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THE CIVIL SERVICES SCHOOL

Syllabus

April – May:

Rational Numbers – Chapter 1

- Properties of rational numbers.
- Representation of rational numbers on the number line
- To insert rational numbers between any two given rational numbers

Squares and Square roots – Chapter 6

- Squares and square roots
- Square roots using factor method, division method and inspection method for numbers containing
 - (a) no more than total four digits.
 - (b) no more than two decimal places .

Cubes and cube roots – Chapter 7

- Cubes and cube roots for numbers containing three digits.

July:

Exponents and Powers – Chapter 12

- Integers as exponents
- Laws of exponents with integral powers
- Introduction to rational exponents

Algebraic Expressions and Identities – Chapter 9

- Multiplication and division (coefficient should be integers)
- Identities - $(a + b)^2$, $(a - b)^2$, $(a + b + c)^2$, $a^2 - b^2$, $(x + a)(x + b)$

August:

Mensuration – Chapter 11

- Area of a trapezium and a polygon.
- Concept of volume, measurement of volume using a basic unit
- Volume and capacity of a cube, cuboid and cylinder.
- Surface area of a cube, cuboid and cylinder.

Data handling – Chapter 5

- Reading bar-graphs.
- Arranging a raw data into an ungrouped data, representation as a bar graph.
- Grouped data and its representation as a histogram (up to Ex. 5.1).

Revision for the First Term Examination.

September-October:Data handling – Chapter 5

- Simple Pie charts with reasonable data numbers.

Direct and Inverse Proportions – Chapter 13

- Simple and direct word problems

November:Comparing Quantities – Chapter 8

- Percentages, profit and loss, discount, tax.
- Word problems.
- Difference between simple and compound interest (compounded yearly upto 3 years or half yearly)

December:Introduction to graphs – Chapter 15

- Coordinate Geometry-Axes (same units), Cartesian Plane.
- Plotting points for different kind of situations(perimeter VS length of squares, area as a function of side of a square, plotting of multiples of different numbers, simple interest VS number of years etc.)
- Reading and drawing conclusions from Line and Linear graphs.

Understanding Quadrilaterals – Chapter 3

- Interior and exterior angle of a polygon
- Properties of quadrilaterals
- Properties of parallelogram
- Properties of rectangle, rhombus and square

January:Linear Equations in one variable – Chapter 2

- Solving Equations
- Word Problems

Practical Geometry – Chapter 4

- Given four sides and one diagonal
- Three sides and two diagonals
- Three sides and two included angles
- Two adjacent sides and three angles

February:Factorization – Chapter 14

Factorization of the form: $a(x+y)$, $(x+a)(x+b)$ and using the three basic identities.

Revision for Final Exam.

Investigative Mathematics Project (Group Project)

- Investigate the allotted topic and collect interesting and useful information on it.
- Present the information in either of the two forms:
 - ✓ Poster on A2 sized sheet
 - ✓ Online mode (Google Slides, Google Drawings, Videos or any other.)
- Each group will present their work in front of the class.
- It is **compulsory** for each student to work on the project, as it will be assessed for the First Term.

Topics for the Project:

1. TESSELLATIONS

- Define Tessellations (tiling).
- Types of Tessellations- regular, semi-regular.
- Tessellations using polygons.
- Tessellations in art, architecture, nature.
- Create at least two art pieces of your own, involving Tessellations.

2. MAGIC SQUARES

Explore the following:

- Define a magic square.
- History of magic square.
- Types of magic square –ordered, dated etc.
- Create a magic square.

3. MATH IN SPORTS

Choose any two sports of your choice and explore the mathematical concepts involved in each of them.

For example:

- Geometric shapes and standard dimensions of Equipment and Playground.
- Statistics involved in the sport. Like Run Rate in Cricket, Angle of elevation in Basketball, Possession and Chances Created in Football, Acceleration in Athletics etc.
- Ways of recording, presenting and interpreting data – total, percentage, average, graphs, team fixtures etc.

4. PYTHAGORAS THEOREM

Explore five visual proofs of Pythagoras Theorem. Include some proofs which involve paper folding or paper cutting.

5. MATH WITH ORIGAMI

- History of Origami and paper folding.
- Using Origami to make different 2-D and 3-D mathematical models.
- Exploring mathematical concepts involved in origami like fractions, geometry, etc.

GUIDELINES FOR PROJECT

- Project should reflect the mathematics involved.
- Google Slides presentation should comprise of 8-10 slides.
- Videos should not be for more than 3-4 minutes.
- Online Projects to be mailed to the concerned Math teacher or shared on the Google Classroom.
- Computer printouts allowed only for pictures and not for written work in Poster.
- Original and innovative ideas will be appreciated.
- There will be negative marking for the delay in submission of the project.
- Every student will score the work of their group members and submit individually.

REFERENCES:

- www.cut-the-knot.org
- www.mathforum.org
- <https://sport.maths.org/content/>
- http://annex.exploratorium.edu/geometryplayground/Activities/GP_Activities_6-8/ExploringTessellations_%206-8_v4.pdf

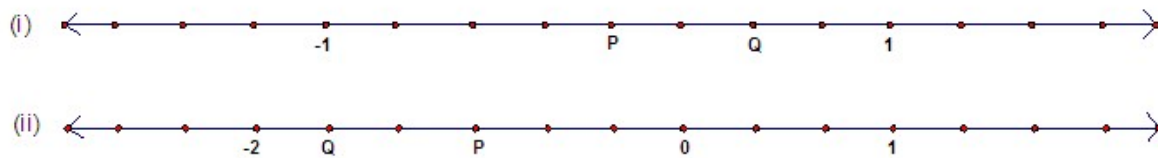
RUBRIC for the assessment of Project:

Category	Score 4	Score 3	Score 2
ORGANISATION	Content is well organized.	The overall organization of topics is not up to the mark.	Content is not logically organized.
MATHEMATICAL CONTENT	Covers topic in depth with details and examples. Subject knowledge is excellent.	Covers topics without providing details and examples. Subject knowledge is sufficient.	Some important facts seem to be missing and there are 1-2 factual errors.
CREATIVITY	Work has been presented in a very creative and visually appealing manner.	Work has been presented in a creative manner.	Work is presented in a casual manner.
CLASSROOM PRESENTATION	Very well presented.	Good presentation.	Satisfactory Presentation.
PEER OBSERVATION	If the person did his share of work.	If person did less than his share of work.	If person did a lot less than his share of work.

Assignment - 1
RATIONAL NUMBERS

1. Write four rational numbers between: a) $\frac{-2}{5}$ and $\frac{4}{3}$ b) $\frac{1}{3}$ and $\frac{1}{2}$
2. Write 10 rational numbers between $\frac{-2}{3}$ and 1.
3. Multiply $\frac{4}{17}$ by the reciprocal of $\frac{-3}{15}$.
4. Using appropriate properties evaluate the following, also name the property used.
 - (a) $\frac{-1}{4} \times \frac{2}{7} + \frac{5}{2} - \frac{2}{7} \times \frac{1}{6}$
 - (b) $\frac{2}{7} \times \frac{-4}{5} + \frac{3}{8} \times \frac{4}{9} + \frac{2}{7}$
 - (c) $\frac{1}{3} \times \frac{-2}{5} + \frac{7}{10} \times \frac{1}{3} - \frac{1}{3}$
 - (d) $\frac{3}{7} \times \frac{-2}{5} - \frac{1}{3} - \frac{3}{7} \times \frac{1}{5}$
 - (e) $\frac{-1}{9} \times \frac{3}{5} + \frac{7}{2} + \frac{1}{9} \times \frac{1}{6}$
5. Add the multiplicative inverse of $\frac{-5}{8} \times \frac{-3}{7}$ to the additive inverse of $\frac{2}{-9}$.
6. Subtract the multiplicative inverse of $\frac{4}{7} \times \frac{-1}{2}$ from additive inverse of $\frac{9}{8}$.
7. Multiply the additive inverse of $-1\frac{1}{8}$ by the negative of multiplicative inverse of $(\frac{-8}{9})$.
8. Represent $\frac{2}{7}, \frac{-3}{7}, \frac{6}{7}$ on the same number line.
9. Represent $\frac{-2}{3}$ and $\frac{3}{2}$ on the same number line.
10. Represent the following numbers on the number line:
 - a) $\frac{7}{3}$ b) $\frac{-5}{4}$ c) $-\frac{18}{5}$ d) $-\frac{11}{4}$
11. Nine times the multiplicative inverse of a rational number equals six times the reciprocal of seventeen. Find the rational number.
12. Additive inverse of x is same as multiplicative inverse of $\frac{3}{7}$. Find x .

13. What rational numbers do P and Q represent in each case?



Web Resources

- <http://tinyurl.com/weird-number>
- <http://tinyurl.com/rational-no-line>
- https://www.youtube.com/watch?v=_6hYeS8I9zQ

Fraction Puzzle

Can you arrange the numerals 1 to 9 (1, 2, 3, 4, 5, 6, 7, 8 and 9) in a single fraction that equals exactly $\frac{1}{3}$ (one third)?

Example that doesn't work: $\frac{7192}{38456} = 0.187$

A Matter of Denominator

A fraction has the denominator greater than its numerator by 6. But if you add 8 to the denominator, the value of the fraction would then become $\frac{1}{3}$. Can you find this fraction??

What were you doing when the lights went out?



Last time there was load shedding in Calcutta, I was reading a very interesting book and I could not stop. My neighbor Parveen gave me two candles and assured me that I could manage with them.

Though the candles were of the same length, Parveen told me that one candle would burn for four hours and the other for five hours.

After I had been reading for some time I put the candles out as the lights came on again. And I noticed that what remained of one candle was exactly four times the length of what was left of other.

Can you find out just how long those two candles were burning?

Learning Outcomes:

After the end of this unit, the students will be able to-

- Apply Distributive Property to solve questions based on the same.
- Identify and plot rational numbers on a given number line.
- Find rational numbers between two given rational numbers.



Assignment - 2
Squares and Square roots

1. Using the properties of squares state which of the following are not perfect squares. Give reasons to support your answer. a) 1296 b) 1000 c) 373758 d) 22034087
2. Find the square roots of the following using prime factorization method:
a) 11664 b) 47089 c) 1764
3. Find the smallest number by which 180 must be multiplied so that it becomes a perfect square. Also find the square root of the new number.
4. Find the smallest number by which 9408 must be divided so that it becomes a perfect square. Also find the square root of the perfect square so obtained.
5. Express 64 as the sum of consecutive odd integers starting from 1.
6. How many numbers are between squares of 15 and 16?
7. The area of a square field is $9\frac{49}{64} m^2$. Find the perimeter of the square field.
8. Find the square root using inspection method: a) 9801 b) 2304
9. Find the square root using long division method: a) 150.0625 b) 54756 c) 0.053361
10. Find the least number which must be subtracted from 18265 to make it a perfect square.
11. Find the smallest number which must be added to 4515600 to make it a perfect square.
12. Find the smallest number of four digits which is a perfect square.
13. Find the greatest number of six digits which is a perfect square.
14. Find the square root of 12.0068 correct to two decimal places.
15. Find the square root of 11 upto two places of decimal.

Web Resources

- <http://tinyurl.com/shootsquare>
- <http://tinyurl.com/square-even>
- <http://tinyurl.com/square-pairs>
- <http://tinyurl.com/square-puzzle-pears>
- <http://tinyurl.com/squareroot-test>

Squaring numbers in the 200s- Calculation Trick

1. Choose a number in the 200s (practice with numbers under 210, and then progress to larger ones).
2. The first digit of the square is 4: 4 _ _ _ _
3. The next two digits will be 4 times the last 2 digits: _ X X _ _
4. The last two places will be the square of the last digit: _ _ _ X X

Example:

1. If the number to be squared is **206**:
2. The first digit is 4: 4 _ _ _ _
3. The next two digits are 4 times the last digit:
 $4 \times 6 = 24$: _ 2 4 _ _
4. Square the last digit: $6 \times 6 = 36$: _ _ _ 3 6
5. So **$206 \times 206 = 42436$** .

For larger numbers work right to left:

1. Square the last two digits (keep the carry): _ _ _ X X
2. 4 times the last two digits + carry: _ X X _ _
3. Square the first digit + carry: X _ _ _ _

See the pattern?

4. If the number to be squared is **225**:
5. Square last two digits (keep carry):
 $25 \times 25 = 625$ (keep 6): _ _ _ 2 5
6. 4 times the last two digits + carry:
 $4 \times 25 = 100$; $100 + 6 = 106$ (keep 1): _ 0 6 _ _
7. Square the first digit + carry:
 $2 \times 2 = 4$; $4 + 1 = 5$: 5 _ _ _ _

So, **$225 \times 225 = 50625$**

Now find the squares of 207, 223, 256 and verify your answer using calculator.

Learning Outcomes:

After the end of this unit, the students will be able to-

- Identify square numbers and apply their properties.
- Calculate square root of a perfect square number using prime factorisation method.
- Calculate square root of any number (including decimals and fractions) using long division method.
- Solve simple word problems based on calculation of square root.

CODING and DECODING

You can make secret codes by letting numbers represent letters of the alphabet. We can let:

Vowels: A=6, E=8, I=4, O=2, U=10,

*=0(ZERO)

Consonants: B=1, C=3, D=5, F=7, G=9, H=11, J=13, K=15,

L=17, M=19, N=21, P=23, Q=25, R=27, S=29, T=31, V=33, W=35, X=37,

Y=39, Z=41

CODING

So, to Code the word CAT, we find the numbers for each letter.

