line $3x - 5y + 11 = 0$.
9. A ray of light coming from the point $(1, 2)$ is reflected at a point A on the x-axis and then passes through the point $(5, 3)$. Find the coordinates of the point A .
10. If one diagonal of a square is along the line $8x - 15y = 0$ and one of its vertex is at $(1, 2)$, then find the equation of sides of the square passing through this vertex.

1. Find the centre and the radius of the circle $x^2 + y^2 + 8x + 10y - 8 = 0$
2. Find equation of the line perpendicular to the line $x - 7y + 5 = 0$ and having x intercept 3.
3. Find the equation of the hyperbola where foci are $(0, \pm 12)$ and the length of the latus rectum is 36.
4. Find the equation of the ellipse, whose length of the major axis is 20 and foci are $(0, \pm 5)$.
5. If the lines $2x + y - 3 = 0$, $5x + ky - 3 = 0$ and $3x - y - 2 = 0$ are concurrent, find the value of k.
6. Find the equation of the line passing through the point of intersection of the lines $4x + 7y - 3 = 0$ and $2x - 3y + 1 = 0$ that has equal intercepts on the axes.
7. Find the distance of the line $4x - y = 0$ from the point P (4, 1) measured along the line making an angle of 135° with the positive x-axis.
8. A beam is supported at its ends by supports which are 12 metres apart. Since the load is concentrated at its centre, there is a deflection of 3 cm at the centre and the deflected beam is in the shape of a parabola. How far from the centre is the deflection 1 cm?
9. A person standing at the junction (crossing) of two straight paths represented by the equations $2x - 3y + 4 = 0$ and $3x + 4y - 5 = 0$ wants to reach the path whose equation is $6x - 7y + 8 = 0$ in the least time. Find equation of the path that he should follow.
10. Prove that the product of the lengths of the perpendiculars drawn from the points $(\sqrt{a^2 - b^2}, 0)$ and $(-\sqrt{a^2 - b^2}, 0)$ to the line $\frac{x}{a} \cos \theta + \frac{y}{b} \sin \theta = 1$ is b^2 .

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1. A survey shows that 63% of the people watch a News Channel whereas 76% watch another channel. If $x\%$ of the people watch both channels, then
 (a) $x = 35$ (b) $x = 63$ (c) $39 \leq x \leq 63$ (d) $x = 39$
 2. Two finite sets have m and n elements. The number of subsets of the first set is 112 more than that of the second set. The values of m and n are, respectively,
 (a) 4, 7 (b) 7, 4 (c) 4, 4 (d) 7, 7
 3. Let S = set of points inside the square, T = the set of points inside the triangle and C = the set of points inside the circle. If the triangle and circle intersect each other and are contained in a square. Then
 (a) $S \cap T \cap C = \phi$ (b) $S \cup T \cup C = C$ (c) $S \cup T \cup C = S$ (d) $S \cup T = S \cap C$
 4. Find x and y if $(x - y, x + y) = (6, 10)$
 (a) $x = -8, y = -2$ (b) $x = 8, y = -2$ (c) $x = 8, y = 2$ (d) $x = 4, y = -2$
 5. If $f(x) = x^3 - \frac{1}{x^3}$, then $f(x) + f\left(\frac{1}{x}\right)$ is equal to
 (a) $2x^3$ (b) $2\frac{1}{x^3}$ (c) 0 (d) 1
 6. The domain and range of the real function f defined by $f(x) = \frac{4-x}{x-4}$ is given by
 (a) Domain = \mathbb{R} , Range = $\{-1, 1\}$ (b) Domain = $\mathbb{R} - \{1\}$, Range = \mathbb{R}
 (c) Domain = $\mathbb{R} - \{4\}$, Range = $\{-1\}$ (d) Domain = $\mathbb{R} - \{-4\}$, Range = $\{-1, 1\}$
 7. The value of $\tan 75^\circ - \cot 75^\circ$ is equal to
 (a) $2\sqrt{3}$ (b) $2 + \sqrt{3}$ (c) $2 - \sqrt{3}$ (d) 1
 8. The minimum value of $3 \cos x + 4 \sin x + 8$ is
 (a) 5 (b) 9 (c) 7 (d) 3
 9. The value of $\tan 1^\circ \tan 2^\circ \tan 3^\circ \dots \tan 89^\circ$ is
 (a) 0 (b) 1 (c) $1/2$ (d) Not defined
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1. In a town of 840 persons, 450 persons read Hindi, 300 read English and 200 read both. Then the number of persons who read neither is
(a) 210 (b) 290 (c) 180 (d) 260
 2. The set $(A \cup B \cup C) \cap (A \cap B' \cap C')' \cap C'$ is equal to
(a) $B \cap C'$ (b) $A \cap C$ (c) $B \cup C'$ (d) $A \cap C'$
 3. Let $n(A) = m$, and $n(B) = n$. Then the total number of non-empty relations that can be defined from A to B is
(a) m^n (b) $n^m - 1$ (c) $m^n - 1$ (d) $2^{mn} - 1$
 4. If $[x]^2 - 5[x] + 6 = 0$, where $[\cdot]$ denote the greatest integer function, then
(a) $x \in [3, 4]$ (b) $x \in (2, 3]$ (c) $x \in [2, 3]$ (d) $x \in [2, 4)$
 5. Two finite sets have m and n elements respectively. The total number of subsets of first set is 56 more than the total number of subsets of the second set. The values of m and n respectively are.
(a) 7, 6 (b) 5, 1 (c) 6, 3 (d) 8, 7
 6. If $f(x) = ax + b$, where a and b are integers, $f(-1) = -5$ and $f(3) = 3$, then a and b are equal to
(a) $a = -3, b = -1$ (b) $a = 2, b = -3$ (c) $a = 0, b = 2$ (d) $a = 2, b = 3$
 7. The greatest value of $\sin x \cos x$ is
(a) 1 (b) 2 (c) $\sqrt{2}$ (d) $\frac{1}{2}$
 8. If $\sin \theta + \operatorname{cosec} \theta = 2$, then $\sin 2\theta + \operatorname{cosec} 2\theta$ is equal to
(a) 1 (b) 4 (c) 2 (d) None of these
 9. If $f(x) = \cos^2 x + \sec^2 x$, then
(a) $f(x) < 1$ (b) $f(x) = 1$ (c) $2 < f(x) < 1$ (d) $f(x) \geq 2$
 10. If $\tan \theta = 3$ and θ lies in third quadrant, then the value of $\sin \theta$ is
(a) $\frac{1}{\sqrt{10}}$ (b) $-\frac{1}{\sqrt{10}}$ (c) $-\frac{3}{\sqrt{10}}$ (d) $\frac{3}{\sqrt{10}}$
-

