

# **Numerical Aptitude and Reasoning Ability tests in Competitive Exams**

**PART-1**

by

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## **The difference between Aptitude and Abilities:**

- Dictionary defines Aptitude as an innate, acquired or learned or developed component of a competency to do a certain kind of work at a certain level.
- Aptitude could be the potential, which has as yet not been tapped and trained to a skill level.

- Whereas ability as the word describes is, it is present here and now in the individual.
- Basically what an aptitude test can reveal is the persons mental abilities.
- Each type of intelligence denotes a person's aptitude in that area and so it makes sense to choose a career which requires more of that particular type of aptitude.
- For example a person with Linguistic intelligence has a natural aptitude for words.

- He/she would be able to write and/ or speak well because of his/her natural command over language.
- Professions like Teaching, Journalism, Novelists, Speakers, Technical Writers, Jockeys, require people with high levels of Linguistic intelligence or Aptitude.

Here the words Intelligence and Aptitude are used interchangeably.

## Basics :

- Ability comes from the term ‘able’ which relates to the expertise that you already possess.
- Aptitudes should not be confused with abilities. Present skills and capabilities are not aptitudes.
- Aptitudes are about ‘potential’, which is not necessarily realized at the present time.
- It is like a natural intelligence.

- Many tests show a mixture of both ability and aptitude – an ability to understand what the test requires and an aptitude to perform at something for which a person may not as yet have any prior experience.
- Humans acquire the potential to excel in a specific area of work, which denotes the aptitude of that person.
- The noun ‘**aptitude**’ is widely used by companies in the organization of their tests to

measure the potential of an individual;  
however, the dictionary meaning of this term  
is the **competence of the talent or skills  
acquired over a period of time.**

- **Ability is the capability and talent that an individual  
already possesses.**

## **Main Differences Between Aptitudes vs Abilities**

Basis of Comparison	Aptitude	Ability
Definition	Potential, that can be further improved	Already possess the maximum knowledge, skills to do the job
Enhancement	Can be enhanced via training, practice.	Can be improved; however, not as much as aptitude.
Measurement	Can be measured	Cannot be measured
Sense	It is used with regard to talent	It is used with regard to expertise
Application	Practical application	Natural as well as practical application



## **Logical:**

People who are high on this intelligence are capable of understanding concepts, analyze and solve problems, are good at sequential thinking and working with mathematical problems.

This aptitude is required in most careers but more so in careers which require conceptual thinking and involve scientific work like Technical jobs, Scientific research study, Mathematicians.

## **Interpersonal:**

A person with high Interpersonal Intelligence is very good at interpersonal relationships, they can make friends easily, they have this ability to reach out to people and establish rapport and connect to people easily.

Most successful businessmen who are able to build a good customer base or enrol the support of other people are examples of this type of intelligence. So are politicians.

## **Intrapersonal:**

A person high on this intelligence is very high on self awareness. They are in touch with their strengths and weaknesses, what they can do, what they cant do, how they react to things, where to go for help.

This intelligence again is important for most professions but in certain professions where you are helping people like psychology it becomes invaluable to help others help themselves

Generally it is the person with high Logical Aptitude and Verbal aptitude who is able to well academically.

It is very important that a persons aptitude is in alignment with the requirements of his career.

Because this is one of the factors which very strongly determine a persons ability to perform on a job.

Our experience, as well as the research literature, shows that **numerical reasoning skills can be quickly and significantly improved with the right training or preparation.**

Office Assistant:

The Paper has five sections-

**Numerical Ability, Reasoning Ability, English/Hindi Language, Computer Awareness and General Knowledge.**

## Officer Scale-I:

The Paper has five sections-

Quantitative Aptitude,

Reasoning Ability,

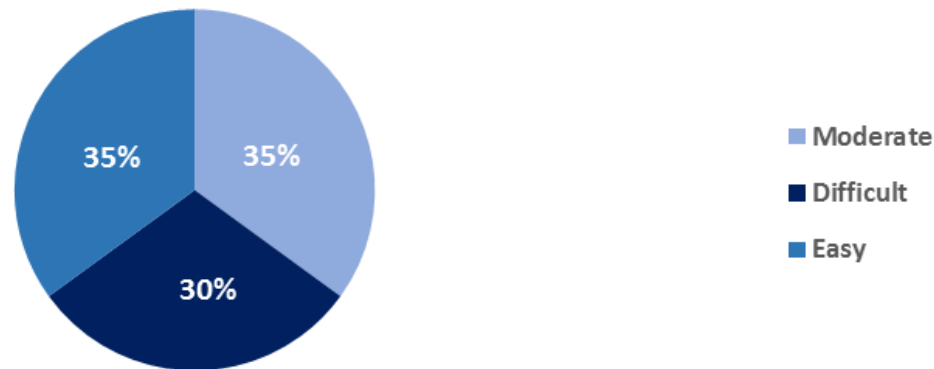
English/Hindi Language,

Computer Awareness and General Knowledge.

## Given below is IBPS RRB subject wise paper analysis:

Section	Total Number of MCQs	Maximum Marks	Difficulty Level	Positive Attempts	Time Consumed
Reasoning	40 Questions	50 Marks	Moderate	28-35	35 minutes
Quantitative Aptitude	40 Questions	50 Marks	Difficult	25-30	40 minutes
General Awareness	40 Questions	40 Marks	Moderate	26-31	10 minutes
English/Hindi Language	40 Questions	40 Marks	Easy	25-30	25 minutes
Computer Knowledge	40 Questions	20 Marks	Easy	31-37	10 minutes
<b>Total</b>	<b>200 Questions</b>	<b>200 Marks</b>	<b>Moderate</b>	<b>135-155</b>	<b>120 minutes</b>

Level of Difficulty



## **Section 1: Reasoning**

The reasoning section in IBPS RRB 2019 had a bit of high level questions.

There were a total of 40 questions asked in reasoning section.

The questions framed through this topic were usually about blood relations, verbal reasoning, mathematical operations, odd one out, alphabet test, classification, syllogism, causes and effects, coding-decoding, analysis, decision



making, sitting arrangements, statement and conclusion, word formation, puzzle, assertion and reasoning, series.

Candidates found that this section needs thorough preparation particularly with the sitting arrangement/puzzles questions.

It is advised not to spend too much time on one single question and move ahead to next one.

**Students roughly took 35-40 minutes to solve 40 questions of the reasoning section.**

Topic	Number of Questions
Syllogisms	05 Questions
Seating Arrangement	05 Questions
Inequality	05 Questions
Floor Puzzle	05 Questions
Linear Arrangement (Parallel)	05 Questions
Blood Relations	03 Questions
Numerical Series	02 Questions
Miscellaneous: Coding-Decoding, Direction Sense	10 Questions

# Syllabus for Reasoning Ability:

Reasoning Topics	Reasoning Topics	Reasoning Topics
Seating Arrangement	Input-Output	Assertion and reason
Logical Reasoning	Alphanumeric Series	Figure Series
Tabulation Puzzles	Ranking	Word Formation
Coding-Decoding	Direction	Statement and Conclusion
Inequalities	Alphabet Test	Statement and assumption
Blood Relations	Data Insufficiency	Statement and Argument
Syllogism	Analogy	Statement and action's courses
Decision making	Odd one out	Passage and conclusions
Venn Diagram	-	-

Allegation or Mixture, Average, Banker's Discount, Binomial Theorem, Boats and Streams, Calculus, Calendar,

Chain Rule, Clock, Complex Number and Quadratic Equations, Compound Interests, Coordinate Geometry, Decimal Fractions, Height and Distance, LCM and HCF, Linear Equations, Logarithm, Mensuration, Number System, Odd Man Out and Series, Partnership, Percentage, Permutations, Pipes and Cistern, Probability, Problems on Age, Problems on Trains, Profit and Loss, Progressions, Races and Games, Ratio and Proportion, Relations and Functions, Simple Interest, Simplification, Square and Cube Root, Stocks and Shares, Surds and Indices, Time and Work, Time, Work and Distance, Trigonometric, True Discount, Vector, Volume Surface Area and Perimeter.