Look up C. C=3. Look up A. A=6. Look up T. T=31.

So, CAT is 3 6 31.

DECODING

Now let's decode a word and see what we get. Decode 5 2 9:

What is 5? 5=D. What is 2? 2=O. What is 9? 9=G. So, 5 2 9 is DOG!

A) Code the following words:

SPOON MATH COMPUTER

B) Decode the following words:

23 8 21

8 27 6 29 8 27

29 8 3 27 8 31

C) Code the name of your school.

Learning Outcomes:

After the end of this unit, the students will be able to-

- Identify cube numbers and recall their properties.
- Calculate cube root of a given number by prime factorization and inspection.
- Solve simple word problems based on cube roots.

Assignment - 4
Exponents and Powers

1. Simplify:

$$(a) (4^{-1} + 8^{-1})^{-1} \div \left(\frac{2}{3}\right)^{-3}$$

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

$$(c) \{5^{-1} \times 3^0 + 4^{-1}\}^{-1} \div \left(\frac{3}{2}\right)^{-3}$$

$$(d) \left(\frac{1}{2}\right)^{-2} + \left(\frac{2}{3}\right)^{-2} + \left(\frac{3}{4}\right)^{-2}$$

2. Simplify using law of exponents:

$$(a) 7^{\frac{1}{2}} \times 7^{\frac{3}{2}}$$

$$(b) \left[(11)^{\frac{1}{2}} \right]^4$$

$$(c) 100^{\frac{3}{2}} \div 100^{\frac{1}{2}} \quad (d) 4 \times 36^{-\frac{1}{2}}$$

3. Evaluate:

$$(a) (.04)^{\frac{3}{2}}$$

$$(b) (.008)^{\frac{2}{3}}$$

$$(c) (6.25)^{\frac{3}{2}}$$

$$(d) (.000064)^{\frac{5}{6}}$$

4. By what number should $(-6)^{-1}$ be multiplied so that the product is 9^{-1} ?

5. By what number should $\left(\frac{-2}{3}\right)^{-3}$ be divided so that the quotient is $\left(\frac{4}{27}\right)^{-2}$?

6. Find the value of x in each of the following:

$$(a) \left(\frac{7}{12}\right)^{-4} \times \left(\frac{12}{7}\right)^{3x} = \left(\frac{7}{12}\right)^{-5} \quad (b) \left(\frac{-5}{6}\right)^{\frac{3}{4}} \div \left(\frac{-5}{6}\right)^{\frac{-1}{6}} = \left(\frac{-6}{5}\right)^{7-x} \quad (c) 6^{3x-1} = 1$$

7. Find the value of y in each case:

$$(i) 7 \times 49^{-} = y$$

$$(ii) 3^3 \times (2y)^3 = 216$$

$$(iii) (y)^5 \div 5^5 = 32$$

8. Express the following numbers in the standard form:

$$(a) 162000000$$

$$(b) 0.00000078$$

$$(c) 0.0000342 \times 10^5$$

9. Write the following numbers in the usual form:

$$(a) 11.003 \times 10^9$$

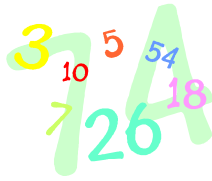
$$(b) 6.89 \times 10^{-5}$$

Web Resources

- <http://tinyurl.com/exponents8>
- <http://tinyurl.com/livebinders-exponents>

BRAIN TEASERS

The Biggest Number:



Can you name the biggest number that can be written with four 1s?

Biggest Number:

What is the biggest number that can be expressed in three figures?

A Three Digital Problem:



By using only the digits 9, 9, 9 can you make:

- a) 1 b) 4 c) 6 ?

You can adopt mathematical processes such as $+$, $-$, \times , \div , $\sqrt{\quad}$ etc.

Number Sequence

What is special about the following number sequence?

8, 5, 4, 9, 1, 7, 6, 10, 3, 2, 0

Learning Outcomes:

After the end of this unit, the students will be able to-

- Apply laws of exponents to negative and rational exponents.
- Simplify given expressions using laws of exponents.

Assignment - 5
Algebraic Expressions and Identities

1. Simplify using suitable identities:

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

(b) $\left(\frac{x}{2} - \frac{2}{3}y - 4z\right)^2$

2. Evaluate each of the following using a suitable identity:

(a) 303×305

(b) 298×310

(c) 102^2 (d) $132^2 - 122^2$

(e) 9.9^2

(f) 14.7×15.3

(g) $\frac{198 \times 198 - 102 \times 102}{96}$

3. Simplify: $(-a + 2b + c)^2 - (a - 2b + c)^2$

4. Subtract the sum of $7(y^2 - y - 21)$ and $3y(y - 2)$ from the product of $(y - 2)$ and $(y + 7)$.

5. Simplify: (i) $3x^2(x - 2) - 8x(x^2 - 2x - 1) + 5$ and find its value when $x = -2$.

(ii) $2x^2(3x + 2) - 5x(x - 4) + 4x + 7$ and find its value when $x = -1$.

6. Find the value of $(x^2 + y^2)$ if $x + y = 12$ and $xy = 14$.

7. If $16x^2 + 25y^2 = 401$, $xy = 1$. Find the value of $4x + 5y$.

8. Multiply $(2x^3 - 5x^2 - x + 2)$ by $(x^2 - 5)$

HOTS

9. If $\left(x + \frac{1}{x}\right) = 4$, find the value of (i) $\left(x^2 + \frac{1}{x^2}\right)$ and (ii) $\left(x^4 + \frac{1}{x^4}\right)$

10. If $\left(a - \frac{1}{a}\right) = 5$, find the value of (i) $\left(a^2 + \frac{1}{a^2}\right)$ and (ii) $\left(a^4 + \frac{1}{a^4}\right)$

Web Resources

- <http://tinyurl.com/algebraic-identity1>
- <http://tinyurl.com/algebraic-identity2>
- <http://tinyurl.com/algebraic-identity3>

Algebra Terms Crossword Puzzle Clues

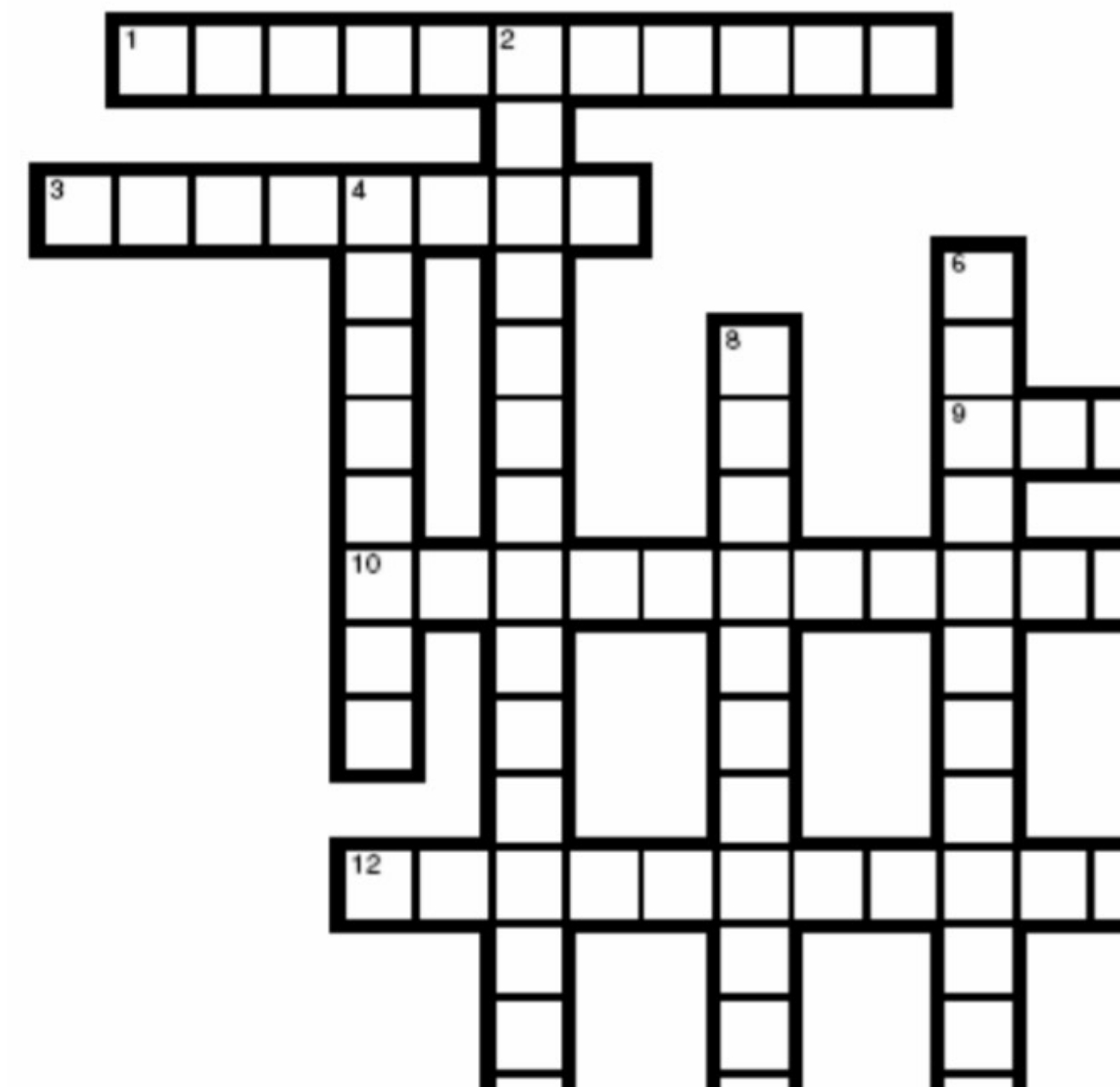
The numbers in parentheses show how many spaces are used for each of the two words in the solution. Example: In Across 12 (7, 6) means there are two words. The first word is seven letters (COMPLEX) and the second word is six letters (NUMBERS) long.

Across

1. The number before a variable in a term.
3. A polynomial that has two terms (ex: $5x + 3$).
9. A polynomial with three terms.
10. A real number that is not a rational number (ex: the square root of two or pi). (10, 7)
12. The set of all numbers in the form $a + bi$ where b may or may not be zero. (7, 6)
13. Two or more terms that have the same variable and exponent are _____. (4, 5)
14. A single number without a variable.

Down

2. If b does not equal zero, then $a + bi$ is called a _____. (9, 6)
4. A polynomial that has one term (ex: $12m$).
5. A memory aid to remember how to multiply two binomials.
6. An answer that appears to be a solution, but does not work in the original equation, such as making a denominator a zero in the original equation. (10, 8)
7. When the product of two irrational or imaginary numbers equals a rational number, then the two factors are called _____.
8. Equations with solving strategies such as using the odd-root property, even-root property, or raising each side of the equation to a power. (7, 9)
11. If a equals b squared, then b is a _____ of a . (6, 4)



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❖ **Rock Paper Scissors Answer:** Anjali wins 7 and loses 3 in total.

Learning Outcomes:

After the end of this unit, the students will be able to-

- Identify the like and unlike terms forming algebraic expressions.
- Add, subtract and multiply the given algebraic expressions.
- Apply the standard identities to solve given expressions.

Assignment - 6
Mensuration

1. Find the altitude of a triangular region whose base is 28m and the area is 224sq m.
2. The area of a rhombus is 119sq cm and its perimeter is 56cm. Find its altitude.
3. The height of a parallelogram is one third its base. If its area is 108sqcm, find the base and the height.
4. The area of a trapezium is 105 cm^2 , and its height is 7cm. If one of the parallel sides is longer than the other by 6 cm, find the two parallel sides.
5. The diagonal of a quadrilateral is 30m in length and the perpendiculars to it from the opposite vertices are 6.8m and 9.6m. Find the area of the quadrilateral.
6. The ratio of parallel sides of a trapezium is 3:4. The distance between them is 4 cm. If area of trapezium is 42 cm^2 , find the lengths of parallel sides.
7. ABCD is a parallelogram in which $DC = 40 \text{ cm}$, $DE \perp AB$ and $AE = 16 \text{ cm}$. If the area of parallelogram is 480 cm^2 , find DE and BC.