-
1. If A and B are two sets, then $A \cap (A \cup B)$ equals
(a) A (b) B (c) ϕ (d) $A \cap B$
2. In a class of 60 students, 25 students play cricket and 20 students play tennis, and 10 students play both the games. Then, the number of students who play neither is
(a) 0 (b) 25 (c) 35 (d) 45
3. Let F_1 be the set of parallelograms, F_2 the set of rectangles, F_3 the set of rhombuses, F_4 the set of squares and F_5 the set of trapeziums in a plane. Then F_1 may be equal to
(a) $F_2 \cap F_3$ (b) $F_3 \cap F_4$ (c) $F_2 \cup F_5$ (d) $F_2 \cup F_3 \cup F_4 \cup F_5$
4. Find x and y if $(4x + 3, y) = (3x + 5, -2)$
(a) $x = -2, y = -2$ (b) $x = 2, y = -3$ (c) $x = 2, y = 2$ (d) $x = 2, y = -2$
5. The domain and range of real function f defined by $f(x) = \sqrt{x-1}$ is given by
(a) Domain = $(1, \infty)$, Range = $(0, \infty)$ (b) Domain = $[1, \infty)$, Range = $(0, \infty)$
(c) Domain = $[1, \infty)$, Range = $[0, \infty)$ (d) Domain = $[1, \infty)$, Range = $[0, \infty)$
6. Let $f(x) = \sqrt{1+x^2}$, then
(a) $f(xy) = f(x) \cdot f(y)$ (b) $f(xy) \geq f(x) \cdot f(y)$
(c) $f(xy) \leq f(x) \cdot f(y)$ (d) None of these
7. The value of $\cos 12^\circ + \cos 84^\circ + \cos 156^\circ + \cos 132^\circ$ is
(a) $\frac{1}{2}$ (b) 1 (c) $-\frac{1}{2}$ (d) $\frac{1}{8}$
8. If $\sin \theta + \cos \theta = 1$, then the value of $\sin 2\theta$ is equal to
(a) 1 (b) $1/2$ (c) 0 (d) -1
9. If $\sin \theta = \frac{-4}{5}$ and θ lies in third quadrant then the value of $\cos\left(\frac{\theta}{2}\right)$ is
(a) $\frac{1}{5}$ (b) $-\frac{1}{\sqrt{10}}$ (c) $-\frac{1}{\sqrt{5}}$ (d) $\frac{1}{\sqrt{10}}$
10. Number of solutions of the equation $\tan x + \sec x = 2 \cos x$ lying in the interval $[0, 2\pi]$ is
(a) 0 (b) 1 (c) 2 (d) 3
-