## Numerical Ability Syllabus

Numerical Ability Topics	Numerical Ability Topics	Numerical Ability Topics
LCM and HCF	Ratios	Percentage
Factoring	Age	Profit and Loss
Missing Numbers	Average	Prices and Expenditure Problems
Simple and Compound Interest	Time and Work	Mensuration
Volume	Time and Distance	Fractions
Series Completion	--	--

## **Section 2: English Language**

Language test was of moderate to high level. Total 40 questions were asked that carried 40 marks.

Usually topics in this section were of comprehension passage, idioms and phrases, jumbled sentence, synonyms antonyms, fill in the blanks, spelling check, spot the error in a sentence and one word substitution.

Jumbled sentences were rather time-consuming and confusing for those who hadn't practiced much of them. So, it is advised to practice more for jumbled sentences.

One is advised not to spend much time reading comprehension passages rather to answer them by applying tricks.

<b>Topic</b>	<b>Number of Questions</b>
<b>Reading Comprehension (Based on a short story)</b>	<b>10 Questions</b>
<b>Sentence Correction</b>	<b>05 Questions</b>
<b>Para Jumble</b>	<b>05 Questions</b>
<b>Cloze Test</b>	<b>10 Questions</b>
<b>Fillers</b>	<b>05 Questions</b>
<b>Sentence Improvement</b>	<b>05 Questions</b>



# English Language Syllabus

English Language Topics	English Language Topics
<b>Cloze Test</b>	<b>Antonyms</b>
<b>Reading Comprehension</b>	<b>Multiple Meanings</b>
<b>Fill in the blanks</b>	<b>Error Spotting</b>
<b>Paragraph Completion</b>	<b>Double blanks in a sentence</b>
<b>Sentence Correction</b>	<b>Phrase substitution</b>
<b>Para Jumbles</b>	<b>Fill in the blanks with suitable words</b>
<b>Miscellaneous</b>	<b>Mistakes</b>
<b>Synonyms</b>	<b>Vocabulary</b>

## Section 3: Quantitative Aptitude

Quantitative Aptitude of IBPS Exam 2019 was considered to be of high-level difficulty.

This section had 40 questions.

Questions here were based on number system, Decimal Fractions, LCM-HCF, number series, Simple/Compound Interest, time, distance and speed, partnership, time and work, percentage, profit and loss, permutation and combination and data interpretation.

Such questions need fast calculation speed. And to achieve that speed one has to practice a lot.

Topic	Number of Questions
Series	05 Questions
Simplification	15 Questions
Data Interpretation	05 Questions
Miscellaneous: P&L, SI, CI, Speed and Distance, Mixture & Allegations, Age, Time and Work and Mensuration	15 Questions

## **Quantitative Aptitude syllabus**

<b>Quantitative Aptitude Topics</b>	<b>Quantitative Aptitude Topics</b>	<b>Quantitative Aptitude Topics</b>
<b>Data interpretation</b>	<b>Percentage</b>	<b>Simple and compound Interest</b>
<b>Permutations and combinations</b>	<b>Average</b>	<b>Sequence and Series</b>
<b>Probability</b>	<b>Profit and Loss</b>	<b>Bar Graphs</b>
<b>Sequence and series</b>	<b>Work and Time</b>	<b>Line Graphs</b>
<b>Simplification</b>	<b>Time and Distance</b>	<b>Mixed Graphs</b>
<b>Number System</b>	<b>Mixtures and Allegations</b>	<b>Case Study</b>
<b>Ration and Proportion</b>	<b>Surds and Indices</b>	<b>Pie Charts</b>

## **Section 4: General Awareness**

One can score really well in General Awareness section, with a condition that you are well aware of the current affairs.

One who is not having ample knowledge of what is going on around the world finds this section very difficult to attempt.

This was the section that has the ability to get you past the barrier of cut-off.