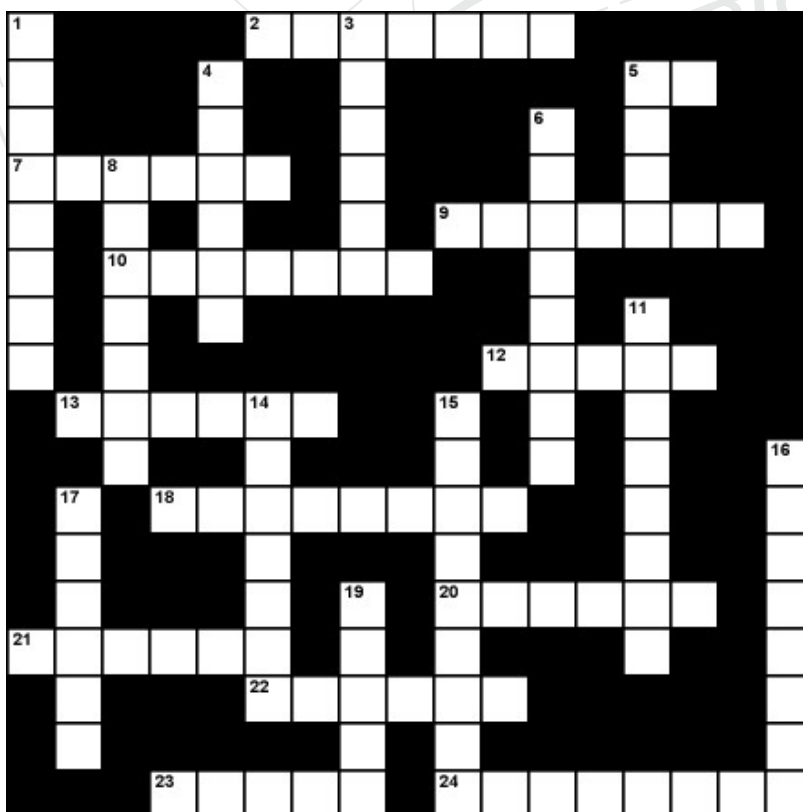
8. The total surface area of a cube is 216square cm. Find its volume.
9. The diameter of a roller 120cm long is 84cm. If it takes 500 complete revolutions to level a playground, find the cost of leveling it at 75paise per square metre.
10. Find the number of coins 1.5cm in diameter and 0.2cm thick to be melted to form a right circular cylinder of height 5cm and diameter 4.5cm.
11. A roller 2.5m in length, 1.75m in radius when rolled on a road was found to cover the area of 5500sq m. How many revolutions did it make?
12. What happens to the volume of a cylinder if its height is doubled and the radius remains the same?
13. How does the volume of a cylinder get changed if its radius is doubled and the height remains the same?

14. Three cubes, each measuring 4 cm are joined end to end. Find (i) the volume of the resulting cuboid (ii) the surface area of the resulting cuboid (iii) Is the surface area of the cuboid equal to the surface area of the three separate cubes.
15. A rectangular vessel $25\text{cm} \times 8\text{cm} \times 1\text{cm}$ is full of water. If the water is poured into an empty cylindrical vessel of radius 10 cm, what will be the height of water in the cylindrical tank?

Web Resources

<http://tinyurl.com/xmas-wrapping8>

Test your math vocabulary in this mathematics crossword puzzle.

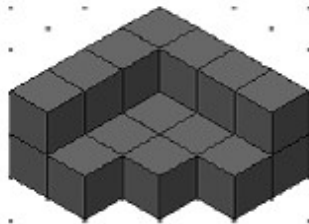


Across

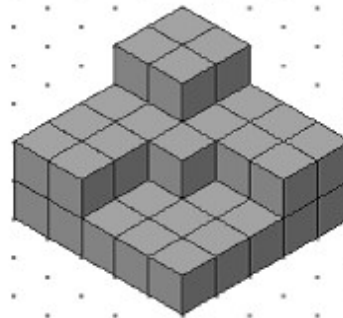
3. The result in multiplication (7)
5. Approximately equal to 3.1415 (2)
7. Number added to another in addition (6)
9. The bottom number in division (7)
10. A positive or negative whole number (7)
12. A sign used in subtraction (5)
13. Amount of space taken up by a 3D object (6)
18. $1/2$ or $3/4$, for example (8)
20. This shape has all points the same distance from its center (6)
21. The 3 or the 2 in $3 \times 2 = 6$ (6)
22. Is identical in value (6)
23. Figure formed by two lines extending from the same point (5)
24. Take away (8)

Down

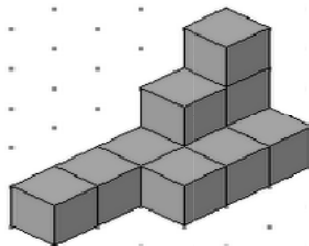
1. This shape comes in scalene, equilateral, or 15-Down varieties (8)
3. Angle greater than 90 degrees and less than 180 degrees is this (6)
4. Longer dimension of a rectangle (6)
5. ____ sign, +, is used in addition (4)
6. Sharing a pie between friends requires this kind of operation (8)
8. No Clue
11. To determine the product (8)
14. A gram, a foot or 87 degrees (7)
15. A three-sided figure having two equal sides (9)
16. The answer in a division problem (8)
17. A quadrilateral with four sides equal (6)
19. An angle measuring less than 90 degrees (5)



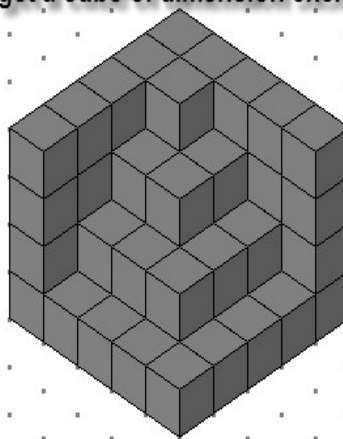
How many unit cubes are to be added to make a cuboid of dimension $4 \times 4 \times 2$?



How many unit cubes are added to get a cuboid of dimension $5 \times 5 \times 3$?



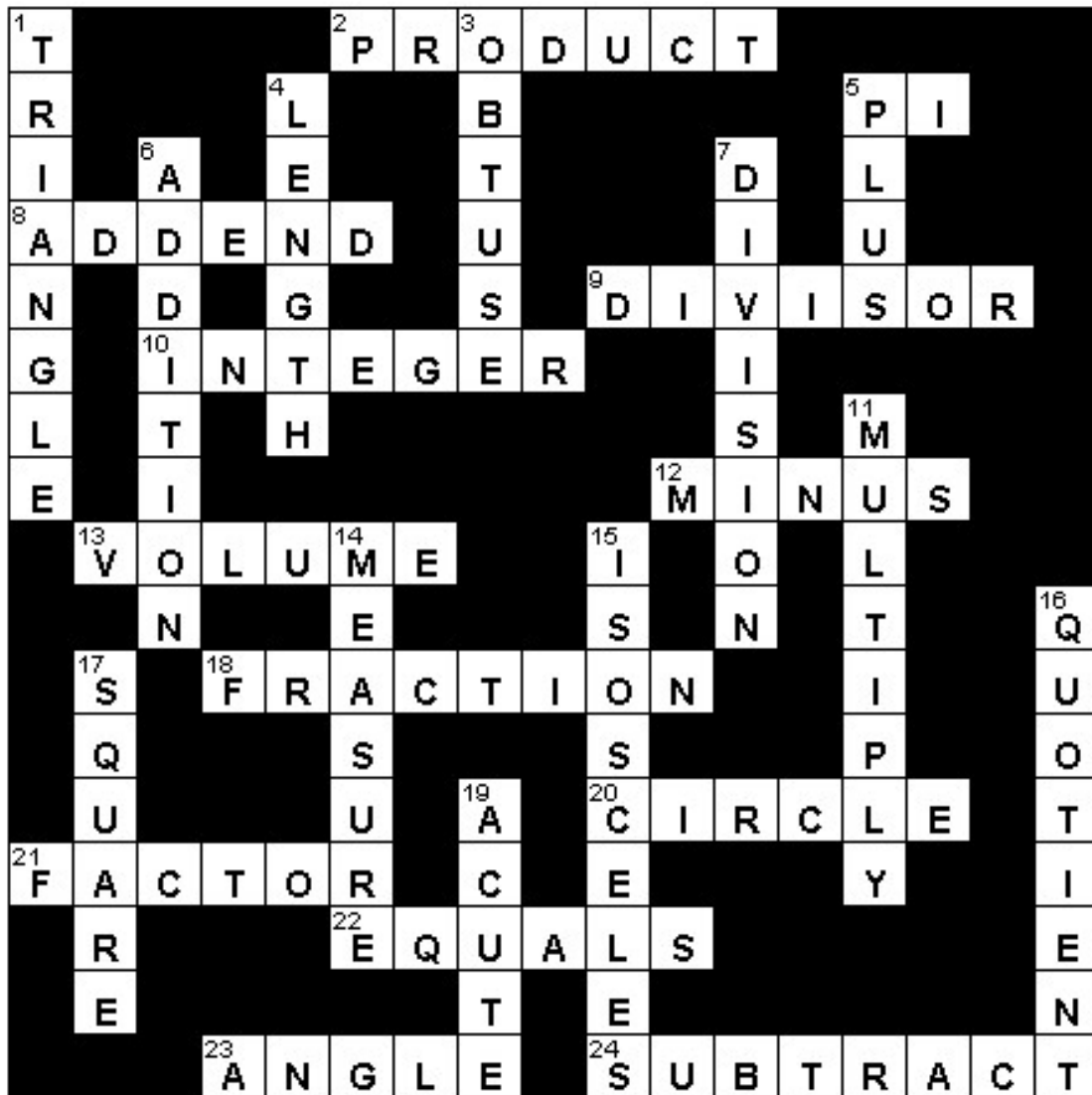
How many unit cubes are to be added to get a cuboid of dimension $2 \times 5 \times 3$?



How many unit cubes are to be added to get a cube of dimension $5 \times 5 \times 5$?

THE CIVIL SERVICES SCHOOL

Solution to mathematics crossword puzzle



Crossword Compiler Software © A. Lewis 2000

- ❖ Count the red beads answer: 55
- ❖ Count the triangles answer: 44

Learning Outcomes:

After the end of this unit, the students will be able to-

- Calculate the area of a trapezium and rhombus.
- State and apply formulae for surface area and volume of solids (cube, cuboid and cylinder) to solve real life problems.

Assignment - 7
Data Handling

1. Construct a frequency distribution table and a histogram for the following weights (in grams) of 34 apples using equal class intervals, one of them being 40 – 45:

30, 40, 45, 32, 43, 50, 55, 62, 70, 70, 61, 62, 53, 52, 42, 35, 37, 53, 55,
65, 70, 73, 74, 45, 46, 58, 59, 60, 62, 74, 34, 35, 70, 68

- i) What is the class mark of the class interval 40 – 45?
ii) What is the range of the above weights?
iii) How many classes are there?

2. The monthly savings (in rupees) of 32 salaried persons are:

420, 400, 600, 500, 460, 400, 500, 520, 620, 720, 620, 660, 460, 560, 520, 580, 520, 700,
600, 660, 560, 400, 500, 420, 420, 800, 600, 500, 860, 700, 620, 520.

Construct a frequency distribution table and a histogram with one of the class intervals as 400 – 500.

3. The following table gives the number of different fruits kept in a hamper:

Type of fruit	Mangoes	Apples	Oranges	Coconuts	Bananas
Number	26	30	21	5	8

Represent the above data by a pie- chart.

4. The marks obtained by Sunil in an examination are given. Represent the given data by a pie chart.

Subject	English	Hindi	Mathematics	Science	Social Studies
Marks obtained	75	105	90	120	150

5. If the pie chart representing the number of students opting for various streams of study out of a total of 1650 students, the central angle of the sector representing science is 48° , what is the actual number of students opting for science?

6. The pie chart below shows the result of a survey carried out to find the modes of travel used by children to go to school. Study the pie chart and answer the related questions.



- What is the most common mode of transport?
- What fraction of children travel by car?
- If 18 children travel by car, how many children took part in the survey?
- How many children use taxi to travel to school?
- By which two modes of transport are equal number of children travelling?

Web Resources

- <http://tinyurl.com/piechart8>
- <http://tinyurl.com/histograms8>
- <http://tinyurl.com/class-interval>

Rock Paper Scissors

In the game of Rock Paper Scissors, each of two players picks rock, paper, or scissors. On a count of three, each player puts down a fist, which means rock, a flat hand, which means paper, or two fingers in a "V," which means scissors. The following rules decide the winner:

- Rock breaks scissors, so rock wins.
- Scissors cut paper, so scissors wins.
- Paper covers rock, so paper wins.

If both players do the same thing, the game is a tie.

Anjali and Vasudha played Rock Paper Scissors 10 times. Anjali used three rocks, six scissors, and one paper. Vasudha used two rocks, four scissors, and four papers. There was never a tie and the order in which Anjali and Vasudha used rocks, papers, and scissors is unknown. Who won, and how many wins did he or she have?

Brain Teasers**Count the red beads:**

Colored beads are placed in the following order: 1 red, 1green; then 2 red,2green; then 3 red, 3 green; and so on. In all, how many of the first 100 beads are red?

Count the triangles:

Avi uses 11 toothpicks to form a row of 5 attached triangles, as shown. Suppose he continues this pattern, using 89 toothpicks in all. What is the total number of triangles formed?

**Learning Outcomes:**

After the end of this unit, the students will be able to-

- Prepare and read a frequency distribution table.
- Draw and interpret a histogram accurately.
- Comprehend and make a pie chart for the given data.

Assignment-8
Direct and Inverse proportions

1. I earn Rs. 1645 per week. In how many days will I earn Rs. 3760?
2. If 32 men can dig a playground in 15 days, in how many days can 20 men dig the same playground?
3. In 10 days, the earth picks up 2.6×10^8 pounds of dust from the atmosphere. How much dust it will pick up in 45 days?
4. 18 men can reap a field in 35 days. For reaping the same field in 15 days, how many more men are required?
5. Arun has just enough money to buy 25 cycles worth Rs. 500 each. How many cycles he will be able to buy, if the cost of each cycle increases by Rs. 125?
6. A car travels 432 km on 48 litres of petrol. How far would it travel on 22 litres of petrol?
7. A hostel has enough food for 1200 students for 25 days. However, some students went on a vacation and the food lasted for 30 days. How many students went away?
8. If 52 bars of soap weigh 26 kg, find the weight of 312 bars of soap of the same kind.
9. An army camp has food for 600 soldiers for 42 days. If 200 soldiers are shifted to another camp, then for how much time will the food last?
10. Raghu has enough money to buy 72 machines worth Rs. 2000 each. How many machines can he buy if he gets a discount of Rs. 200 on each machine?