1. Two finite sets have m and n elements respectively. The total number of subsets of first set is 56 more than the total number of subsets of the second set. The values of m and n respectively are.
(a) 7, 6 (b) 5, 1 (c) 6, 3 (d) 8, 7
2. The greatest value of $\sin x \cos x$ is
(a) 1 (b) 2 (c) $\sqrt{2}$ (d) $\frac{1}{2}$
3. Number of solutions of the equation $z^2 + |z|^2 = 0$ is
(a) 1 (b) 2 (c) 3 (d) infinitely many
4. In how many ways a committee consisting of 3 men and 2 women, can be chosen from 7 men and 5 women?
(a) 45 (b) 350 (c) 4200 (d) 230
5. The number of signals that can be sent by 6 flags of different colours taking one or more at a time is
(a) 63 (b) 1956 (c) 720 (d) 21
6. The total number of terms in the expansion of $(x + a)^{51} - (x - a)^{51}$ after simplification is
(a) 102 (b) 25 (c) 26 (d) None of these
7. In an A.P. the p th term is q and the $(p + q)$ th term is 0. Then the q th term is
(a) $-p$ (b) p (c) $p + q$ (d) $p - q$
8. The length of the foot of perpendicular drawn from the point $P(3, 4, 5)$ on y -axis is
(a) 10 (b) $\sqrt{34}$ (c) $\sqrt{113}$ (d) $5\sqrt{2}$
9. $\lim_{x \rightarrow 0} \frac{x^2 \cos x}{1 - \cos x}$ is
(a) 2 (b) $\frac{3}{2}$ (c) $\frac{-3}{2}$ (d) 1
-
-

10. In a G.P. of positive terms, if any term is equal to the sum of the next two terms. Then the common ratio of the G.P. is
(a) $\sin 18^\circ$ (b) $2 \cos 18^\circ$ (c) $\cos 18^\circ$ (d) $2 \sin 18^\circ$

11. The two digit even numbers can be formed from the digits 1, 2, 3, 4, 5 if the digits can be repeated is _____

OR

Given 5 flags of different colours, the different signals can be generated if each signal requires the use of 2 flags, one below the other is _____

12. The conjugate of the complex number $\frac{1-i}{1+i}$ is _____.

13. $(5 - 3i)^3$ is expressed in the form $a + ib$ as _____

OR

The value of $(1 + i)^6 + (1 - i)^3$ is _____

14. The third term of a G.P. is 4, the product of the first five terms is

15. The coordinates of the foci of the ellipse $9x^2 + 25y^2 = 225$ is _____

16. Given $R = \{(x, y) : x, y \in W, x^2 + y^2 = 25\}$. Find the domain and Range of R.

17. Find the multiplicative inverse of $2 - 3i$.

OR

Solve the equation: $2x^2 + x + 1 = 0$

18. How many numbers are there between 99 and 1000 having 7 in the units place?

19. If $x, 2y, 3z$ are in A.P., where the distinct numbers x, y, z are in G.P. then the find the common ratio of the G.P.

20. Find the number of arrangements of the letters of the word INDEPENDENCE.

1. A survey shows that 63% of the people watch a News Channel whereas 76% watch another channel. If $x\%$ of the people watch both channel, then
 (a) $x = 35$ (b) $x = 63$ (c) $39 \leq x \leq 63$ (d) $x = 39$
2. The domain and range of the function f given by $f(x) = 2 - |x - 5|$ is
 (a) Domain = \mathbb{R}^+ , Range = $(-\infty, 1]$
 (b) Domain = \mathbb{R} , Range = $(-\infty, 2]$
 (c) Domain = \mathbb{R} , Range = $(-\infty, 2)$
 (d) Domain = \mathbb{R}^+ , Range = $(-\infty, 2]$
3. The value of $\frac{1 - \tan^2 15^\circ}{1 + \tan^2 15^\circ}$ is
 (a) 1 (b) $\sqrt{3}$ (c) $\frac{\sqrt{3}}{2}$ (d) 2
4. The value of $\sin 50^\circ - \sin 70^\circ + \sin 10^\circ$ is equal to
 (a) 1 (b) 0 (c) $\frac{1}{2}$ (d) 2
5. If t_n denotes the n th term of the series $2 + 3 + 6 + 11 + 18 + \dots$ then t_{50} is
 (a) $49^2 - 1$ (b) 49^2 (c) $50^2 + 1$ (d) $49^2 + 2$
6. The equation of the circle in the first quadrant touching each coordinate axis at a distance of one unit from the origin is:
 (a) $x^2 + y^2 - 2x - 2y + 1 = 0$ (b) $x^2 + y^2 - 2x - 2y - 1 = 0$
 (c) $x^2 + y^2 - 2x - 2y = 0$ (d) $x^2 + y^2 - 2x + 2y - 1 = 0$
7. The value of $\lim_{x \rightarrow 0} \frac{e^x - \sin x - 1}{x}$ is
 (a) 1 (b) 0 (c) $\frac{1}{2}$ (d) 2

8. If A and B are coefficient of x^n in the expansions of $(1 + x)^{2n}$ and $(1 + x)^{2n-1}$ respectively, then equals
 (a) 1 (b) 2 (c) $\frac{1}{2}$ (d) $\frac{1}{n}$
9. The distance of point P(3, 4, 5) from the yz-plane is
 (a) 3 units (b) 4 units (c) 5 units (d) 550
10. The equation of the line passing through (1, 2) and perpendicular to $x + y + 7 = 0$ is
 (a) $y - x + 1 = 0$ (b) $y - x - 1 = 0$ (c) $y - x + 2 = 0$ (d) $y - x - 2 = 0$.