To ace in this section, all you need is to have a good knowledge of current affairs of the recent past.

Some questions are also based on Static GK as well.

So it is suggested to all the students to go through the current affairs very well and try to remember the facts.

## **General Awareness Syllabus**

<b>General Awareness Topics</b>	<b>General Awareness Topics</b>	<b>General Awareness Topics</b>
<b>Current affairs (Last 6 months)</b>	<b>Roles of RBI</b>	<b>Micro Finance</b>
<b>Banking Awareness</b>	<b>Budget Basics</b>	<b>Base Rate</b>
<b>Indian Financial System</b>	<b>Current Union Budget</b>	<b>Negotiable Instruments</b>
<b>History and structure of Indian Banking</b>	<b>International Organizations</b>	<b>Credit Rating Agencies</b>
<b>Indian Economy</b>	<b>Financial Institutions</b>	<b>Teaser Rates and Current Bank Rates</b>
<b>Regulatory Bodies</b>	<b>Indian Constitution</b>	<b>GAAR and UNO</b>
<b>RBI, SEBI, IRDA, PFRDA, FSDC, FMC</b>	<b>Government Schemes</b>	<b>Important Dates and Abbreviation</b>
<b>History of RBI</b>	<b>Monetary and Credit policies</b>	<b>Marketing</b>
<b>Functions of RBI</b>	<b>Concepts like BASEL</b>	<b>Awards and Honors Sports</b>

## **Section 5: Computer Knowledge**

The computer section remains to be the easiest one and students always manage to perform well in this section of RRB exam.

This section had a total 40 questions for 20 marks.

30 to 35 questions were of very easy level and a candidate could easily attempt all of them without taking much time.



A few questions were bit tricky but could be guessed if one has the knowledge of basics of computer.

This section basically tests the basic knowledge of computer operating system, MS Office, software and hardware, basic knowledge of Internet and networking system.

This section is pretty scoring that comes without much of a practice.

# Computer Knowledge Syllabus

<b>Computer Knowledge Topics</b>	<b>Computer Knowledge Topics</b>	<b>Computer Knowledge Topics</b>
<b>Concept of Internet</b>	<b>Communication (Basic Intro)</b>	<b>MS Windows and MS Office</b>
<b>History of Computers</b>	<b>Operating System</b>	<b>Networking</b>
<b>Database Management System</b>	<b>Security Tools</b>	<b>LAN and WAN</b>
<b>Hardware</b>	<b>Viruses</b>	<b>Shortcuts</b>
<b>History and working of Internet</b>	<b>Hackers</b>	<b>Computer Abbreviations</b>
<b>Applications</b>	<b>Number System</b>	

## Unit Digit:

Units digit is the rightmost digit of the number.

For example, the units digit of 243 is 3, the units digit of 39 is 9.

## Divisibility

1. **Divisibility by 2** - A number is divisible by 2 if its unit digit is 0,2,4,6 or 8.

**Example: 64578 is divisible by 2 or not?**

Solution: Step 1 - Unit digit is 8.

Result - 64578 is divisible by 2.

**Example: 64575 is divisible by 2 or not?**

Solution: Step 1 - Unit digit is 5.

Result - 64575 is not divisible by 2.

2. **Divisibility by 3** - A number is divisible by 3 if sum of its digits is completely divisible by 3.

**Example: 64578 is divisible by 3 or not?**

Solution:

Step 1 - Sum of its digits is  $6 + 4 + 5 + 7 + 8 = 30$

which is divisible by 3.

Result - 64578 is divisible by 3.

**Example: 64576 is divisible by 3 or not?**

Solution:

Step 1 - Sum of its digits is  $6 + 4 + 5 + 7 + 6 = 28$

which is not divisible by 3.

Result - 64576 is not divisible by 3.

3. **Divisibility by 4** - A number is divisible by 4 if number formed using its last two digits is completely divisible by 4.

**Example: 64578 is divisible by 4 or not?**

Solution:

Step 1 - number formed using its last two digits is 78 which is not divisible by 4.