Web Resources

<http://tinyurl.com/direct-proportion>

BRAIN TEASER



Arrange the eight dominoes shown above to form a four-by-four square in which the number of dots in each row and column is the same.

Learning Outcomes:

After the end of this unit, the students will be able to-

- Define, identify and differentiate between direct and inverse proportions.
- Solve real life problems applying the knowledge of direct and inverse proportion.



Assignment - 9 Introduction to graphs

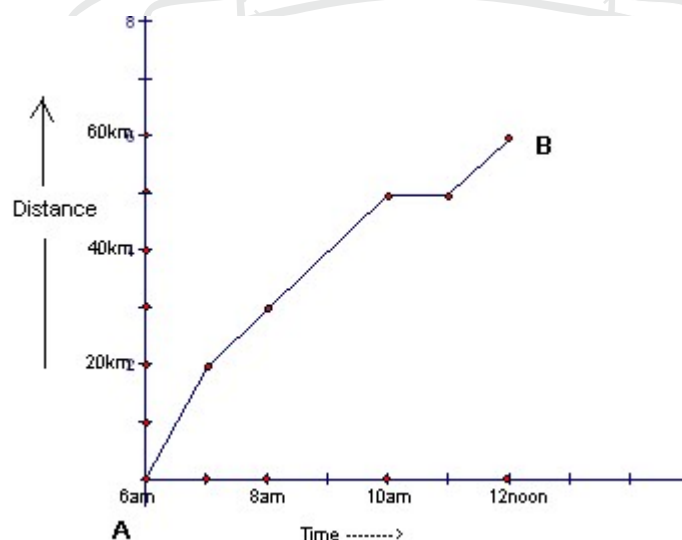
- Plot the following points on a graph sheet and answer the questions that follow.
 - A(1,1), B(2,2), C(3,3), D(4,4). Will this line pass through the origin?
 - P(4,2), Q(5,3) R(4,6), S(3,0). Do these points form a line?
- Draw the line passing through (4, 7) and (6, 5). Find the coordinates of the points at which this line meets the x-axis and y-axis.
- Ranjit can ride a car constantly at a speed of 60km/hr. Draw a time-distance graph for this situation. Use it to find
 - the time taken by him to drive 90km.
 - the distance covered by him in two and a half hours.

- Draw a graph for the following.

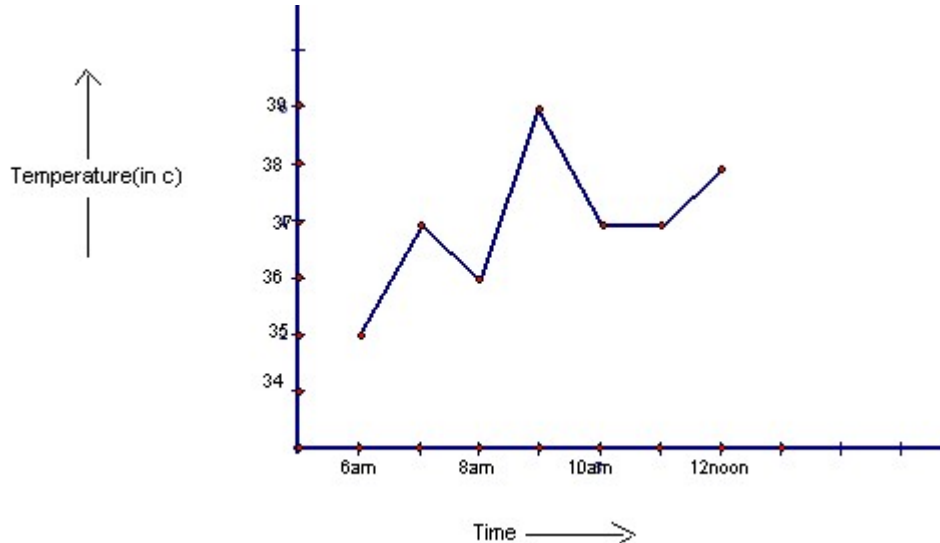
No. of people	10	15	20	25	30
Cost of refreshment	500	750	1000	1250	1500

- A boy travels on a scooter from A to B to deliver a parcel. His distance from A at different times is shown by the following graph. Answer the following:

- How much time did the boy take for the travel?
- How far is B from A?
- Did the boy stop on his way? Explain.
- During which period did he ride fastest?



6. The following graph shows the temperature of a patient in a hospital recorded every hour.

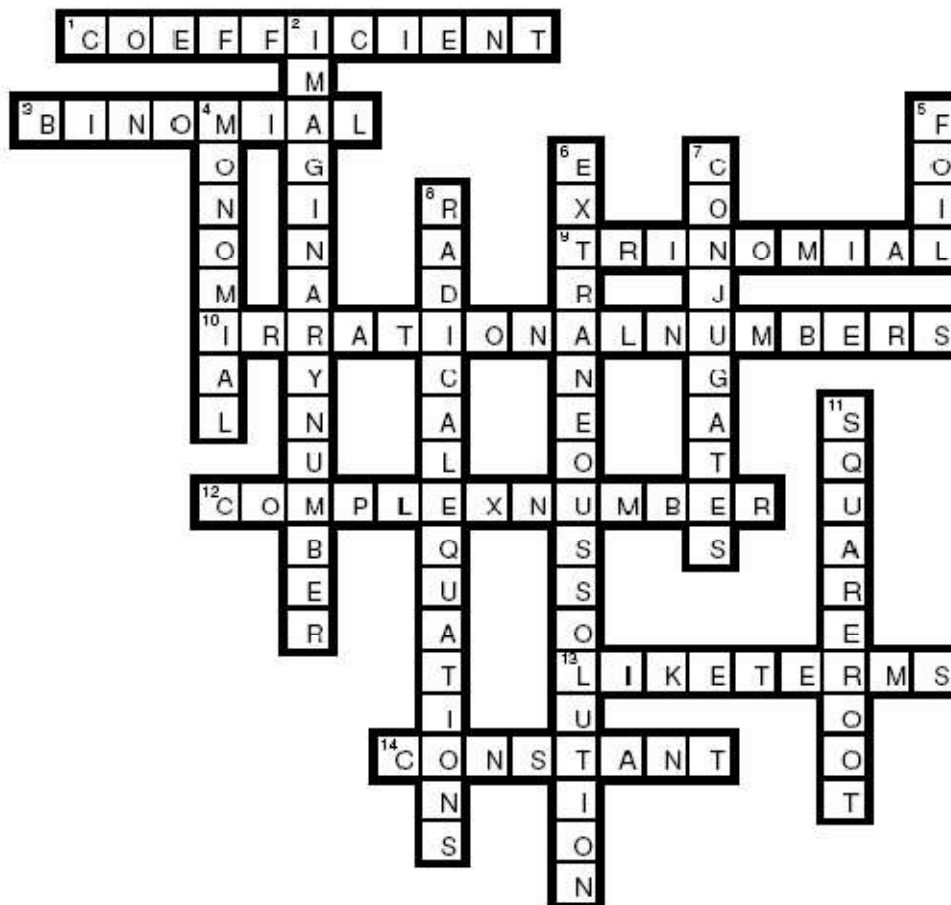


- What is the patient's temperature at 12noon?
- When was the patient's temperature 39°C ?
- The patient's temperature was the same at two times during the period given. What were these two times?
- What was the temperature at 7am?
- During which periods did the patient's temperature show an upward trend?

Web Resources

- <http://tinyurl.com/coordinate8>
- <http://tinyurl.com/graphreading1>
- <http://tinyurl.com/graphreading2>

Algebra Terms Crossword Puzzle Answers



Solution to Dominoes Brain teaser



Learning Outcomes:

After the end of this unit, the students will be able to-

- Read and interpret given line/linear graphs.
- To draw a line graph and a linear graph using the given data.
- To differentiate between a line graph and linear graph.
- Plot the coordinates of a point in the Cartesian system.



Assignment No. 10
Comparing Quantities

1. A dealer buys 40 kg of rice at Rs. 6.25 per kg and 30 kg at Rs. 7 per kg. At what rate per kg should he sell the mixture so as to gain 5% on the whole ?
2. Sonam bought a mobile phone for Rs. 5100, after getting a discount of 15%. What was the Marked price of the phone?
3. By selling a saree for Rs. 322, a shopkeeper gains 15%. At what price should he sell the saree so as to make a profit of 25% ?
4. Mohan sells two tables for Rs. 924 each. He makes a profit of 20% on one and a loss of 20% on the second table. Find his overall gain or loss percent.
5. A chair was sold at a profit of 10%. Had it been sold for Rs. 45 more, the profit would have been 25%. Find the CP of the chair.
6. Find the bill amount of a saree, if its selling price is Rs. 3450 and a 12% VAT is to be charged.
7. A shopkeeper charged Rs. 1242 for a fan which includes 8% VAT on it. Find the price of the fan without VAT.
8. Find the compound interest on Rs. 8000 at 15% p.a. for $2\frac{1}{3}$ years, interest compounded annually.
9. The value of a TV set is Rs. 20,000. If the depreciation rate is 10%, find its value after 3 years.
10. Find the compound interest on Rs. 125000 for $1\frac{1}{2}$ years at 12% p.a. if interest is compounded half yearly.

HOTS

11. Find the principal, if the compound interest payable annually at 10% p.a. for 3 years is Rs. 331.
12. At what rate percent will Rs. 4000 amount to Rs. 4410 in 2 years when compounded annually.

Web Resources

<http://tinyurl.com/percentage-change>

TANGRAM ACTIVITY

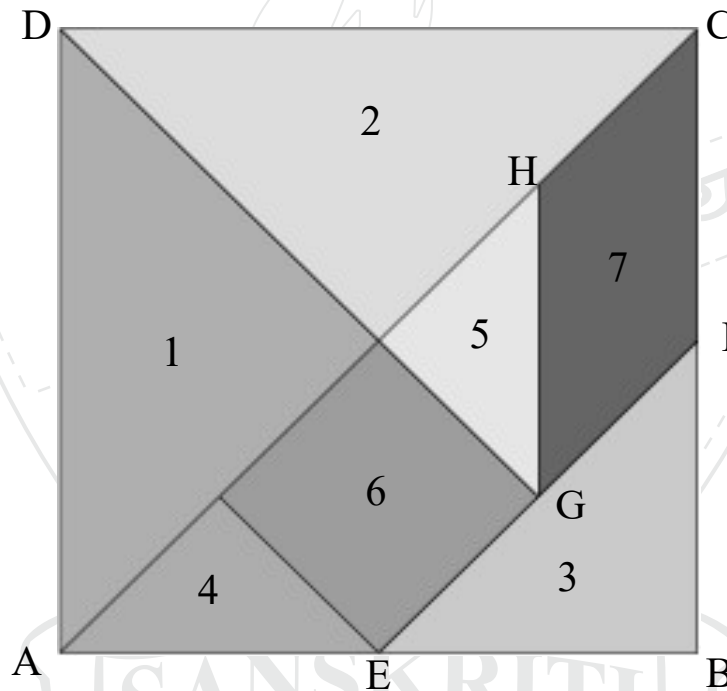
AIM: To make a set of tangram and then find the area of each piece.

MATERIAL REQUIRED:

1. Cardboard of size (10 X 10 cm)
2. Geometry box

WHAT IS A TANGRAM?

This puzzle evolved when a man named Tan dropped a square tile on the floor and it broke into seven pieces. When he tried to put them back together to form a square, He found it was possible to make several shapes and figures using all seven pieces.

**PROCEDURE:**

Do the following geometric construction on cardboard to make the set of tangram:

1. Take a squared cardboard of size, say (10 X 10cm), and name it as ABCD.
2. Draw the diagonal AC.
3. Label the midpoints of AB and BC as E and F respectively. Join EF.
4. Label the midpoint of EF as G. Join GD.
5. Construct a line segment perpendicular to AC from point E.
6. Construct a line segment from G to AC, parallel to BC, meeting AC at H.
7. Name the pieces using numbers 1 to 7 as shown in the given figure.

CONCLUSION:

Various geometrical shapes can be made using tangram pieces.
Now, try to make the following figures using tangram:



Learning Outcomes:

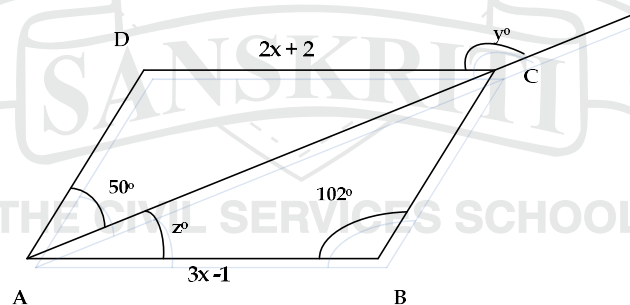
After the end of this unit, the students will be able to-

- Calculate increase and decrease in percentage
- Calculate various prices related to Buying and Selling (CP, SP, MP etc)
- Recognise the relation and difference between Simple Interest and Compound Interest.
- Solve real life problems based on the above concepts.