11. If $\sin \theta + \cos \theta = 1$, then the value of $\sin 2\theta$ is _____

OR

If $\tan A = \frac{1 - \cos B}{\sin B}$, then $\tan 2A =$ _____.

12. The reciprocal of $3 + \sqrt{7}i$ in $a + ib$ form is _____

13. The equation of the line through $(-2, 3)$ with slope -4 is _____

14. The radius of the circle $x^2 + y^2 + 8x + 10y - 8 = 0$ is _____

OR

The equation of the parabola which is symmetric about the y-axis, and passes through the point $(2, -3)$ is _____

15. The 4th term in the expansion of $(x - 2y)^{12}$ is _____.

16. Solve the equation: $x^2 + 3x + 9 = 0$

17. How many 2 digit odd numbers can be formed from the digits 1, 2, 3, 4, 5 if the digits is not repeated?

18. Let $A = \{9, 10, 11, 12, 13\}$ and let $f : A \rightarrow \mathbb{N}$ be defined by $f(n) =$ the highest prime factor of n. Find the range of f.

19. Given that $N = \{1, 2, 3, \dots, 100\}$, then write the subset B of N, whose element are represented by $x + 2$, where $x \in N$.

20. Find the equations of the lines parallel to axes and passing through $(-2, 3)$.

OR

Find the equation of a line which passes through the point $(2, 3)$ and makes an angle of 30° with the positive direction of x-axis.

HOLIDAY HOMEWORK WINTER VACATION (2021-22)

CLASS- 10

MATHEMATICS

1.COMplete the undermentioned lab manual activities in your lab manual work book.

- a) Activity 10**
- b) Activity 11B**
- c) Activity 12**
- d) Activity 13**
- e) Activity 14**
- f) Activity 17**
- g) Activity 18**

2. COMPLETE PORTFOLIO OF THE SUBJECT.

3. SOLVE THE FOLLOWING WORKSHEETS IN A SEPERATE NOTEBOOK.

CLASS-X
MATHEMATICS WORKSHEET
CHAPTER-5: ARITHMETIC PROGRESSION

VERY SHORT ANSWER TYPE QUESTIONS

- Q1. The n th term of an AP is $7 - 4n$. Find its common difference.
Q2. Which term of the AP 21, 18, 15, ..., is zero?
Q3. For what value of p , are $2p + 1$, 13, $5p - 3$ three consecutive terms of an AP?
Q4. If $a_n = n(n - 3)/n + 4$, then find 18th term of this sequence.
Q5. If the sum of first m terms of an AP is $2m^2 + 3m$, then what is its second term?
Q6. How many 2 digit numbers are divisible by 3? (CBSE 2019)

SHORT ANSWER TYPE QUESTIONS

- Q7. Find the sum of first 8 multiples of 3. (CBSE 2018)
Q8. If the sum of first n terms of an AP is n^2 , then find its 10th term. (CBSE 2019)
Q9. If the sum of first p terms of an AP is $ap^2 + bp$, find its common difference.
Q10. The sum of three numbers of an AP is 27 and their product is 405. Find the numbers.
Q11. If the ratio of sum of the first m and n terms of an AP is $m^2 : n^2$, show that the ratio of its m th and n th terms is $(2m - 1) : (2n - 1)$.
Q12. If m times m th term of an AP is equal to n times n th term, find the $(m + n)$ th term of the AP.
Q13. The sum of the first 7 terms of an AP is 63 and the sum of its next 7 terms is 161. Find the 28th term of this AP.
Q14. Which term of the progression 19, 18 $\frac{1}{2}$, 17 $\frac{1}{2}$,.....is the first negative term.
Q15. If the p th, q th, r th terms of an AP be x , y , z respectively, show that
 $x(q - r) + y(r - p) + z(p - q)$.
Q16. If the p th term of an AP is $1/q$ and the q th term is $1/p$, show that the sum of pq terms is $\frac{1}{2}(pq + 1)$.

LONG ANSWER TYPE QUESTIONS

- Q17. In an AP of 50 terms, the sum of first 10 terms is 210 and sum of its last 15 terms is 2565. Find the AP.
Q18. The sum of four consecutive numbers in an AP is 32 and the ratio of the product of the first and the last term to the product of two middle terms is 7:15. Find the numbers. (CBSE 2018)
Q19. The first and the last terms of an AP are 8 and 350 respectively. If its common difference is 9, how many terms are there and what is their sum?
Q20. If a^2 , b^2 , c^2 are in AP, prove that $a/(b + c)$, $b/(c + a)$, $c/(a + b)$ are in AP.
Q21. If S_1 , S_2 , S_3 are the sum of n terms of three Aps, the first term of each being unity and the respective common difference being 1, 2, 3. Prove that $S_1 + S_3 = 2S_2$.

