

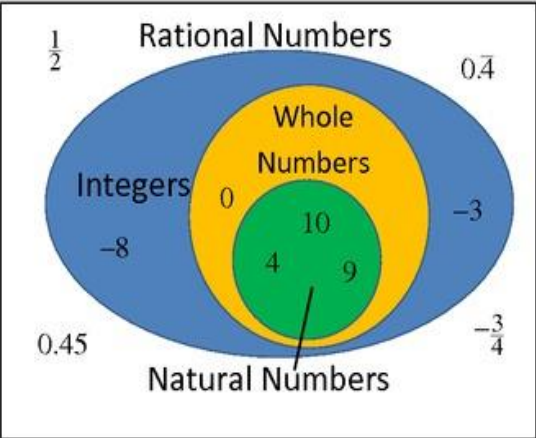
ANNUAL CURRICULUM PLAN 2020-2021

MATHEMATICS

CLASS VIII

VISION: TO CREATE IN STUDENTS A SENSE OF INQUIRY, TO OVERCOME THE FEAR OF MATHEMATICS AND TO HELP STUDENTS REALIZE THAT ANY PROBLEM IN LIFE WILL HAVE AT LEAST ONE SOLUTION

APRIL TO SEPTEMBER

CHAPTER	TRANSACTION STRATEGY/ INNOVATIVE PEDAGOGY	LEARNING OUTCOME	CORE SKILLS/ ART INTEGRATION/ INTERDISCIPLINARY LINKAGE
<p>1. RATIONAL NUMBERS</p> <ul style="list-style-type: none"> <li>○ Properties of rational numbers</li> <li>○ Representation of rational numbers on a number line</li> </ul> 	<p>The concepts are delivered using power point presentation in online teaching. Pre-requisite knowledge of the students are used and then applied to make them understand properties of rational numbers.</p> <p><i>• Distributivity of multiplication over addition for rational numbers</i></p> $a \times (b + c) = a \times b + a \times c$ <p><i>• Distributivity of multiplication over subtraction for rational numbers</i></p> $a \times (b - c) = a \times b - a \times c$	<p>Students will be able to:-</p> <ul style="list-style-type: none"> <li>• Recognize properties of rational numbers.</li> <li>• Compute sums of rational numbers.</li> <li>• Find rational numbers between two rational numbers.</li> </ul>	<ul style="list-style-type: none"> <li>• Core skills Logical reasoning, Precision</li> <li>• Art Integration Draw a diagram representing different rational numbers.</li> </ul> <p>Interdisciplinary linkage Science</p>
<p>2. LINEAR EQUATIONS IN ONE VARIABLE</p> <ul style="list-style-type: none"> <li>○ Solve an equation</li> <li>○ Write statement in equation form</li> </ul> <p><b>What percent of 500 is 75 ?</b></p> <p style="text-align: center;"> <math>\downarrow</math>     <math>\downarrow</math>     <math>\downarrow</math>     <math>\downarrow</math>     <math>\downarrow</math>     <math>\downarrow</math>  <b>m     %     x     500     =     75</b> </p> $\frac{m}{100} \times 500 = 75$ $5m = 75$ <div style="border: 1px solid black; padding: 2px; display: inline-block;"><b>m = 15</b></div>	<p>Objects are used for visualization to convert word problems to equations. Unknown variables are found by problem solving method and explanation.</p>	<ul style="list-style-type: none"> <li>• Recall equations.</li> <li>• Solve equations to find value of the unknown variable.</li> <li>• Conversion of word problems to mathematical equations.</li> <li>• Represent equations in statement form.</li> <li>• Solve word problems.</li> </ul>	<ul style="list-style-type: none"> <li>• Core skills Analytical skills, Problem Solving skills</li> <li>• Art Integration Draw pictures to convert word problems into equation.</li> <li>• Interdisciplinary linkage Drawing, English, Computer (Flowchart)</li> </ul>