Assignment - 11
Understanding Quadrilaterals

- 1) The perimeter of a parallelogram is 150cm. One of its sides is greater than the other by 25cm. Find the length of all the sides of the parallelogram.
- 2) Diagonal AC of a rhombus ABCD is equal to one of its sides BC. Find all the angles of the rhombus.
- 3) If the diagonals of a parallelogram are 12 cm and 16 cm, find the lengths of each segment of the diagonal into which they are divided. State the property of parallelogram used.
- 4) The point of intersection of the diagonals of a quadrilateral divides one of the diagonals in the ratio 2:3. Can it be a parallelogram? Why?
- 5) The angles of a quadrilateral are in the ratio 3:4:6:7, find all the angles of the quadrilateral.
- 6) The lengths of the diagonals AC and BD of a rhombus are 6cm and 8cm. Find the length of each side of the rhombus. Also, find its area.
- 7) In a square, the lengths of two adjacent sides are $(2a - 3)$ and $(a + 6)$. Find the value of a . Also, find the length of the diagonal.
- 8) The sum of interior angles of a regular polygon is 2700° . How many sides does this polygon have?
- 9) The exterior angle of a regular polygon and its adjacent interior angle are in the ratio 1:8. Find the number of sides in the polygon.
- 10) ABCD is a parallelogram. Find x , y , z . State the properties used.



Web Resources

- <http://tinyurl.com/quadrilaterals8>

Geo-Word Search

Words to Find

SQUARE
RECTANGLE
TRIANGLE
OBTUSE
TANGENT
LINE
POINT
SEGMENT
RHOMBUS
ACUTE
DIAMETER
ANGLE

T	P	G	M	L	G	D	G	Z	Y	D	S	X	T	R
T	I	S	F	S	S	N	S	E	Q	A	E	I	J	N
N	G	U	U	T	C	O	L	B	R	O	G	G	Q	F
I	N	B	P	L	B	E	S	T	B	X	M	V	H	N
O	Q	M	F	F	H	T	E	T	D	T	E	G	R	P
P	L	O	A	C	D	L	U	I	C	T	N	P	E	E
X	J	H	O	A	G	S	A	K	A	R	T	T	C	N
D	R	R	D	N	E	M	A	O	K	I	C	A	T	I
S	O	M	A	Z	E	G	D	W	B	A	G	N	A	L
C	Y	Y	W	T	G	W	E	P	R	N	K	G	N	B
S	U	H	E	M	V	A	X	X	I	G	X	E	G	K
I	X	R	D	E	R	A	U	Q	S	L	P	N	L	A
S	U	P	Q	X	Q	O	P	N	V	E	B	T	E	A
V	O	H	J	B	C	M	Z	H	G	K	H	I	R	D
Q	H	G	I	D	S	Q	N	D	E	T	U	C	A	K

❖ Aunt Helen's Age answer: 80 years

Learning Outcomes:

After the end of this unit, the students will be able to-

- Define and classify polygons based on their angles/sides.
- State the angle sum property of different polygons and apply the same to find the measure of missing angle(s) in simple figures.
- Recall the properties of different kinds of quadrilaterals and use the same to calculate the missing angle(s) or side(s) of a given



Assignment - 12
Linear Equations in One Variable

1. Solve the following equations:

(a) $\frac{3x-1}{4x+3} = \frac{5}{11}$

(b) $\frac{1}{2}(x-1) - \frac{2}{3}(x+1) = \frac{3}{4}$

(c) $\frac{2y-(3y+4)}{7y-(2-5y)} = \frac{-9}{58}$

(d) $\frac{x}{3} - \left(\frac{2x}{5} - \frac{4}{3} \right) = \frac{x+2}{5}$

(e) $\frac{x-3}{2} - \frac{x+5}{4} = x - \frac{3}{4}$

2. The digit in the tens place of a two-digit number is three times that in the ones place. If the digits are reversed, the new number will be 36 less than the original number. Find the number.
3. The numerator of a rational number is less than its denominator by 3. If the numerator becomes three times and the denominator is increased by 20, the new number becomes $\frac{1}{8}$. Find the original number.
4. The present ages of Parul and Sonia are in the ratio 5:7. If Parul was 9 years older and Sonia 9 years younger, the age of Parul would have been twice the age of Sonia. Find their ages.
5. What same number should be added to each of the numbers 2, 7, 10 and 25 so that they form a proportion?
6. The length of a rectangle exceeds its breadth by 4cm. If the length is increased by 3cm and the breadth is increased by 2cm, the new area exceeds the original area by 79 sq cm. Find the dimensions of the given rectangle.
7. Three prizes are to be distributed in a contest. The value of second prize is five - sixths the value of the first prize and the value of the third prize is four - fifths that of second prize. If the total value of three prizes is Rs. 150, find the value of each prize.
8. A purse contains 1-rupee and 2-rupee coins in the ratio 5:4. If the total money in the purse is Rs. 65, then find the number of 2-rupee coins.
9. Four years ago, the ages of Raju and Rahul were in the ratio 3 : 8. Five years hence, their ages will be in the ratio 3 : 5. Find their present ages.
10. The difference of two positive numbers is 72 and their quotient obtained on dividing one by the other is 4. Find the numbers.

Web Resources

<http://tinyurl.com/equations8>

Brain Teaser- Aunt Helen's Age

Nobody knows how old Aunt Helen is but she gave a few hints. She had passed $\frac{1}{20}$ of her life before she started school. She spent $\frac{3}{20}$ of her life in school; she worked for $\frac{1}{10}$ of her life before she got married. She was married for $\frac{2}{5}$ of her life. Her husband died after $\frac{7}{10}$ of her life.

From reading Uncle Harry's gravestone you find out that she has been a widow for 24 years.

How old is Aunt Helen?

Brain Teaser-Count the pineapples

Four men were shipwrecked on an island. Having no food, they went to work gathering pineapples. After gathering pineapples, they were tired and all fell asleep. After another while, one of the men awoke and was very hungry so he ate $\frac{1}{3}$ of the pineapples - more than his proper share. He then went back to sleep. The second man awoke and being hungry, ate $\frac{1}{3}$ of the remaining pineapples and went back to sleep. The third man did the same. When the fourth man awoke, he took only his rightful share of the remaining pineapples. Then there were 6 pineapples left. How many pineapples did the men gather?

Solution of Fraction Puzzle:

$$5832/17496 = 1/3$$

$$5823/17469 = 1/3 \text{ (solution by "HarveyDale")}$$

Solution of: A Matter of Denominator $\frac{7}{13}$ **Solution of: What were you doing when the lights went out?**

The candles must have burnt for three hours and three quarters as one candle had one-sixteenth of its total length and the other four-sixteenths.

Curious number



Can you order the digits 1, 2, 3, 4, 5 and 6 so that they make a number with these characteristics:

it is divisible by 6

and

when the final digit is removed it becomes a 5-figure number divisible by 5

and

when the final digit is removed again it becomes a 4-figure number divisible by 4

and

when this is repeated it becomes a 3-figure number divisible by 3

and

when it is repeated again it becomes a 2-figure number divisible by 2?

Of course when it is repeated for a last time it will naturally be 1-figure number divisible by 1.

SOLUTION OF BRAIN TEASERS:

The Biggest Number:

$$11^{11} = 285311670611$$

Biggest Number:

$$9^{9^9}$$

A Three Digital Problem:

$$(a) \left(\frac{9}{9}\right)^9 \quad (b) \frac{9}{9} + \sqrt{9} = 4 \quad (c) \frac{9+9}{\sqrt{9}} = 6$$

Number Sequence

It's the numbers 0 through 10 in alphabetical order.

Learning Outcomes:

After the end of this unit, the students will be able to-

- Translate statements to algebraic equations
- Solve equations using various techniques
- Apply learned concept to solve word problems



Assignment - 13
Practical Geometry

1. Construct a quadrilateral ABCD in which $AB = 5\text{cm}$, $BC = 4\text{cm}$, $AD = 3\text{cm}$, $CD = 6\text{cm}$ and $BD = 5\text{cm}$.
2. Is it possible to construct a quadrilateral ABCD in which $AB = 2\text{cm}$, $BC = 4\text{cm}$, $AD = 3\text{cm}$, $CD = 6\text{cm}$ and $BD = 5\text{cm}$? Give reasons to support your answer.
3. Construct a quadrilateral ABCD in which $BC = 7\text{cm}$, $AC = AD = 6\text{cm}$, $CD = 5\text{cm}$ and $BD = 9\text{cm}$.
4. Construct a parallelogram whose two sides and one angle are 4cm , 5.5cm and 70° respectively.
5. Construct a rectangle with sides 4.5cm and 6cm .
6. Construct a quadrilateral ABCD in which $AB = 4.5\text{cm}$, $BC = 3.5\text{cm}$, $CD = 5\text{cm}$, $\angle B = 45^\circ$ and $\angle C = 150^\circ$.
7. Construct a trapezium ABCD in which $AB \parallel CD$, $AB = 8\text{cm}$, $BC = 6\text{cm}$, $CD = 4\text{cm}$ and $\angle B = 60^\circ$.
8. Construct a quadrilateral ABCD in which $AB = BC = 3\text{cm}$, $AD = 5\text{cm}$, and $\angle A = 90^\circ$, $\angle B = 105^\circ$.
9. Construct a rhombus LMNO with $LN = 7\text{cm}$ and $MO = 6\text{cm}$.

Web Resources

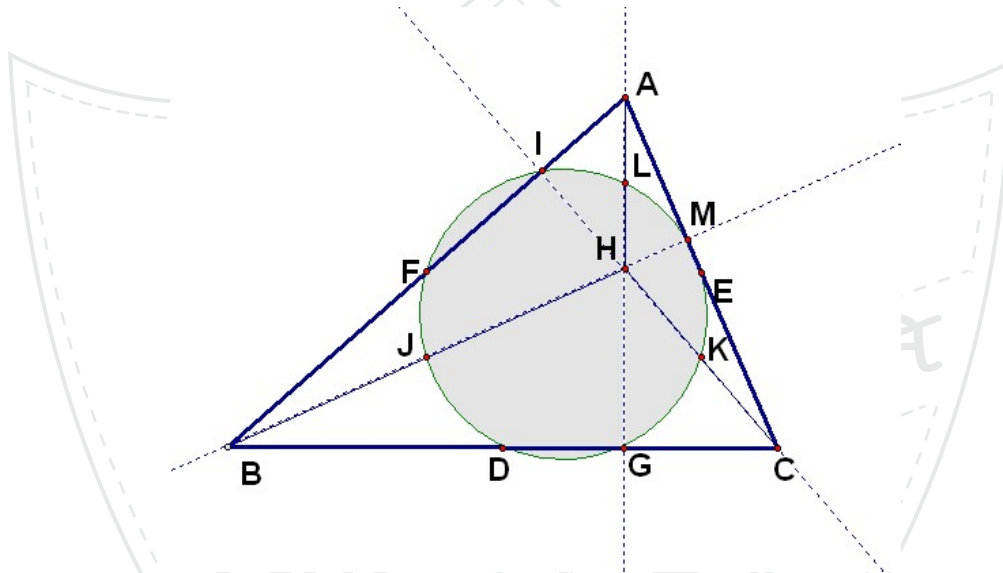
- <http://tinyurl.com/livebinders-construction>



Geometric Wonder-The Nine - Point Circle:

Perhaps one of the true joys in geometry is to observe how some seemingly unrelated points are truly related to each other. The nine points of a triangle that lie on the same circle are:

- ◆ the midpoints of the sides
- ◆ the feet of the altitudes, and
- ◆ the midpoints of the segments from the orthocenter to the vertices.



In 1765 Leonhard Euler showed that six of these points, the midpoints of the sides and the feet of the altitudes, determine a unique circle. Yet not until 1820, when a paper published by Charles Julien Brianchon and Jean Victor Poncelet appeared, were the remaining three points (the midpoints of the segments from the orthocenter to the vertices) found to be on the circle. This paper contains the first complete proof of the theorem and uses the name “nine- point circle” for the first time.

Learning Outcomes:

After the end of this unit, the students will be able to-

- Construct a quadrilateral using given information.