ANSWERS

1. -4
2. 8
3. 4
4. 135/11
5. 9
6. 30
7. 108
8. 19
9. 2a
10. 3, 9, 15 or 15, 9, 3
12. 0
13. 57
14. 25
17. 3, 7, 11,.....,199
18. 2, 6, 10, 14 or 14, 10, 6, 2
19. 39, 6981

CLASS-X
MATHEMATICS WORKSHEET
CHAPTER-4: QUADRATIC EQUATIONS

VERY SHORT ANSWER TYPE QUESTIONS

- Q1. Show that $x = -3$ is the solution of the equation $x^2 + 6x + 9 = 0$.
Q2. For what value of k are the roots of quadratic equation $3x^2 + 2kx + 27 = 0$ real and equal?
Q3. Write the nature of roots of quadratic equation $4x^2 + 4\sqrt{3}x + 3 = 0$.
Q4. If a and b are the roots of the equation $x^2 + ax - b = 0$, then find a and b .
Q5. If $x = 3$ is one root of the quadratic equation $x^2 - 2kx - 6 = 0$, then find the value of k . (CBSE 2018)
Q6. Which of the following are quadratic equations
a) $x^3 - x = x^2 + 2$
b) $\sqrt{x} + 4 = x + 1$
c) $(x + 1)(x^2 - 2) = (x + 3)^3$

SHORT ANSWER TYPE QUESTIONS

- Q7. Solve for x :
a) $x^2 - 2(a^2 + b^2)x + (a^2 - b^2)^2 = 0$
b) $2x^2 + ax - a^2 = 0$
c) $p^2x^2 + (p^2 - q^2)x - q^2 = 0$
d) $\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$
e) $(a + b)^2x^2 + 8(a^2 - b^2)x + 16(a - b)^2 = 0$
f) $1/(a + b + x) = 1/a + 1/b + 1/x$, $a \neq 0$, $b \neq 0$, $x \neq 0$.
Q8. If $ad \neq bc$, then prove that the equation $(a^2 + b^2)x^2 + 2(ac + bd)x + (c^2 + d^2) = 0$ has no real roots.
Q9. If $\sin\theta$ and $\cos\theta$ are roots of the equation $ax^2 + bx + c = 0$, prove that $a^2 - b^2 + 2ac = 0$.
Q10. If one root of the equation $3x^2 - kx - 2 = 0$ is 2, find the value of k . Also find the other root.
Q11. If -5 is a root of the quadratic equation $2x^2 + px - 15 = 0$ and the quadratic equation $p(x^2 + x) + k = 0$ has equal roots, find the value of k .
Q12. Find the value of k for which the roots of the quadratic equation $(k - 4)x^2 + 2(k - 4)x + 2 = 0$ are equal.
Q13. Find the value of k for which the equation $x^2 + kx + 64 = 0$ has real roots.
Q14. If the roots of the equation $(b - c)x^2 + (c - a)x + (a - b) = 0$ are equal then prove that $2b = a + c$.
Q15. If the roots of the equation $(c^2 - ab)x^2 - 2(a^2 - bc)x + b^2 - ac = 0$ are equal, then prove that either $a = 0$ or $a^3 + b^3 + c^3 = 3abc$.
Q16. If the roots of the equation $(1 + m^2)x^2 + 2mcx + (c^2 - a^2) = 0$ are equal, then prove that $c^2 = a^2(1 + m^2)$.

LONG ANSWER TYPE QUESTIONS

- Q17. A train travels at a certain average speed for a distance of 63km and then travels at a distance of 72km at an average speed of 6km/hr more than its original speed. If it takes 3 hours to complete total journey, what is the original average speed? (CBSE 2018)
Q18. An aeroplane left 30 minutes later than its scheduled time and in order to reach its destination 1500km away in time, it has to increase its speed by 250 km/hr from its usual speed, determine its usual speed. (CBSE 2018)
Q19. Two water taps together can fill a tank in $1\frac{7}{8}$ hours. The tap with longer diameter takes 2 hours less than the tap with smaller one to fill the tank separately. Find the time in which each tap can fill the tank separately. (CBSE 2019)
Q20. A takes 6 days less than the time taken by B to finish a piece of work. If both A and B together can finish the work in 4 days, find the time taken by B to finish the work.
Q21. (a) $(x + 1)/(x - 1) + (x - 2)/(x + 2) = 3$, $x \neq 1, -2$
(b) $(3x - 4)/7 + 7/(3x - 4) = 5/2$, $x \neq 4/3$