3. UNDERSTANDING QUADRILATERALS

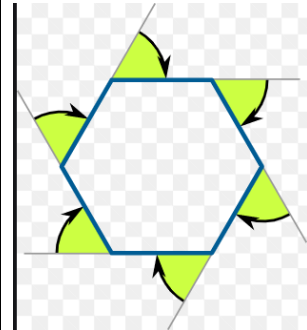
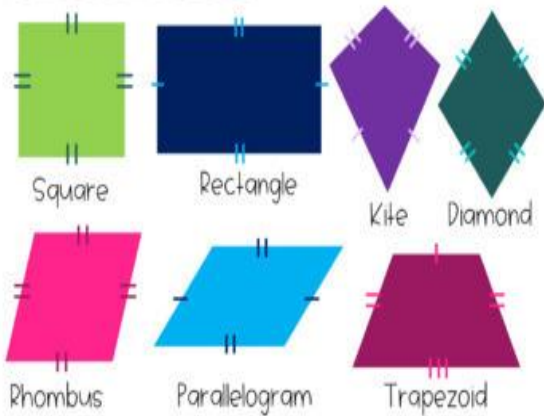
- Polygon
- Diagonal
- Convex and Concave quadrilateral
- Kinds of quadrilaterals
- Special parallelograms

Diagrams are used to make students understand the difference between different kinds of quadrilaterals. Properties of quadrilaterals are discussed and explained using smart board.

- Recall kinds of Polygon.
- Analyze angle sum property of triangle.
- Solve questions on exterior angle property of triangle.
- Categorize special quadrilaterals using properties.
- Find the unknown angle using properties of quadrilaterals.
- Differentiate between convex and concave quadrilaterals.

- Core skills  
Observational Skills, Logical thinking, Drawing skill
- Art Integration  
Construct special types quadrilaterals by cut and paste method and decorate the interior parts with culture of sikkim
- Interdisciplinary linkage  
Computers, Construction

## TYPES OF QUADRILATERALS



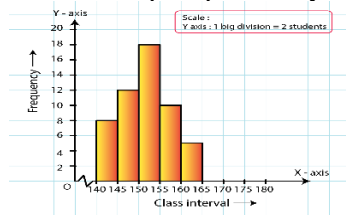
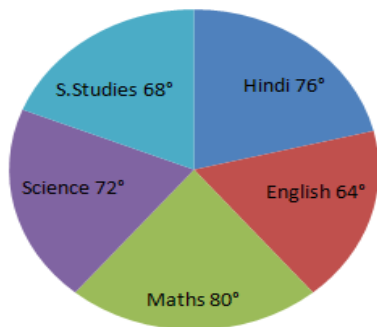
4. DATA HANDLING

- Tally marks
- Bar graph
- Histogram
- Pie chart

The concepts are delivered using inductive method with the help of graph sheets. Pre-requisite knowledge is used for the concept of tally marks and bar graph. Technicalities of drawing a graph are explained in the class. Power point presentation is used to explain pie chart. Problem solving method is used for the concept of probability.

- Recall representation of data.
- Arrange data in frequency distribution table.
- Analyze data given in histogram.
- Draw histogram.
- Represent data on a pie chart.
- Find probability of an event.

- Core skills  
Interpretational skill, Precision, Accuracy
- Art Integration  
Draw suitable graph for the numbers in the decimal expansion of the irrational number pi. Students will integrate the pie chart with the art and culture of the state Sikkim.
- Interdisciplinary linkage  
Statistics, Economics, Financial Accounts



5. SQUARES AND SQUARE ROOTS

- Properties of square numbers
- Patterns
- Pythagorean Triplet
- Finding Square roots

Different patterns are discussed in class through active participation of students. Concept of square roots is delivered using division method,

- Analyze patterns of squares.
- Compute square roots.
- Solve questions

- Core skills  
Observational skills, Logical reasoning, Analytical skills,

$$1 = 1 = 1^2$$

$$1 + 3 = 4 = 2^2$$

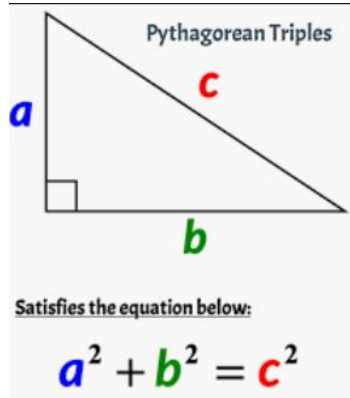
$$1 + 3 + 5 = 9 = 3^2$$

$$1 + 3 + 5 + 7 = 16 = 4^2$$

$$1 + 3 + 5 + 7 + 9 = 25 = 5^2$$

$$1 + 3 + 5 + 7 + \dots + n = n^2$$

prime factorization and the method of estimation.



on square roots.