Result - 64578 is not divisible by 4.

**Example: 64580 is divisible by 4 or not?**

Solution:

Step 1 - number formed using its last two digits is 80 which is divisible by 4.

Result - 64580 is divisible by 4.

4. **Divisibility by 5** - A number is divisible by 5 if its unit digit is 0 or 5.

**Example: 64578 is divisible by 5 or not?**

Solution:

Step 1 - Unit digit is 8.

Result - 64578 is not divisible by 5.

**Example: 64575 is divisible by 5 or not?**

Solution:

Step 1 - Unit digit is 5.

Result - 64575 is divisible by 5.

5. **Divisibility by 6** - A number is divisible by 6 if the number is divisible by both 2 and 3.

Example: 64578 is divisible by 6 or not?

**Solution:**

**Step 1 - Unit digit is 8. Number is divisible by 2.**

Step 2 - Sum of its digits is  $6 + 4 + 5 + 7 + 8 = 30$  which is divisible by 3.

Result - 64578 is divisible by 6.

**Example: 64576 is divisible by 6 or not?**

Solution: Step 1 - Unit digit is 6. Number is divisible by 2.

Step 2 - Sum of its digits is  $6 + 4 + 5 + 7 + 6 = 28$  which is not divisible by 3.

Result - 64576 is not divisible by 6.

6. **Divisibility by 8** - A number is divisible by 8 if number formed using its last three digits is completely divisible by 8.

Example: 64578 is divisible by 8 or not?

Solution:

Step 1 - number formed using its last three digits is 578 which is not divisible by 8.

Result - 64578 is not divisible by 8.

Example: 64576 is divisible by 8 or not?

Solution:

Step 1 - number formed using its last three digits is 576 which is divisible by 8.

Result - 64576 is divisible by 8.



7. **Divisibility by 9** - A number is divisible by 9 if sum of its digits is completely divisible by 9.

Example: 64579 is divisible by 9 or not?

Solution:

Step 1 - Sum of its digits is  $6 + 4 + 5 + 7 + 9 = 31$

which is not divisible by 9.

Result - 64579 is not divisible by 9.

Example: 64575 is divisible by 9 or not?

Solution:

Step 1 - Sum of its digits is  $6 + 4 + 5 + 7 + 5 = 27$

which is divisible by 9.

Result - 64575 is divisible by 9.

8. **Divisibility by 10** - A number is divisible by 10 if its unit digit is 0.

Example: 64575 is divisible by 10 or not?

Solution:

Step 1 - Unit digit is 5.

Result - 64575 is not divisible by 10.

Example: 64570 is divisible by 10 or not?

Solution:

Step 1 - Unit digit is 0.

Result - 64570 is divisible by 10.

9. **Divisibility by 11** - A number is divisible by 11 if difference between sum of digits at odd places and sum of digits at even places is either 0 or is divisible by 11.

**Example: 64575 is divisible by 11 or not?**

Step 1 - difference between sum of digits at odd places and sum of digits at even places =  $(6+5+5) - (4+7) = 5$  which is not divisible by 11.

Result - 64575 is not divisible by 11.

**Example: 64075 is divisible by 11 or not?**

Step 1 - difference between sum of digits at odd places and sum of digits at even places =  $(6+0+5) - (4+7) = 0$ .

Result - 64075 is divisible by 11

## Arithmetic Mean

Airthmetic mean of two numbers a and b is:

$$\text{Arithmetic Mean} = (1/2)(a + b)$$

## Geometric Mean

Geometric mean of two numbers a and b is

$$\text{Geometric Mean} = \sqrt{ab}$$

## Decimal Fractions

Fractions having denominators in power of 10 are called decimal fractions.

$$1/10 = .1, 2/10 = .2, \dots$$

$$1/100 = .01, 2/100 = .02, \dots$$

$$1/1000 = .001, 2/1000 = .002, \dots$$

## Converting a decimal number into a fraction

In the denominator part, place 1 under decimal point and suffix with as many zeroes as is the total number of digits after decimal point.