ANSWERS

2. $k = \pm 9$
3. Real and equal roots
4. $a = -1, b = 2$
5. $\frac{1}{2}$
6. (c)
7. (a) $(a + b)^2, (a - b)^2$
(b) $a/2, -a$
(c) $q^2/p^2, -1$
(d) $-5/\sqrt{2}, -\sqrt{2}$
(e) $-4(a - b), (a + b)$
(f) $-a, -b$
10. 2, $-1/3$
11. $7/4$
12. 6
13. $k \geq 16$
17. 42km/hr
18. 750km/hr
19. $5, \frac{3}{4}$
20. 12 days
21 (a) $-5, 2$
(b) 6, $5/2$

MATHEMATICS WORKSHEET

Ch-9 (Some Applications of Trigonometry)

1 Mark Questions

1. A ladder leaning against a wall, makes an angle of 60° with the horizontal. If the foot of the ladder is 2.5m away from the wall, find the length of the ladder. (Ans.- 5m)
2. An observer, 1.7m tall is $20\sqrt{3}$ m away from a tower. The angle of elevation from the eye of observer to the top of the tower is 30° . Find the height of the tower. (Ans.- 21.7m)
3. The tops of two towers of height x and y , standing on level ground, subtend angles of 30° and 60° respectively at the centre of the line joining their feet, then find $x : y$. (Ans.- 1:3)
4. In fig, a tower AB is 20m high and BC, its shadow on the ground, is $20\sqrt{3}$ m long. Find its sun's altitude. (Ans.- 30°)
5. A pole casts a shadow of length $20\sqrt{3}$ m on the ground, when the sun's elevation is 60° . Find the height of the pole. (Ans.- 6m)

3 Mark Questions

6. The angles of depression of the top and bottom of a 50m high building from the top of a tower are 45° and 60° respectively. Find the height of the tower and the horizontal distance between the tower and the building. (use $\sqrt{3} = 1.73$) (Ans. 68.25m)
7. Two men on either side of a 75m high building and in line with base of building observe the angles of elevation of the top of the building as 30° and 60° . Find the distance between the two men. (use $\sqrt{3} = 1.73$) (Ans.- 155.7m)
8. An aeroplane when flying at a height of 4000m from the ground passes vertically above another aeroplane at an instant when the angles of elevation of the two planes from the same point on the ground are 60° and 45° respectively. Find the vertical distance between the aeroplanes at that instant. (use $\sqrt{3} = 1.73$) (Ans.- 2920m)
9. From a window (9m above the ground) of a house in a street, the angles of elevation and depression of the top and foot of another house on the opposite side of the street are 30° and 60° respectively. Find the height of the opposite house and the width of the street. (use $\sqrt{3} = 1.73$) (Ans.- 5.196m)
10. From the top of a tower of height 50m, the angles of the depression of the top and bottom of the pole are 30° and 45° respectively. Find :
 - (I) How far the pole is from the bottom of a tower.
 - (II) The height of the pole.(use $\sqrt{3} = 1.73$) (Ans.- 21.13m)

11. Two ships are approaching a lighthouse from opposite directions. The angle of depression of the two ships from the top of the lighthouse are 30° and 45° . If the distance between the two ships is 100m, find the height of the lighthouse. (use $\sqrt{3} = 1.73$) (Ans.- 36.6m)
12. The horizontal distance between two poles is 15m. the angle of depression of the top of the first pole as seen from the top of the second pole is 30° . If the height of the second pole is 24m, find the height of the first pole. (use $\sqrt{3} = 1.73$) (Ans.- 15.34m)

4 MARK QUESTIONS

13. A bird is sitting on the top of a 80m high tree. From a point on the ground, the angle of elevation of the bird is 45° . The bird flies away horizontally in such a way that it remained at a constant height from the ground. After 2 seconds, the angle of elevation from the same point is 30° . Find the speed of flying of the bird. . (use $\sqrt{3} = 1.73$) (Ans.- 29.28 m/s)
14. The angle of elevation of the top Q of a vertical tower PQ from a point X on the ground is 60° . From a point Y, 40m vertically above X, the angle of elevation of the top Q of a tower is 45° . Find the height of the tower PQ and the distance PX. (use $\sqrt{3} = 1.73$) (Ans.- 54.6m)
15. At a point A, 20m above the level of the water in a lake, the angle of elevation of a cloud is 30° . The angle of depression of the reflection of the cloud in the lake, at A is 60° . Find the distance of the cloud from A. (use $\sqrt{3} = 1.73$) (Ans.- 40m)
16. A round balloon of radius 'r' subtends an angle A at the eye of the observer while the angle of elevation of its centre is B . prove that the height of the centre of balloon,