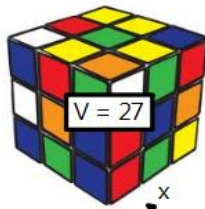
competency in competitive exams

- Art Integration Find out different pattern formation of squares. [Figure 1](#)
- Interdisciplinary linkage Physics, Biology

### 6. CUBES AND CUBE ROOTS

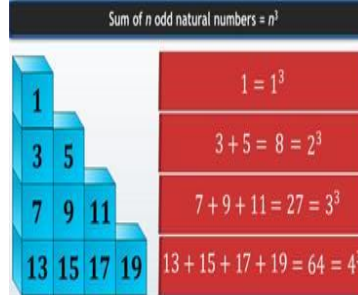
- Properties of cube numbers
- Patterns
- Finding Cube roots

$$\sqrt[3]{27} =$$



Find Me!

The concept of finding cube roots is delivered using prime factorization. Primarily problem solving is used for transaction of the concepts.



- Compute cube roots.
- Solve questions related to cubes.
- Analyze patterns of cubes and cube roots.

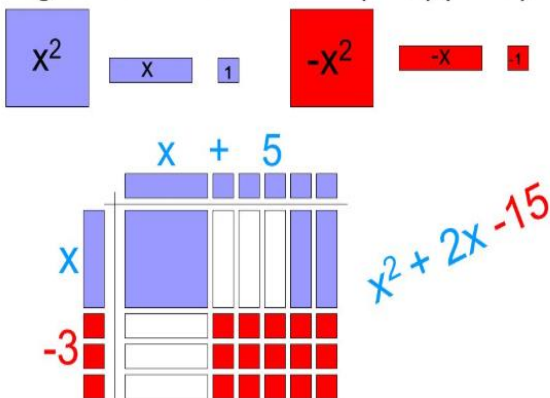
- Core skills Observational skills, Logical reasoning, Analytical skills
- Art Integration Find out different pattern formation of cubes. [Figure 2](#)
- Interdisciplinary linkage Science

### 7. ALGEBRAIC EXPRESSIONS AND IDENTITIES

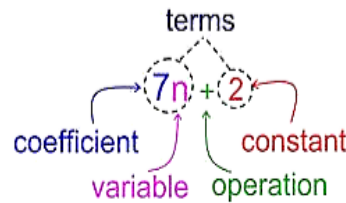
- Definitions
- Addition, subtraction and multiplication of algebraic expressions

#### Algebra Tiles

$$(x-3)(x+5)$$



Pre-requisite knowledge is used to identify different types of polynomials. Inductive method is used to multiply different polynomials. Deductive method is used to deduce the standard identities.



- Define terms, factors, coefficients and degree of a polynomial.
- Identify types of polynomials.
- Multiply different kind of polynomials.
- Solve problems on identities.

- Core skills Problem solving, Analytical skills
- Art Integration Represent the standard identities using diagrams. [Figure 3](#)
- Interdisciplinary linkage Science

8. EXPONENTS AND POWERS

- Positive and negative exponents
- Laws of exponents

**RULES OF EXPONENT !**

First Rule:  $a^m \times a^n = a^{m+n}$

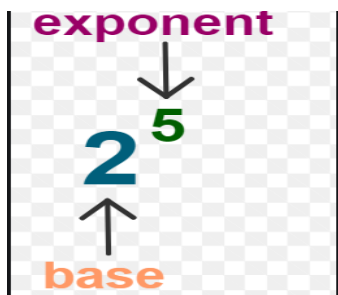
Second Rule:  $a^m \div a^n = a^{m-n}$

Third Rule:  $(a^m)^n = a^{mn}$

Fourth Rule:  $a^m \times b^m = (ab)^m$

Fifth Rule:  $a^m \div b^m = \left(\frac{a}{b}\right)^m$

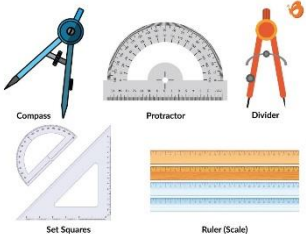
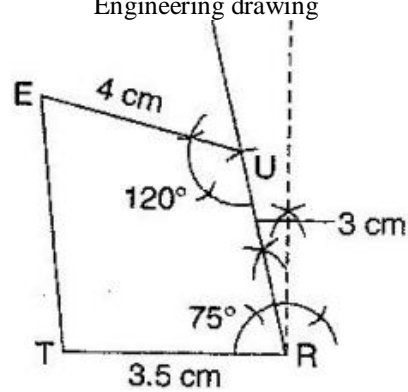
Inductive method is used to transact the concept of exponents and power.