Remove the decimal point and reduce the fraction to its lowest term.

$$.56 = 56/100 = 14/25$$

$$.0024 = 24/10000 = 3/1250$$

## Adding decimals

Place each number under each other in such a way that decimal points lies in same colum. Numbers so arranged can be added in usual way.

$$21.3 + .213 + 3.21 + .021 + 2.0031 = ?$$

21.3

.213

3.21

.021

2.0031

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26.7471

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## Subtracting decimals

Place each number under each other in such a way that decimal points lies in same colum.

Numbers so arranged can be subtracted in usual way.

$$\begin{array}{r} 23.004 \\ -16.5628 \\ \hline 6.4412 \\ \hline \end{array}$$

## Multiplying decimals

Multiply given numbers without considering decimal point. In product, mark the decimal point as many places of decimals as is the sum of number of decimal places in the given numbers.

$$2.3 \times 0.12 = ?$$

$$23 \times 12 = 276$$

$$\text{Sum of decimal places} = 1 + 2 = 3$$

$$\therefore 2.3 \times 0.12 = 0.276$$



## Dividing decimals by number

Divide given decimal number without considering decimal point. In quotient, mark the decimal point as many places of decimals as is the sum of number of decimal places in the given dividend.

$$0.63 / 9 = ?$$

$$63 / 9 = 7$$

Decimal places in dividend = 2

$$\therefore 0.63 / 9 = 0.07$$

## Dividing decimals by decimals

Multiply both dividend and divisor by such multiple of 10 so that divisor becomes a whole number.

Divide dividend without considering decimal point.

In quotient, mark the decimal point as many places of decimals as is the sum of number of decimal places in the given dividend.

$$0.00042 / 0.06 = ?$$

$$\begin{aligned} 0.00042 / 0.06 &= (0.00042 \times 100) / (0.06 \times 100) \\ &= 0.042 / 6 \end{aligned}$$

$$\text{Now } 42/6 = 7$$

Decimal places in dividend = 3

$$\therefore 0.00042 / 0.06 = 0.007$$

Q 1 - Which of the following is the fraction for 0.36?

<u>A - 9/25</u>	<u>B - 51/25</u>	<u>C - 3/400</u>	<u>D - 2081/250</u>
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**Answer - A**

**Explanation**

$$0.36 = 36/100 = 9/25$$

Q 2 - Which of the following is the fraction for 2.04?

<u>A - 9/25</u>	<u>B - 51/25</u>	<u>C - 3/400</u>	<u>D - 2081/250</u>
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**Answer - B**

**Explanation**

$$2.04 = 204/100 = 51/25$$

Q 3 - Which of the following is a fraction for .0075?

<u>A - 9/25</u>	<u>B - 51/25</u>	<u>C - 3/400</u>	<u>D - 2081/250</u>
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**Answer - C**

**Explanation**

$$.0075 = 75/10000 = 3/400$$

Q 4 - Which of the following is a fraction for 8.324?

<u>A - 9/25</u>	<u>B - 51/25</u>	<u>C - 3/400</u>	<u>D - 2081/250</u>
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**Answer - D**

**Explanation**

$$8.324 = 8324/1000 = 2081/250$$

Q 5 - What is fraction for 0.313131?

<u>A - 3/7</u>	<u>B - 4/9</u>	<u>C - 3/9</u>	<u>D - 31/99</u>
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**Answer - B**

**Explanation:**  $0.313131 = 31/99$

Q 6 - What is fraction for 0.5366666?

<u>A - 61/300</u>	<u>B - 69/550</u>	<u>C - 161/300</u>	<u>D - 8/45</u>
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**Answer - C**

**Explanation**

$$0.5366666 = (536 - 53)/900 = 483/900 = 161/300.$$

Q 7 - Find the value of  $(0.4442 + 0.6662 + 0.8882)$ .

<u>A - 0.147852</u>	B - 0.049284	<u>C - 1.9986</u>	<u>D - 1.4292</u>
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Answer : C

Explanation:  $0.4442 + 0.6662 + 0.8882 = 1.9986$

Q 8 - Which of the following fractions is greater than  $1/3$  and less than  $5/6$ .