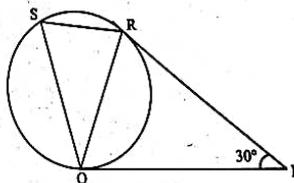
$$h = r \sin B \operatorname{cosec} A/2.$$
17. The angle of elevation of the top of a tower from a point on the same level as the foot of the tower is A . on advancing 'p' metres towards the foot of the tower, the angle of elevation becomes B. Show that the height 'h' of the tower is given by-

$$h = \frac{p \tan A \tan B}{\tan B - \tan A} \text{ metres.}$$

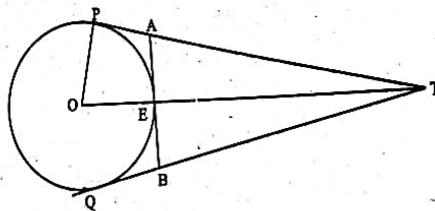
CHAPTER -10 (CIRCLES)

WORKSHEET (HOTS)

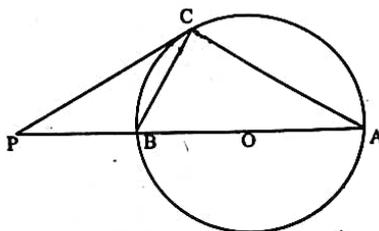
- If TP AND TQ are tangents drawn from an external point T to a circle with centre O with $\angle TQP=60^\circ$ then $\angle OPQ$ is -
 (a) 30° (b) 25° (c) 40° (d) 60° .
- The tangent AB touches a circle , with centre O , at the point O .If the radius of the circle is 5cm,OB=10cm and OB=AB, then find AP .
- AB is the diameter of a circle and AC is the chord such that $\angle BAC=30^\circ$. If the tangent at C intersects AB extended at D, then prove that BC =BD.
- In a right ΔABC in which $\angle B = 90^\circ$,a circle is drawn with AB as diameter intersecting the hypotenuse AC at P . Prove that the tangent to the circle at P bisects BC.
- In the given fig. , tangents PQ and PR are drawn to a circle such that $\angle RPQ = 30^\circ$. A chord RS is drawn parallel to the tangent PQ. Find the $\angle RQS$.



- In the given figure O is the centre of the circle of radius 5 cm . T is a point such that OT = 13 cm and OT intersect the circle at E . If AB is the tangent to the circle at E , find the length of AB.
 [NCERT EXEMPLAR]



- In the given figure , the tangent at a point C of the circle and a diameter AB when extended intersect at P. If $\angle PCA=110^\circ$ then find $\angle CBA$.
 [NCERT EXEMPLAR]



- Let s denotes the semi- perimeter of a ΔABC in which $BC = a$, $CA = b$ and $AB = c$. If a circle touches the sides BC, CA, AB at D, E ,F respectively . Prove that $BD = s-b$.
- Prove that opposites of quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle. [NCERT , CBSE 2012,14]
- In the given figure two tangents AB and AC are drawn to a circle with centre O such that $\angle BAC = 120^\circ$. Prove that $AB = \frac{1}{2} OA$. [CBSE 2016]

Gen BC Joshi APS , Pithoragarh

Winter vacation homework

Class 12th , Mathematics

1.Lab manual activities-:

- A. To verify geometrically that $c\vec{r} \times (a\vec{r} + b\vec{r}) = c\vec{r} \times a\vec{r} + c\vec{r} \times b\vec{r}$.
- B. To demonstrate the equation of a plane in normal form.
- C. To find the distance of given point(in space) from a plane(passing through three non-collinear points) by actual measurement and also analytically

2.Draw the graph of 6 different inverse trigonometric functions in scrap file.

3. SOLVE THE FOLLOWING QUESTIONS IN SEPARATE NOTE BOOK :

Chapter 7 .Integrals

1. Evaluate: $\int \frac{3ax}{(b^2 + c^2x^2)} dx$.
2. Determine $\int \tan^8x \sec^4 x dx$.
3. Write the anti-derivative of the following function: $3x^2+4x^3$
4. Determine the antiderivative F of “f” , which is defined by.
 $f(x) = 4x^3 - 6$, where $F(0) = 3$
5. Integrate the given function using integration by substitution:
 $2x \sin(x^2+ 1)$ with respect to x:
6. Integrate: $\int \sin^3 x \cos^2x dx$

Chapter 8- Application of integrals

7. Find the area enclosed by the ellipse $x^2/a^2 + y^2/b^2 = 1$.
8. Find the area of the region bounded by $y^2 = 9x$, $x = 2$, $x = 4$ and the x-axis in the first quadrant
9. Find the area of the curve $y = \sin x$ between 0 and π .
10. Find the area of the region bounded by the two parabolas $y = x^2$ and $y^2 = x$
11. Smaller area enclosed by the circle $x^2+ y^2 = 4$ and the line $x + y = 2$ is.