- Classify positive and negative exponents.
- Evaluate the value of the number given in exponential form.
- Solve questions using laws of exponents.
- Recall laws of exponents.

- Core skills  
Logical reasoning, Analytical skills
- Art Integration  
Memorize the laws of exponents in musical method
- Interdisciplinary linkage  
Science, Astronomy, music

**OCTOBER TO MARCH**

CHAPTER	TRANSACTION STRATEGY/ INNOVATIVE PEDAGOGY	LEARNING OUTCOME	CORE SKILLS/ ART INTEGRATION/ INTERDISCIPLINARU LINKAGE
<p>1. PRACTICAL GEOMETRY</p> <ul style="list-style-type: none"> <li>○ Construction of quadrilateral when 5 measures are given</li> <li>○ Construction of special quadrilaterals</li> </ul>	<p>Geometrical instruments are used to draw the constructions. The students learn to construct by hands on experience.</p> 	<p>Students will be able to:</p> <ul style="list-style-type: none"> <li>• Construct a quadrilateral when lengths of four sides and a diagonal are given.</li> <li>• Construct a quadrilateral when its two diagonals and three sides are given.</li> <li>• Construct a quadrilateral when two adjacent sides and three angles are given.</li> <li>• Construct a quadrilateral when three sides and two included angles are given.</li> </ul>	<ul style="list-style-type: none"> <li>• Core skills Focus, Concentration, Decision making</li> <li>• Art Integration</li> <li>• Construct quadrilateral using given data and properties of quadrilateral and design the interior part by art of Sikkim. Interdisciplinary linkage Engineering drawing</li> </ul> 
<p>2. COMPARING QUANTITIES</p> <ul style="list-style-type: none"> <li>○ Ratios and percentage</li> <li>○ Increase and decrease per cent</li> </ul>	<p>Objects are used to analyze the concepts of profit and loss. Concepts of simple interest and compound interest are delivered by</p>	<ul style="list-style-type: none"> <li>• Define discount.</li> <li>• Recall how to calculate loss and profit percentage.</li> <li>• Calculate Simple</li> </ul>	<ul style="list-style-type: none"> <li>• Core skills Problem solving, Analytical skills</li> <li>• Art Integration</li> <li>• Visit to bank and observe the</li> </ul>

- Simple interest
- Compound interest

**COMPOUND INTEREST:**

$$A = P \left( 1 + \frac{r}{100} \right)^n$$

where :

- A = total amount after n years
- P = principal or original value
- r = rate of interest per annum
- n = number of years the money is invested

problem solving method.

$$I = Prt$$

**I = Interest**  
**P = Principal**  
**r = rate**  
**t = time**

Interest.

- Calculate Compound Interest.







different savings and loan facilities and interest calculations on them

- Interdisciplinary linkage Statistics, Insurance, Actuarial Science

**3. VISUALIZING SOLID SHAPES**

- View of 3D shapes
- Mapping
- Faces, edges and vertices

**3D SHAPES**

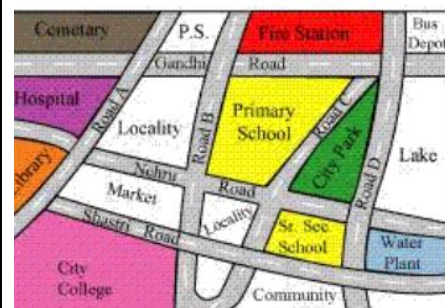
 <p><b>sphere</b> 0 faces 0 vertices 0 edges</p>	 <p><b>cone</b> 1 faces 1 vertex 0 edges</p>
 <p><b>cylinder</b> 2 faces 0 vertices 0 edges</p>	 <p><b>pyramid</b> 5 faces 5 vertices 8 edges</p>
 <p><b>cube</b> 6 faces 8 vertices 12 edges</p>	 <p><b>rectangular prism</b> 6 faces 8 vertices 12 edges</p>

Objects are shown to make the students visualize the concepts of faces, edges and vertices. Maps are shown in order to understand the difference between a picture and a map.

Students were asked to observe and note the different shapes in their homes and surroundings and differentiate between them.