Assignment - 14
Factorisation

Factorise completely:

1. $x^2 - 14x + 48$

2. $6m^2 + 36m + 54$

3. $4x^2 + 9y^2 + z^2 - 12xy - 6yz + 4xz$

4. $36x^2 + 36x + 9$

5. $48a^2 - 243b^2$

6. $a^2x^2 + b^2y^2 - a^2y^2 - b^2x^2$

7. $(2x + 11)^2 - 1$

8. $4m^2 - 9a^2 + 4m + 1$

9. $x^2 - 5x - 24$

10. $200a^3b^3 - 128ab$

11. $x^2 - xz + xy - yz$

12. $p^2q - r^2p - pq + r^2$

13. $ab(x^2 + y^2) - xy(a^2 + b^2)$

14. $16x^4 - 8x^2 + 1$

15. $16a^2 - \frac{1}{144}$

16. $pq^2 + q(p-1) - 1$

Divide the first polynomial by the second

17. $(63a^3b^2 - 7a)$ by $(6a^2b + 2a)$

18. $25a^4b^3 - 81a^2b^5$ by $5a^3b^4 + 9a^2b^5$

Evaluate (using identities):

19. $\frac{3x^3 - 48x}{(x+4)(x-4)}$

20. $\frac{16x^3y - 9y^3x}{xy(4x-3y)}$

Web Resources

<http://nrich.maths.org/7490>

<http://tinyurl.com/factorisation8>

Learning Outcomes:

After the end of this unit, the students will be able to-

- Identify irreducible form of factors
- Factorise given expressions using different methods (common factor, regrouping, using identities, splitting the middle term)
- Divide a given polynomial by another polynomial



Question Bank for First Term Examination

- Find the least number which must be added to 306452 to make it a perfect square.
- Find the least number of six digits which is a perfect square.
- Find the least number which must be subtracted from 18265 to make it a perfect square.
- Find the smallest number by which the number 1100 must be multiplied so that the product becomes a perfect square. Also find the square root of the perfect square so obtained.
- Find the smallest number by which the number 45056 must be divided so that the quotient becomes a perfect square. Also find the square root of the perfect square so obtained.
- 10404 students are sitting in a lecture room in such a manner that there are as many students in a row as there are rows in the lecture room. How many students are there in each row of the lecture room?
- The area of a square plot of land is 325 square meters. Find the approximate length of one side of the plot (correct to 2 places of decimal).
- Find the square root of 1.7 correct to 2 places of decimal.
- Find the values of:
 - $\sqrt{34\frac{15}{49}}$
 - $\sqrt{\frac{361}{625}}$
- Using inspection method, find the square root of 1764 and 3136.
- Multiply 137592 by the smallest number so that the product is a perfect cube. Also find the cube root of the product.
- Divide the number 26244 by the smallest number so that the quotient is a perfect cube. Also find the cube root of the new quotient.
- Using inspection method, find the cube roots of 74088 and 175616.
- Find the cube root of the following:
 - -216×3375
 - $\frac{27}{-4096}$
 - 2863288
 - 0.000015625
- The volume of a cubical box is 13.824 cubic meters. Find the length of each edge of the cube.
- If the lateral surface area of a cube is 400 sq.cm, find its total surface area and its volume.
- Three metallic solid cubes with edges 3cm, 4cm and 5cm are melted and recast to form a single cube. Find the lateral surface area of the new cube.
- Write the expansions:
 - $(2p + 2q - 3r)^2$
 - $(x - 5y + 2z)^2$
 - $\left(x + \frac{4}{3}\right)\left(x + \frac{3}{4}\right)$
 - $(4x + 3y)(4x - 3y)$
- A cylindrical pillar is 50cm in diameter and 3.5m high. Find the cost of white-washing its curved surface area at the rate of Rs. 1.25 per square meter.

20. Write any three rational numbers between $-\frac{4}{7}$ and $\frac{5}{8}$

21. Represent $\frac{7}{3}, \frac{-5}{7}$ on two number lines.

22. Multiply $\frac{4}{11}$ by the reciprocal of $-\frac{7}{8}$

23. What is the multiplicative inverse of $-1\frac{1}{8}$?

24. What is the additive inverse of $\frac{27}{131}$?

25. Using appropriate properties solve the following and also name the property.

a) $\frac{-1}{9} \times \frac{3}{5} + \frac{7}{2} + \frac{1}{9} \times \frac{1}{6}$

b) $\frac{3}{7} \times \frac{-2}{5} - \frac{1}{3} - \frac{3}{7} \times \frac{1}{5}$

26. Express the following numbers in standard form:

a) 0.000000002654

b) 6325987410000000000

c) 0.00000000856

d) 326000000000

27. Express the following numbers in usual form:

a) 1.05×10^{-6}

b) 2.32×10^4

28. Using laws of exponents simplify:

a) $(-7)^5 \div (-7)^2$

b) $\left(\frac{2}{3}\right)^5 \times \left(\frac{2}{3}\right)$

c) $(3^2)^3 + \left(\frac{2}{3}\right)^0 + 3^5 \times \left(\frac{1}{3}\right)^4$

d) $\left(\frac{3^{-2}}{5}\right)^{-2}$

e) $(3^{-2} \times 4^{-2})^{-3}$

29. Solve the following equations:

a) $5^x = 625$

b) $6^{x-2} = 1$

c) $2^{2x+2} = 4^{2x-1}$

d) $3^{3x-5} = \frac{1}{9^x}$

30. The weekly wages (in Rs) of 30 workers in a factory are:

780, 720, 730, 760, 753, 765, 789, 780, 795, 745, 730, 720, 765, 756, 765, 780, 754, 745, 765, 745, 750, 780, 790, 780, 785, 745, 765, 750, 760, 780

Using tally marks make a frequency distribution table with one class interval as 720-730.

Also draw a histogram.

31. Draw a histogram to represent the following data:

Height (in cm)	Number of students
140-145	6
145-150	10
150-155	15
155-160	18
160-165	2
165-170	1

32. The air distances of four cities from Delhi(in km)are given below:

City	Kolkata	Mumbai	Chennai	Hyderabad
Distance from Delhi(inkm)	1340	1100	1700	1220

Draw a bar graph to represent the above data.

33. 2304 students are sitting in the auditorium in such a manner that there are as many students as there are rows in the auditorium. How many rows are there?
34. Is 128 a perfect cube? Give reason to justify your answer.
35. Evaluate 102×108 using a suitable identity.
36. Expand : $(x + 5y - 2z)^2$
37. Solve: $\frac{1}{7} + \frac{7}{3} \times \frac{1}{7} - \frac{2}{3} \times \frac{1}{7}$
38. What is the smallest number by which 675 must be divided so that the quotient is a perfect cube?
39. Find 'x' if $\left(\frac{2}{3}\right)^{-5} \times \left(\frac{4}{9}\right)^x = \left(\frac{3}{2}\right)^2$
40. Find 'x' if $7^x \times 3^x \times 2^x = 1764$
41. Simplify: $(2x - 7) \times (3x^2 - 7x + 5)$
42. Represent $-\frac{3}{7}$ and $\frac{4}{7}$ on the same number line.
43. Evaluate: $(5^{-1} \times 3^0 + 4^{-1}) \div \left(\frac{3}{2}\right)^{-3}$
44. Evaluate the following by the method of inspection
 a) $\sqrt[3]{17576}$ b) $\sqrt{9801}$
47. The base and corresponding altitude of a parallelogram are given as 10cm and 12cm respectively. If the other altitude is 8 cm, find the length of the other pair of parallel sides.
48. Find the value of 'x', if $3x = 7^3 \times 5^3 \times 49^{-1} \times 125^{-3}$
49. Evaluate: (i) $(2^{-5} \div 4^2) \times 8^{-1}$ (ii) $(6^{-1} - 8^{-1})^{-1} + (2^{-1} - 3^{-1})^{-1}$
50. Insert 3 rational numbers between $-\frac{2}{7}$ and $\frac{1}{2}$.
51. Subtract the sum of $-\frac{5}{4}$ and $-\frac{7}{3}$ from the product of $\frac{2}{3}$ and $-\frac{8}{6}$.
52. Find the greatest number of 6 digits which is a perfect square.
53. Subtract $5x^2 - 4y^2 + 5y - 3$ from $7x^2 - 3xy + 8y^2 + 6x - 3y$.
54. What is the smallest number by which 41160 must be divided so that the quotient is a perfect cube?

55. Evaluate: $\sqrt[3]{-1331} \times \sqrt[3]{1056}$
56. Evaluate using suitable identities:
 a) $\frac{144 \times 144 - 81 \times 81}{63}$ b) 103^2 c) 58×42
57. Find the least number which must be added to 306452 to make it a perfect square.
58. Simplify: $(a+b+c)^2 - (a-b+c)^2$
59. Simplify: $(2x+y+z)^2 - (2x-y-z)^2$
60. Write the expression $\left(-5x + \frac{1}{2}y + \frac{3}{4}z\right)^2$ in the expanded form.
61. The diagonals of a rhombus are 6cm and 8cm. Find its perimeter.
62. If the edge of a cube is tripled, how does its volume change?
63. The base of a triangular field is three times its altitude. If the cost of cultivating the field at Rs.246.80 per hectare is Rs. 331.80, find its base and height.
64. The parallel sides of a trapezium are 25cm and 13cm; its non-parallel sides are equal, each being 10. Find the area of the trapezium.
65. A rectangular grassy plot is 112m long and 78m broad. It has a gravel path 2.5m wide all around it on the inside. Find the area of the path and the cost of constructing it at Rs1.80 per sq. m.
66. Simplify: $(4m-x)^2 - (2m+3x)^2$
67. Find x if $\frac{21x}{20} = 29^2 - 71^2$ using suitable identity.
68. The area of a rhombus is equal to the area of a triangle whose side is 13 cm and its corresponding altitude is 21 cm. If one of the diagonals of the rhombus is 14 cm, find the other diagonal.
69. Simplify: $4b^2 + (2a-3b)^2 - 5a^2$
70. Find the value of m if $\left(\frac{4}{49}\right)^{m-2} \div \left(\frac{343}{8}\right)^5 = \left(\frac{7}{2}\right)^m$
71. A room 6m long, 4m broad and 5m high is to be painted. Find the cost of painting its walls and ceiling at the rate of Rs. 7.50 per m^2 .
72. The diameter of a roller is 80 cm and its length is 126 cm. It takes 200 revolutions moving once over to level a playground. Find the area of the playground in square meters.
73. Using suitable identity find: a) 103×97 b) 94×102
74. A closed cylindrical water tank of diameter 140 cm and height 1m is to be constructed.
 (a) Find the area (in m^2) of metal sheet needed to make the tank.
 (b) How many litres of water can it hold?
75. The paint in a container is sufficient to paint $8.5 m^2$ surface. How many containers of paint will be required to paint the walls of a room which is 12 m long, 5 m wide and 4.25 m high? Find the cost of paint if each container costs Rs. 250.

Question Bank for Annual Examination

- The difference between two positive integers is 60. The ratio of these integers is 1:4. Find them.
- After allowing a discount of 12% on the MP of an article, it is sold for Rs. 880. Find the MP.
- Divide: $x^2 - 5x + 6$ by $x - 3$.
- Factorize the following:
 - $x^2 + 5x - 36$
 - $x^2 + 2x + xy + 2y$
 - $36x^2 + 36x + 9$
- Factorize: a) $4x^2 + y^2 + 25z^2 + 4xy - 10yz - 20zx$ b) $50x^2 - 32y^2$
- Divide $(10x + 5)(3x + 5)$ by $(2x + 1)$
- Find the compound interest on Rs. 8000 for 2 years at $12\frac{1}{2}\%$ p.a., interest compounded annually.
- Solve for x : $\frac{2x - (7 - 5x)}{9x - (3 + 4x)} = \frac{7}{6}$
- In parallelogram PQRS
 - $\angle P = (2x + 10)^\circ$, $\angle R = (3x - 20)^\circ$. Find the value of x .
 - $\angle R = (5y)^\circ$, $\angle S = (2y + 19)^\circ$. Find the value of y .
- Vimla purchased two bags for Rs. 750 each. She sold these bags, gaining 6% on one and losing 4% on the other. Find the loss or gain percent on the whole transaction.
- Factorize the following:
 - $70a - 5a^2 - 245$
 - $12lx^2 - 9 + 6y - y^2$
 - $z^2 + 4y^2 + x^2 - 4xy - 4yz + 2xz$
 - $p^2 - 17p + 52$
 - $81y^4 - 18y^2 + 1$
 - $pq - ab - ap + bq$
 - $\frac{x^2}{2} + \frac{x}{2} - 15$
- Construct a rhombus with one of its sides as 6 cm and one of its angles equal to 75° .
- Using Factor method divide:
 - $100 - 9x^2$ by $3x + 10$
 - $x^2 - 11x - 80$ by $x + 5$
 - $6 - x - x^2$ by $3 + x$
- Neha cycles to school at an average speed of 12 km per hour. It takes her 20 minutes to reach her school. What should be her speed if she wants to reach her school in 15 minutes?
- Find n if $\sqrt[3]{256} = n \times \sqrt[3]{4}$

16. Factorize: $15a^2b + 18ab^2 - 24ab$

17. Factorize $3x^4 - 48$ and divide it by $(x + 2)$.

18. Factorize:

a) $x^2 + 3x + x + 3$

b) $a^2 + b - ab - a$

c) $(2x - 3)^2 - 8x + 12$

d) $x^2 - 1 - 2a - a^2$

e) $x^4 - 1$

f) $x^2 + 11x + 30$

g) $x^2 + 5x - 6$

h) $x^2 - x - 156$

i) $25x^2 + 4y^2 + 9z^2 - 20xy - 12yz + 30xz$

19. In 10 days, the earth picks up 2.6×10^8 kg of dust from the atmosphere.

(i) In how many days will it pick up 8.32×10^8 kg of dust?

(ii) How much dust will be picked up in 45 days?

20. Construct a quadrilateral ABCD where $AB=6\text{cm}$, $BC=4.5\text{cm}$, $\angle A = 60^\circ$, $\angle B = 105^\circ$ and $\angle C = 105^\circ$.

21. How many sides does a regular polygon have if the measure of an exterior angle is 36° ?

22. Mark a point R (2, 8) and a point S (4, 3) on the graph. Give the co-ordinates of the points where the line RS meets the x and the y axis.