Chapter 9 -Differential equations

12. Determine order and degree (if defined) of differential equation.

$$(y''')^2 + (y'')^3 + (y')^4 + y^5 = 0$$

13. Verify that the function $y = a \cos x + b \sin x$, where, $a, b \in \mathbb{R}$ is a solution of the differential equation $d^2y/dx^2 + y=0$

14. The number of arbitrary constants in the general solution of a differential equation of fourth order is:

15. Form the differential equation representing the family of curves.

$$y = a \sin (x + b), \text{ where } a, b \text{ are arbitrary constants}$$

16. Find the differential equation of the family of lines through the origin.

17. Form the differential equation of the family of circles having a centre on y -axis and radius 3 units.

18. Find the general solution of the differential equation $dy/dx = 1+y^2/1+x^2$.

19. Find the equation of a curve passing through $(1, \pi/4)$ if the slope of the tangent to the curve at any point $P (x, y)$ is $y/x - \cos^2(y/x)$.

20. Integrating factor of the differential equation $(1 - x^2)dy/dx - xy = 1$ is

Chapter 10 Vectors

21. Find the vector joining the points $P(2, 3, 0)$ and $Q(-1, -2, -4)$ directed from P to Q
23. Find a vector \vec{r} of magnitude $3\sqrt{2}$ units which makes an angle of $\pi/4$ $\pi/2$ with y and z -axes, respectively.
24. Find the area of the triangle with vertices $A(1, 1, 2)$, $B(2, 3, 5)$ and $C(1, 5, 5)$
25. Using vectors find the area of triangle PQR , whose vertices are $P(1, 2, 3)$, $Q(2, -1, 4)$ and $C(4, 5, -1)$
26. Use vector method to show that P, Q, R are Collinear – $P(3, -5, 1)$, $Q(-1, 0, 8)$ and $C(7, -10, -6)$
27. Find the angles between the lines whose direction ratios are $3, 2, -6$ and $1, 2, 2$. Find the angles of a triangle PQR whose vertices are $P(-1, 3, 2)$, $B(2, 3, 5)$ and $C(3, 5, -2)$.
28. Prove that the points $P(-2, 4, 7)$, $Q(3, -6, -8)$ and $R(1, -2, -2)$ are collinear.
29. Find the angle between the lines whose direction ratios are: $2, -3, 4$ and $1, 2, 1$.
30. Using vectors, find the value of k such that the points $(k, -10, 3)$, $(1, -1, 3)$ and $(3, 5, 3)$ are collinear.

Chapter II Three dimensional geometry

31. Find the direction cosines of a line whose direction ratios are 2, -6, 3
32. Find the direction cosines of a line that makes equal angles with the coordinate axes
33. Find the angles of triangle ABC whose vertices are A(-1, 3, 2), B (2, 3, 5) and C(3, 5, -2).
34. Find the angles between the lines whose direction ratios are 3, 2, -6 and 1, 2, 2.
35. A line makes an angle 60 degree and 45 degrees with the positive direction of x-axis and y-axis respectively. What acute angle does it make with the z-axis?
36. Show that the lines $(x-1)/2=(y-2)/2=(z-3)/2$ and $(x-4)/5 = (y-1)/2 = z$ intersect each other. Also, find the point of intersection.
37. Find the equation of the plane which is at a distance $3\sqrt{3}$ units from origin and the normal to which is equally inclined to coordinate axis.
38. O is the origin and A is (a,b,c). Find the direction cosines of the line OA and the equation of the plane through A at the right angle to OA

Chapter 13 -Probability

39. Two numbers are selected at random from the integers 1 through 9. If the sum is even, find the probability that both the numbers are odd.
40. A die is rolled. If the outcome is an odd number, what is the probability that it is prime?
42. A coin is tossed twice. If the outcome is at most one tail, what is the probability that both head and tail have appeared?
43. An unbiased die is tossed twice. Find the probability of getting a 4, 5, 6 on the first toss and a 1, 2, 3, 4 on the second toss.
44. The probability that person A hits a target is $\frac{1}{3}$ and the probability that person B hits it is $\frac{2}{5}$. What is the probability that the target will be hit if both person A and person B shoot at it?
45. A die is thrown twice and the sum of the numbers rising is noted to be 6. Calculate the conditional probability that the number 4 has arrived at least once?
46. Given that the events A and B are such that $P(A) = \frac{1}{2}$, $P(A \cup B) = \frac{3}{5}$, and $P(B) = p$. Find p if they are mutually exclusive
47. Given that the events A and B are such that $P(A) = \frac{1}{2}$, $P(A \cup B) = \frac{3}{5}$, and $P(B) = p$. Find p if they are independent
48. The probability of solving the specific problem independently by the persons' A and B are $\frac{1}{2}$ and $\frac{1}{3}$ respectively. In case, if both the persons try to solve the problem independently, then calculate the probability that the problem is solved.
49. 5 cards are drawn successively from a well-shuffled pack of 52 cards with replacement. Determine the probability that (i) all the five cards should be spades? (ii) only 3 cards should be spades? (iii) none of the cards is a spade?