- Recognize 2D and 3D objects
- Differentiate between map and a picture
- Establish relationship between faces, edges and vertices

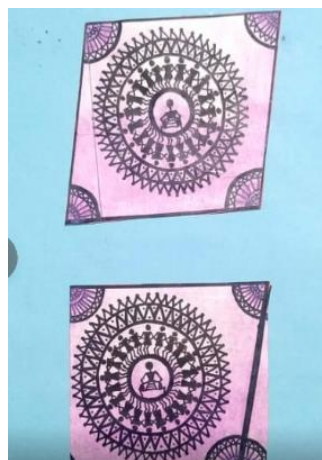
- Core skills Visualization, Analytical skills
- Art Integration Draw a net of a 3D figure of cube, cuboid and cylinder.
- Interdisciplinary linkage Building construction



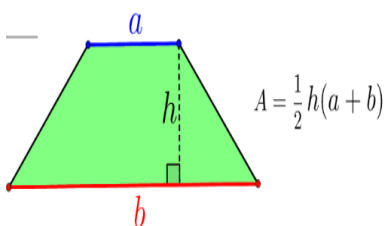
**4. MENSURATION**

- Area of combination of shapes
- Area of trapezium
- Area of special quadrilaterals
- Area of polygon
- Surface area of solid shapes
- Volume of solid shapes

Concept of surface area and volume is delivered using models of different solids.



**Art Integration with Sikkim**



- Find area of a trapezium and a rhombus.
- Find surface area of solids.
- Find volume of solids.
- Establish relationship between the different units of area.
- Establish relationship between the different units of volume.

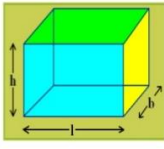
- Core skills Analytical skills, Logical reasoning, Problem solving
- Art Integration Using the net of cube, cuboid and cylinder, make a solid figure and calculate their volume and surface area.
- Interdisciplinary linkage Science and drawing

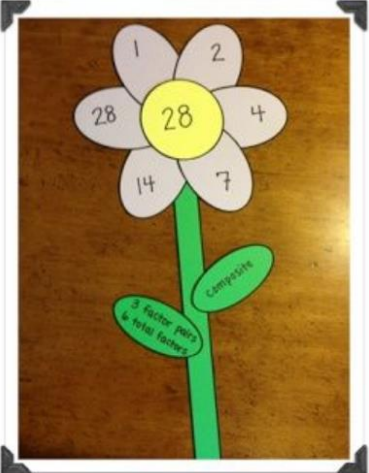
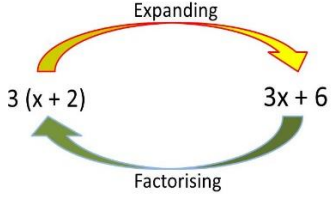
**CUBE**

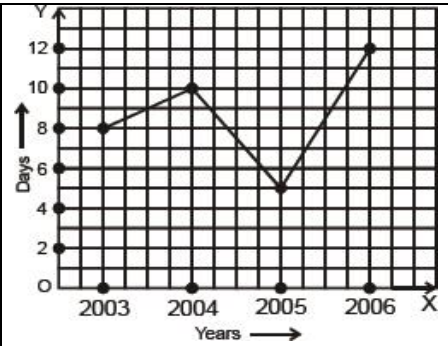
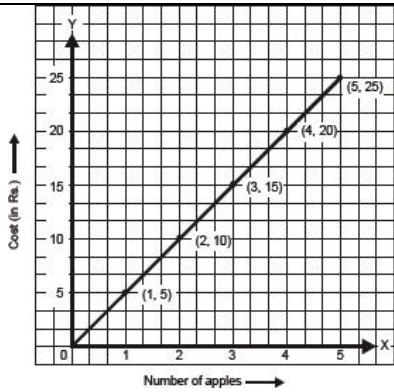
LATERAL Surface Area –  $4a^2$