23. The denominator of a fraction exceeds its numerator by 3. If the numerator is doubled and the denominator is increased by 14, the fraction becomes $\frac{2}{3}$ rd of the original. Find the fraction.

24. A purse contains Re 1 and Rs. 2 coins in the ratio 5:4. If the total money in the purse is Rs. 65, find the number of Rs. 2 coins.

25. Solve for x: $\frac{7x+1}{2} - \frac{3x+2}{5} + x = 4$

26. The difference between CI and SI on a certain principal at 15% p.a. for 3 years is Rs. 2268.

Find the principle amount.

27. A father's age is equal to the combined age of his four children. In 10 years, his age will be $\frac{2}{3}$ rd of the sum of their ages. Find the present age of the father.

28. In a hostel, there is enough food for 300 students for 42 days. How long will this food last if 50 students join the hostel?

29. Solve: $\frac{2+m}{3} - \frac{4m}{5} = \frac{1-2m}{15} - \frac{2}{3}$

30. A shop gives 20% discount on all items. How much money would Preeti have to pay if she buys a dress and a bag marked at Rs. 1200 and Rs. 500 respectively?

31. If 8% VAT is included in the prices, find the original price of a hair-dryer and a shampoo bottle bought for Rs. 2160 and Rs. 540 respectively.

32. The angles of a quadrilateral are in the ratio 2:3:4:6. Find the greatest angle of the quadrilateral.

33. Draw the line passing through (2, 3) and (4, 1). Find the coordinates of the points at which this line meets the x-axis and the y-axis.

34. Construct a quadrilateral ABCD where AB = 7cm, BC = 5.5cm, $\angle B = 90^\circ$, $\angle C = 70^\circ$ and $\angle D = 95^\circ$.

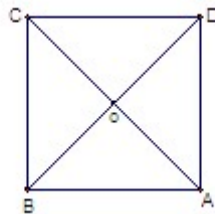
35. A shopkeeper sold two TV sets for Rs. 12000 each. He sold one at a loss of 4% and the other at a gain of 20%. Find his overall gain or loss percent.

36. I have a total of Rs. 4500 in notes of denomination of Rs. 20, Rs. 10 and Rs. 5. The ratio of the number of these notes is 1 : 4 : 6. How many notes of each denomination are with me?

37. The sum of the digits of a two-digit number is 8. If 36 are added to the number, the digits interchange their places. Find the number.

38. (a) Is a quadrilateral with exactly two opposite angles of equal measure always a parallelogram? Why or why not? Give an example to support your answer.

(b) Find x if $OD = 3x$ and $AC = 10 + x$. State the properties used.



39. Draw the graph for the following table and from the graph, answer the questions:

Distance travelled by a car:

Time(in hours)	5 a.m.	6 a.m.	7 a.m.	8 a.m.
Distance(in km)	50	90	130	170

- (i) How much distance did the car cover during the period 6.30 a.m. to 7 a.m.?
(ii) What was the time when the car had covered a distance of 150 km since its start?

40. Factorize: a) $4m^2 + 4m + 1 - 9x^2$ b) $(2x + 11)^2 - 1$
 c) $x^2 - 50x + 625$ d) $pq^2 + pq - q - 1$

41. Divide $3x^2 + 6x - 45$ by $3x - 9$.

42. Shreya took a loan of Rs. 80,000 for 2 years at 5% p.a. compounded annually; whereas Sumit borrowed the same sum for 18 months at 10% p.a. compounded half-yearly. Who paid more interest and by how much?

43. Find the compound interest at the rate of 5% p.a. compounded annually for 3 years on that principal which in 3 years gives Rs. 1200 as simple interest at the rate of 5% p.a.

44. A train is moving at a uniform speed of 75 km/hr.

- (i) Find the distance covered in 24 minutes.
(ii) How long will it take to travel 200 km?

45. Find the sum for which the difference between the simple interest and interest for 2 years at 4% per annum, interest compounded annually, is Rs. 200.

46. A baby food is available in two packs. One is a plastic can with a circular base of diameter 6 cm and height 12 cm. The other is a cardboard carton with a square base of side 5 cm and height 12 cm. Which of them has a greater capacity and by how much?

47. Two years ago Dilip was three times as old as his son and two years hence, twice of his age will be equal to five times that of his son. Find their present ages.

48. Find the area of quadrilateral PQRS in which diagonal PR = 20 cm, QM ⊥ PR and SN ⊥ PR, QM = 8 cm, SN = 6 cm.

49. Plot the following points on a graph and check if they lie on a line: A (2,6), B (3,5), C (5,3)

50. A road roller takes 750 complete revolutions to move once over to level a road. Find the area of the road if the diameter of the road roller is 84 cm and length is 1 m.

51. A group of 600 people were asked to vote for their favorite language from the languages Tamil, Hindi, Gujarati and Punjabi. 150 opted for Tamil, 200 for Gujarati, 130 for Punjabi and the rest for Hindi. Draw a pie chart to show this information.

Multiple Choice Questions

Q1. Cube root of $\frac{125}{64}$ is:

- a) $\frac{5}{4}$ b) $\frac{0.5}{4}$ c) $\frac{0.05}{4}$ d) $\frac{0.005}{4}$

Q2. Square root of 1.21 is:

- a) 1.1 b) 0.11 c) 0.011 d) 0.101

Q3. Twice the square of a number is thrice its cube. The number is:

- a) $\frac{3}{2}$ b) $\frac{2}{3}$ c) $\frac{9}{4}$ d) $\frac{4}{9}$

Q4. Which ones of the following are perfect squares?

- a) 100 b) 3570 c) 56347 d) 1234321

Q5. $\sqrt{\frac{27}{3}}$, when simplified, is:

- a) $\sqrt{3}$ b) $\sqrt{9}$ c) $\frac{\sqrt{3}}{3}$ d) $3\sqrt{3}$

Q6. The value of $\sqrt{(4^{-1} + 8^{-1})^2 \div \left(\frac{2}{3}\right)^{-2}}$ is:

- a) $\frac{1}{4}$ b) $\frac{9}{32}$ c) $\frac{1}{16}$ d) None of these

Q7. $\left(27^{\frac{2}{3}}\right)^{-\frac{1}{2}}$ is equal to:

- a) $\frac{1}{9}$ b) $\frac{27}{54}$ c) $\frac{2}{3}$ d) $\frac{1}{3}$

Q8. Two-thirds of a number is 6 less than $\frac{4}{5}$ of the number. The number is:

- a) 45 b) 60 c) 30 d) 75

Q9. If $\frac{x+2}{2} = \frac{5}{4}$, then x is:

- a) 3.25 b) 4.25 c) 1.75 d) 5.75

Q10. If $4^{-x} = \frac{1}{16}$, then x is:

- a) 2 b) -2 c) 0 d) None of these

Q11. The coefficient of x in the sum of $2x + 5y - 3z$ and $3x + 2y + 5z$ is:

- a) 2 b) 3 c) 0 d) 5

Q12. Two angles forming a linear pair are in the ratio 4:5. The greater angle is:

- a) 120° b) 110° c) 98° d) 100°

Q13. The no. of right angles in a right angled triangle is:

- a) 0 b) 1 c) 2 d) 3

Q14. If $5^{x-1} = 1$, then x = ?

- a) 1 b) 2 c) 0 d) 4

Q15. If A is greater than B by 20%, then, B is less than A by:

- a) 20% b) $16\frac{2}{3}\%$ c) 10% d) $83\frac{1}{3}\%$

Q16. The centroid of a triangle divides the median in the ratio:

- a) 1:3 b) 2:1 c) 2:3 d) None of the three

Q17. If $x^2 = 9$, what can be the value of $2 - x$?

- a) 7 b) -7 c) 11 d) -1

Q18. A sum of money doubles itself in 16 years. It will treble itself in:

- a) 24yrs b) 30 yrs c) 32 yrs d) None of these

Q19. What percent of 6.25 is 1.25?

- a) 10% b) 15% c) 20% d) 25%

Q20. If V and C stand respectively for the volume and curved surface area of a cylinder with base of radius r, then:

- a) $VC = \pi r$ b) $2V = Cr$ c) $2C = Vr$ d) $2r = VC$

Q21. The number of degrees in $\frac{4}{9}$ of a right angle is:

- a) 40° b) 50° c) 60° d) 80°

Q22. The area of a square with diagonal $\sqrt{128}$ cm is:

- a) 128 cm^2 b) $8\sqrt{2} \text{ cm}^2$ c) 64 cm^2 d) 16 cm^2

Q23. The surface area of a cube is 216 cm^2 , then its volume is:

- a) 162 cm^3 b) 216 cm^3 c) 612 cm^3 d) 621 cm^3

Q24. A fruit seller buys some bananas at the rate of 4 for a rupee and the same quantity at the rate of 5 for a rupee. He mixes the two varieties and sells them at the rate of nine for 2 rupees. The net result for him from this transaction is a:

- a) No loss, no gain b) profit of $1\frac{19}{81}\%$ c) loss of $1\frac{19}{81}\%$ d) loss of $1\frac{1}{4}\%$

Q25. $\sqrt{0.4} \times \sqrt{3.6}$ is equivalent to:

- a) 12 b) 0.12 c) 1.2 d) 0.012

Q26. $(-1)^{126} + (-1)^{421}$ is equivalent to:

- a) 1 b) -1 c) 2 d) 0

Q27. If the sum of two numbers is 8 and their difference is 2, then the numbers are

- a) 10, -2 b) 6, -4 c) 5, 3 d) -5, -3

Q28. If the base of triangle is doubled and the height is halved, its area will be

- a) doubled b) halved c) one-fourth d) same

Q29. Two-thirds of a number is 6 less than four-fifths of a number, the number is

- a) 60 b) 30 c) 45 d) 75

Q30. The class mark of the class 30- 40 is

- a) 35 b) 40 c) 30 d) 25

Q31. The angle of the sector of an event in a pie chart is 60° . The ratio of the frequency of this event to the total frequency is

- a) 6 : 1 b) 1 : 6 c) 5 : 6 d) 6 : 5

Q32. The square root of a number is the number itself. This number cannot be

- a) 1 b) 0 c) 0.1 d) none of these

Q33. The value of x which satisfies the equation $3^{x-2} = 1$ is

- a) 1 b) 2 c) 3 d) 4

Q34. The diagonal of a square whose side is x is

- a) $2x$ b) $2x^2$ c) $\sqrt{2}x$ d) $\sqrt{2}x$

Q35. A circle is inscribed in a square of side a . The area of the circle is

- a) $a^2\pi$ b) $\frac{1}{4}a^2\pi$ c) $4a^2\pi$ d) $\frac{1}{2}a^2\pi$

Q36. The ratio of the areas of a square and a rectangle of length 4 cm and width 3 cm is 4 : 3.

The side of the square will be

- a) 4 cm b) 3 cm c) 12 cm d) 9 cm

Q37. Two right circular cylinders of equal volume are such that their radii are in the ratio 2 : 3.

The ratio of their heights will be

- a) 2 : 3 b) 4 : 9 c) 3 : 2 d) 9 : 4

Q38. The ratio of the radii of two right circular cylinders of equal curved surface are in the ratio 1 : 2. The ratio of their heights will be

- a) 1 : 2 b) 2 : 1 c) 1 : 4 d) 4 : 1

Q39. If $\frac{p}{q}$ is a rational number, then which one is incorrect?

- a) p can be zero b) q can be zero c) q cannot be zero d) p can be zero but q cannot be zero

Q40. If the diagonals of a quadrilateral are equal and bisect each other (not at right angles), then it is a

- a) square b) rhombus c) rectangle d) parallelogram

Sample Paper of First Term Examination

Time: 3 hours

MM – 80

Section A

- To get the product 1, we should multiply $\frac{-8}{21}$ by
 (a) $\frac{8}{21}$ (b) $\frac{-8}{21}$ (c) $\frac{21}{8}$ (d) $\frac{-21}{8}$
- The fourth class interval for a grouped data whose first and second class intervals are 10 - 15 and 15 - 20 respectively is _____.
- 68^2 will have _____ at the unit's place.
- Which one of this is **not** a Rational number when $n = 2$?
 (a) $\frac{n}{6}$ (b) $\frac{(n-4)}{7}$ (c) $\frac{n-2}{n+2}$ (d) $\frac{n+2}{n-2}$
- The cube of 0.3 is _____.
- Size of class (150 - 175) is _____.
- $\sqrt{24025}$ will have _____ digits.
- The number of times a particular observation occurs in the given data is called its _____.
- The value of $(-2)^{2 \times 3 - 1}$ is
 (a) 32 (b) 64 (c) -32 (d) -64
- Volume of a rectangular box with length = $2ab$, breadth = $3ac$ and height = $2ac$ is _____.
- Write the usual form of 2.03×10^{-5} .
- $(6^0 - 7^0) \times (6^0 + 7^0) =$ _____.
- Which of the following is not a perfect square?
 (a) 361 (b) 1156 (c) 1128 (d) 1681
- $\frac{-3}{8} + \frac{1}{7} = \frac{1}{7} + \frac{(-3)}{8}$ is an example to show that
 (a) addition of rational numbers is commutative.
 (b) rational numbers are closed under addition.
 (c) addition of rational numbers is associative.
 (d) rational numbers are distributive under addition.