<u>A - <math>4/3</math></u>	<u>B - <math>2/7</math></u>	<u>C - <math>3/2</math></u>	D - $2/3$
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Answer : D

Explanation

As  $1/3=0.33$ ,  $5/6=0.83$ ,  $4/3=1.33$ ,  $2/7=0.28$ ,  $3/2=1.5$  and  $2/3=0.67$

Clearly,  $0.67$  lies between  $0.83$  and  $0.33$ .

Q 9 :  $0.6 + .66 + .066 + 6.606 = ?$

<u>A - 6.744</u>	<u>B - 6.738</u>	C - 7.932	<u>D - 7.388</u>
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Answer : C

Explanation

0.6

0.66

0.066

6.606

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7.932

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Q 10 : What is fraction equivalent of 32%.

<u>A - 6/30</u>	<u>B - 8/25</u>	<u>C - 7/50</u>	<u>D - 11:10</u>
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**Answer - B**

**Explanation**

$$32\% = 32/100 = 8/25.$$

Q 11 - What is fraction equivalent of 160%.

<u>A - 8/5</u>	<u>B - 9/5</u>	<u>C - 6/7</u>	<u>D - 6/23</u>
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**Answer - A**

**Explanation**

$$160\% = 160/100 = 8/5$$



Q 12 - What is decimal equivalent of 18%.

<u>A - 0.0018</u>	<u>B - 0.18</u>	<u>C - 18</u>	<u>D - 0.018</u>
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**Answer - B**

**Explanation:**  $18\% = 18/100 = 0.18$

Q 13 - What is decimal equivalent of 5%.

<u>A - 0.0005</u>	<u>B - 0.005</u>	<u>C - 0.05</u>	<u>D - 0.5</u>
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**Answer - C**

**Explanation:**  $5\% = 5/100 = 0.05$

Q 14 - What is decimal equivalent of 0.06%.

<u>A - 0.6</u>	<u>B - 0.06</u>	<u>C - 0.006</u>	<u>D - 0.0006</u>
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**Answer - D**

**Explanation :**  $0.06\% = 0.06/100 = 0.0006$ .

Q 15 - What is  $3/4$  as per cent?

<u>A - 45</u>	<u>B - 55</u>	<u>C - 65</u>	<u>D - 75</u>
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**Answer - D**

**Explanation**

$$3/4 = (3/4 * 100)\% = 75\%$$

Q 16 - What per cent is 120 of 90?

<u>A - 400/3%</u>	<u>B - 400/6%</u>	<u>C - 200/3%</u>	<u>D - 200/6%</u>
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**Answer - A**

**Explanation**

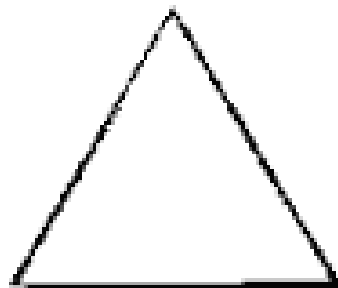
Required % =  $(120/90 * 100)$  % = 400 / 3 %

Q 17 - What percent is 5gm of 1kg?

<u>A - 0.15%</u>	<u>B - 0.05%</u>	<u>C - 0.25%</u>	<u>D - 0.35%</u>
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**Answer - B**

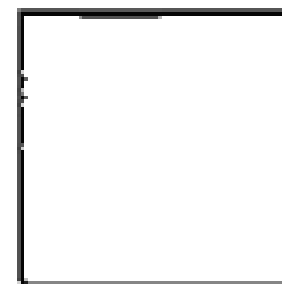
**Explanation:** Required % =  $(5/1000 * 100)$  % = 1/2%  
= 0.05%