Total Surface Area –  $6a^2$

Volume –  $a^3$



<p>5. DIRECT AND INVERSE PROPORTIONS</p> <ul style="list-style-type: none"> <li>○ Direct proportion</li> <li>○ Indirect/ inverse proportion</li> </ul> <p>More men ? -----&gt; Less days to complete the work</p> <p>More speed ? -----&gt; Less time to cover the distance</p> <p>More vehicles on the road ? ----&gt; Less road space</p> <p>Less time per day ? -----&gt; More days to complete the work</p>	<p>The concept is delivered using actions of how quantities are directly or indirectly proportional.</p>	<ul style="list-style-type: none"> <li>• Analyze which quantities are in direct proportion.</li> <li>• Analyze which quantities are in indirect proportion.</li> </ul>	<ul style="list-style-type: none"> <li>• Core skills Logical reasoning, observational skills, Decision making</li> <li>• Art Integration List down the proportion of ingredients used to make your favorite dish.</li> <li>• Interdisciplinary linkage Home Science</li> </ul> <p>You buy more pens ? -----&gt; Costs you more</p> <p>Number of students are more ? -----&gt; More number of teachers</p> <p>You travel less distance ? -----&gt; Time taken is less</p> <p>Number of books are reduced ? -----&gt; Weight of bag is less</p>
<p>6. FACTORISATION</p> <ul style="list-style-type: none"> <li>○ Definitions</li> <li>○ Factorization using different methods</li> <li>○ Division of polynomials</li> </ul> 	<p>The concept of factorization is delivered by comparing factors of whole numbers and expressions. By problem solving method factors are found using regrouping, identities and division of algebraic expressions.</p>	<ul style="list-style-type: none"> <li>• Find factors of the given algebraic expressions using method of common factors.</li> <li>• List out factors of the given algebraic expressions using method of regrouping.</li> <li>• Find factors of the given algebraic expressions using identities.</li> <li>• Compute division of algebraic expressions.</li> </ul>	<ul style="list-style-type: none"> <li>• Core skills Problem solving, Logical thinking, Critical thinking</li> <li>• Art Integration Identify 5 Flowers and write down its components. (This can be correlated with factorization of algebraic expressions)</li> <li>• Interdisciplinary linkage Biology, Chemistry</li> </ul> <p>Factorising is the reverse procedure of expanding.</p> 
<p>7. INTRODUCTION TO GRAPHS</p> <ul style="list-style-type: none"> <li>○ Line graph</li> <li>○ Linear graphs</li> <li>○ Applications of graph</li> <li>○ Coordinate axis</li> <li>○ Cartesian plane</li> </ul>	<p>Graph sheets are used to deliver the concepts of analysis of given data.</p>	<ul style="list-style-type: none"> <li>• Represent data in a bar graph.</li> <li>• Analyze data of a pie graph.</li> <li>• Draw a histogram.</li> <li>• Analyze the information of a line graph.</li> </ul>	<ul style="list-style-type: none"> <li>• Core skills Accuracy, Focus, Interpretational skills</li> <li>• Art Integration Pick up any situation which involves two variables which are in direct variation and plot graph of it.</li> <li>• Interdisciplinary linkage Statistics, Drawing, Dramatics</li> </ul>



### 8. PLAYING WITH NUMBERS

- General form of numbers
- Divisibility tests

#### Divisibility Rules

$\div 2$ The last digit is even (0,2,4,6,8)	$\div 3$ The sum of the digits is divisible by 3	$\div 4$ The last 2 digits are divisible by 4
$\div 5$ The last digit is 0 or 5	$\div 6$ The number is divisible by 2 and 3	$\div 7$ If you double the last digit and subtract it from the rest of the number and the answer is 0 or divisible by 7
$\div 8$ The last three digits are divisible by 8	$\div 9$ The sum of the digits is divisible by 9	$\div 10$ The number ends in 0

Pre-requisite knowledge is used to solve the questions and understand the concepts.

- Recall general form of representing numbers
- Apply divisibility test for the numbers 2, 3, 5, 9 and 10

- Core skills  
Observational skills, Analytical skills
- Art Integration  
Play a game on the multiples of a given number by clapping for each multiple rather than speaking it out loud.  
Create a magic square
- Interdisciplinary linkage  
Physical education

$3A$	$1A$	$AB$
$+25$	$XA$	$+37$
$\hline B2$	$\hline 9A$	$\hline 6A$

playing with numbers

Figure 1

$$3^2 = 9 = 4 + 5$$

$$5^2 = 25 = 12 + 13$$

$$7^2 = 49 = 24 + 25$$

$$9^2 = 81 = 40 + 41$$

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Figure 2

$$4 = 2 \times 2 \quad 4^3 = 64 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 2^3 \times 2^3$$

$$6 = 2 \times 3 \quad 6^3 = 216 = 2 \times 2 \times 2 \times 3 \times 3 \times 3 = 2^3 \times 3^3$$

$$15 = 3 \times 5 \quad 15^3 = 3375 = 3 \times 3 \times 3 \times 5 \times 5 \times 5 = 3^3 \times 5^3$$

$$12 = 2 \times 2 \times 3 \quad 12^3 = 1728 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3 = 2^3 \times 2^3 \times 3^3$$

Figure 3