15. Which of the following is a binomial?

- (a) $7 \times a + a$ (b) $6a^2 + 7a + 2b$ (c) $6(a^2 + a)$ (d) $4a \times 3b \times 2c$

16. State which of the given statements is true:-

- (a) $(-5)^{-2} \times (-5)^{-3} = (-5)^{-6}$.
 (b) $1^0 \times 0^1 = 1$.
 (c) $(-7)^0 = -1$.
 (d) $a^m = \frac{1}{a^{-m}}$

17. If the height of a cylinder becomes $\frac{1}{4}$ of the original height and the radius is doubled, then the volume of the cylinder will be :-

- (a) doubled (b) remain unchanged (c) halved (d) one - fourth of the original vol.

18. Area of the rhombus is equal to _____ of its diagonals.

19. _____ surface area of room = area of 4 walls

20. Cube of a number ending in 7 will end in the digit _____.

Section B

21. Evaluate using suitable property:-

$$104 \times 97$$

OR

$$\frac{6.25 \times 6.25 - 1.75 \times 1.75}{4.5}$$

22. Find $\sqrt{248 + \sqrt{52 + \sqrt{144}}}$

OR

A decimal number is multiplied by itself. If the product is 51.84, find the number.

23. The parallel sides of a trapezium are in the ratio 3: 5. If the height is 16cm and the area is 768cm^2 . Find the length of the parallel sides.

24. Find $\sqrt[3]{-85184}$ by inspection method.

25. Find m, such that $5^{10} \div 5^8 = \left(\frac{1}{5}\right)^m$.

26. Evaluate $\sqrt[3]{125} + \sqrt[3]{0.064} + \sqrt[3]{0.027}$

Section C

27. The area of a square plot is $101\frac{1}{400}m^2$. Find the length of one side of the plot.

28. Study the following distribution and answer the questions below.

Class Interval Daily Income (in Rs)	Frequency Number of Workers
100 - 125	56
125 - 150	26
150 - 175	45
175 - 200	125
200 - 225	150
225 - 250	56
Total	460

(a) Which is the upper limit of the fourth class?

(b) What is the class mark of the second class?

(c) Which class has the lowest frequency?

29. Simplify $\left(\frac{-3}{4} \times \frac{8}{15}\right) - \left(\frac{2}{3} \times \frac{-3}{8}\right) - \left(\frac{-4}{7} \times \frac{-14}{15}\right)$.

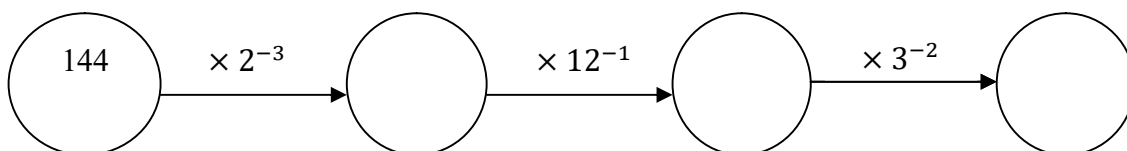
30. Express $\frac{1.5 \times 10^6}{2.5 \times 10^{-4}}$ in standard form.

31. Subtract $b(b^2 + b - 7) + 5$ from $3b^2 - 8$ and find the value of the expression for $b = -3$.

32. A housing society consisting of 5,500 people needs 100L of water per person per day. The cylindrical supply tank is 7m high and has a diameter of 10m. For how many days will the water in the tank last for the society?

33. The area of a quadrilateral is 363sqm. The perpendiculars dropped on the diagonal from the remaining opposite vertices are 12m and 21m. What is the length of the diagonal?

34. Fill in the blanks :



Section D

35. Weekly pocket expenses of 40 students are given below

Weekly pocket expenses (in Rs.)	Number of Students
20 – 30	6
30 – 40	8
40 – 50	10
50 – 60	5
60 – 70	11

(a) Construct a histogram for the above data.

(b) How many students spend Rs. 50 or more during a week?

36. Is 9720 a perfect cube? If not, find the smallest number by which it should be divided to get a perfect cube?

37. If the lateral surface area of a cube is 576sqcm, find its total surface area and its volume.

38. Three numbers are in the ratio 2:3:4. The sum of their cubes is 334125. Find the numbers.

39. (a) Identify the rational number that does not belong with the other three.

$\frac{-5}{11}$, $\frac{-1}{2}$, $\frac{-7}{3}$, $\frac{-4}{9}$. Explain your reasoning.

(b) Subtract the multiplicative inverse of $\frac{4}{9} \times \frac{-7}{8}$ from the additive inverse of $\frac{8}{9}$.

40. Find the value of $(x^2 + y^2)$ if $x + y = 15$ and $xy = 13$.

ANSWERS**Assignment No. 1**
Rational Numbers

1. (a) $\frac{-5}{15}, \frac{-4}{15}, \frac{-3}{15}, \frac{-2}{15}$ (b) $\frac{21}{60}, \frac{22}{60}, \frac{23}{60}, \frac{24}{60}$
2. $\frac{-19}{30}, \frac{-18}{30}, \dots, \frac{-10}{30}$ 3. $\frac{-20}{17}$
4. a) $\frac{50}{21}$ b) $\frac{47}{210}$ c) $\frac{-7}{30}$ d) $\frac{-62}{105}$ e) $\frac{466}{135}$ 5. $\frac{178}{45}$
6. $\frac{19}{8}$ 7. $\frac{81}{64}$ 11. $\frac{51}{2}$ 12. $\frac{-7}{3}$ 13. (i) $0, \frac{1}{2}$ (ii) $-1, \frac{-5}{3}$

Assignment No. 2
Squares and Square Roots

1. (a) 1296 - Yes (b) 1000 - No (c) 373758 - No (d) 22034087 - No
2. (a) 108 (b) 217 (c) 42
3. 5, 30 4. 3, 56 5. $1+3+5+7+9+11+13+15$
6. 30 7. $\frac{25}{2}m$ 8. (a) 99 (b) 48
9. (a) 12.25 (b) 234 (c) 0.231 10. 40 11. 25
12. 1024 13. 998001 14. 3.47 15. 3.32

Assignment No. 3
Cubes and Cube roots

1. a) Yes b) No 2. 7 3. 5 4. $2197 m^3$
5. 8 m 6. a) 75 b) -77 c) -42 d) -180
7. a) $\frac{2}{5}$ b) $\frac{-4}{11}$ c) $\frac{13}{21}$ d) 3.2
8. a) 73 b) 45 c) 48 d) 36
9. 14, 21, 28 10. a) 3.6 b) -1 c) 2 d) 0.1

Assignment No. 4
Exponents and Powers

1. (a) $\frac{64}{81}$ (b) $\frac{19}{64}$ (c) $\frac{15}{2}$ (d) $\frac{289}{36}$
2. (a) 49 (b) 121 (c) 100 (d) $\frac{2}{3}$
3. (a) .008 (b) .04 (c) 15.625 (d) .00032
4. $\frac{-2}{3}$ 5. $\frac{-2}{27}$ 6. (a) $\frac{1}{3}$ (b) 7 (c) $\frac{1}{3}$ (d) $\frac{95}{12}$ (e) $\frac{1}{3}$
7. (i) 7 (ii) 1 (iii) 10
8. (a) 1.62×10^8 (b) 7.8×10^{-7} (c) 3.42×10^0
9. (a) 11003000000 (b) 0.0000689

Assignment No. 5
Algebraic Expressions and Identities

1. a) $4a^2 + 9b^4 + c^2 - 12ab^2 - 6b^2c + 4ca$ b) $\frac{x^2}{4} + \frac{4}{9}y^2 + 16z^2 - \frac{2}{3}xy + \frac{16}{3}yz - 4zx$
2. a) 92415 b) 92380 c) 10404 d) 2540 e) 98.01 f) 224.91 g) 300
3. $8bc - 4ac$ 4. $-9y^2 + 18y + 133$
5. (i) $-5x^3 + 10x^2 + 8x + 5$, 69 (ii) $6x^3 - x^2 + 24x + 7$, -24 6. 116
7. 21 8. $2x^5 - 5x^4 - 11x^3 + 27x^2 - 109$. (i) 14 (ii) 194
10. (i) 27 (ii) 727

Assignment No. 6
Mensuration

1. 16 m 2. 8.5 cm 3. 18 cm, 6 cm 4. 12 cm and 18 cm
5. 246m^2 6. 9 cm, 12 cm 7. DE = 12 cm, BC = 20 cm 8. 216m^3
9. Rs 1188 10. 225 coins 11. 200 revolutions
12. V is doubled 13. V becomes 4 times
14. (i) 192cm^3 (ii) 224cm^2 (iii) No 15. 7 cm

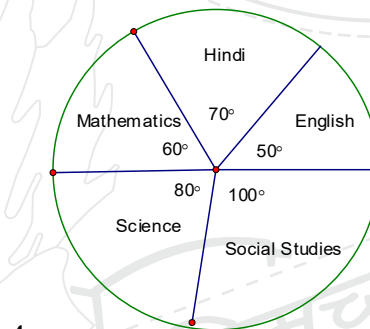
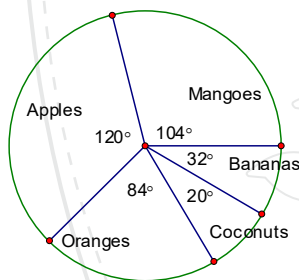
Assignment No. 7

Data Handling

1. (i) 42.5 (ii) 44 (iii) 9

2.

Class Intervals	Frequency
400 – 500	8
500 – 600	11
600 – 700	8
700 – 800	3
800 – 900	2
Total	32



5. 220 students

6. a) Bus b) $\frac{1}{4}$ c) 72 d) 6 e) Cycle, walk

Assignment No. 8

Direct and Inverse Proportions

1. 16 days 2. 24 days 3. 1.17×10^9 pounds
 4. 24 men 5. 20 bicycles 6. 198 km
 7. 200 students 8. 156 kg 9. 63 days 10. 80 machines

Assignment No. 9

Introduction to Graphs

- 1 (a) Yes 1(b) No 2. (11, 0) and (0, 11) 3(a) 1 hour 30 min 3(b) 150 km
 5(a) 6 hours 5(b) 60 km 5(c) Yes 5(d) 6 a.m to 7 a.m
 6(a) 38°C 6(b) 9 a.m 6(c) 10 a.m and 11 a.m 6(d) 37°C
 6(e) 6 a.m to 7 a.m; 8 a.m. to 9 a.m; 11 a.m to 12 noon

Assignment No. 10
Comparing Quantities

- | | | | |
|-------------|---------------|-------------|------------|
| 1. Rs 6.90 | 2. Rs 6000 | 3. Rs 350 | 4. Loss 4% |
| 5. Rs 300 | 6. Rs 3864 | 7. Rs 1150 | 8. Rs 3109 |
| 9. Rs 14580 | 10. Rs 23,877 | 11. Rs 1000 | 12. 5 % |

Assignment No. 11
Understanding Quadrilaterals

- | | |
|---|---|
| 1. 25 cm, 50 cm | 2. $\angle A = 120^\circ, \angle B = 60^\circ, \angle C = 120^\circ, \angle D = 60^\circ$ |
| 3. 6 cm each and 8 cm each | 4. No |
| 5. $54^\circ, 72^\circ, 108^\circ, 126^\circ$ | |
| 6. 5 cm, 24cm^2 | 7. $9, 15\sqrt{2}\text{ cm}$ |
| | 8. 17 sides |
| | 9. 18 sides |
| 10. $x = 3, y = 152^\circ, z = 28^\circ$ | |

Assignment No. 12
Linear Equations in One Variable

- | | | | | |
|--|------------------------------------|---|-----------------------|------------------------|
| 1. (a) $x = 2$ | (b) $x = \frac{-23}{2}$ | (c) $y = 5$ | (d) $x = \frac{7}{2}$ | (e) $x = \frac{-8}{3}$ |
| 2. 62 | 3. $\frac{1}{4}$ | 4. Parul's age = 15 years, Sonia's age = 21 years | | |
| 5. 2 | 6. Length = 17 cm, Breadth = 13 cm | | | |
| 7. Rs. 60, Rs. 50, Rs. 40 | 8. Number of 2-rupee coins = 20 | | | |
| 9. Present age of Raju = 10 years, Present age of Rahul = 20 years | | | | |
| 10. Numbers are 96 and 24 | | | | |

Assignment No. 14
Factorisation

- | | | |
|--|--------------------------------|---------------------------|
| 1. $(x-6)(x-8)$ | 2. $6(m+3)(m+3)$ | 3. $(2x-3y+z)^2$ |
| 4. $9(2x+1)(2x+1)$ | 5. $3(4a+9b)(4a-9b)$ | 6. $(a+b)(a-b)(x+y)(x-y)$ |
| 7. $4(x+6)(x+5)$ | 8. $(2m+1+3a)(2m+1-3a)$ | 9. $(x-8)(x+3)$ |
| 10. $8ab(5ab+4)(5ab-4)$ | 11. $(x-z)(x+y)$ | 12. $(p-1)(pq-r^2)$ |
| 13. $(ay-bx)(by-ax)$ | 14. $(2x+1)(2x+1)(2x-1)(2x-1)$ | |
| 15. $\left(4a + \frac{1}{12}\right)\left(4a - \frac{1}{12}\right)$ | 16. $(q+1)(pq-1)$ | 17. $\frac{7}{2}(3ab-1)$ |
| 18. $\frac{(5a-9b)}{b}$ | 19. $3x$ | 20. $4x+3y$ |