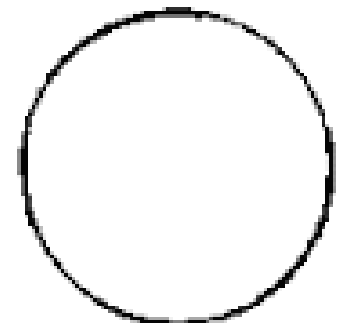
TRIANGLE



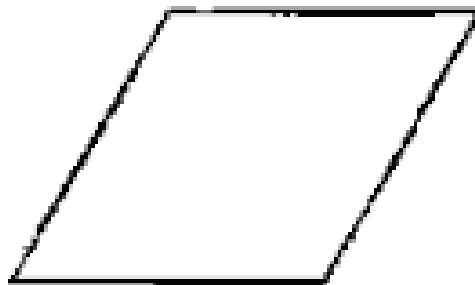
RECTANGLE



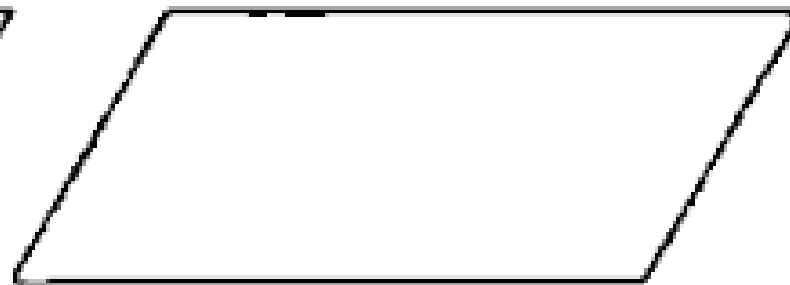
SQUARE



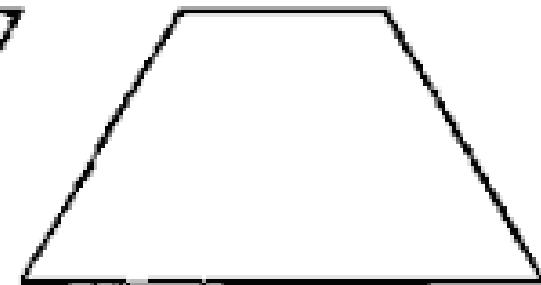
CIRCLE



RHOMBUS

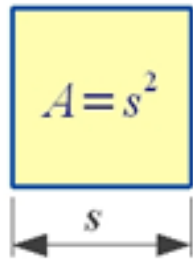


PARALLELOGRAM

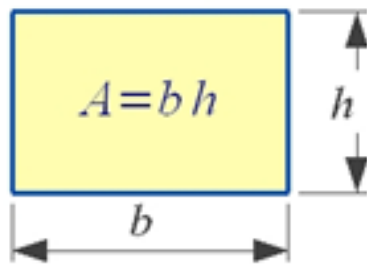


TRAPEZIUM

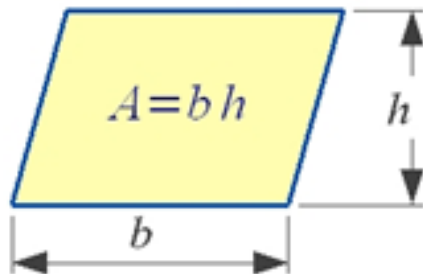
**Square**



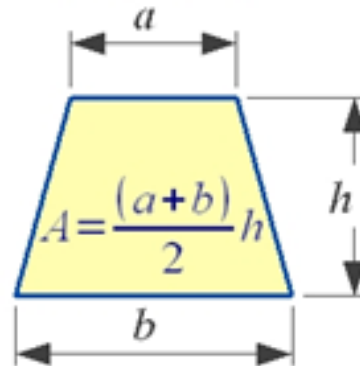
**Rectangle**



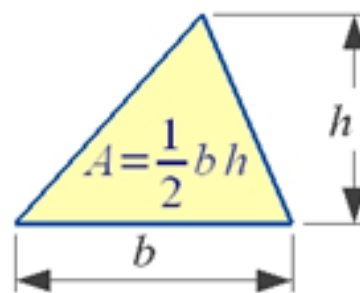
**Parallelogram**



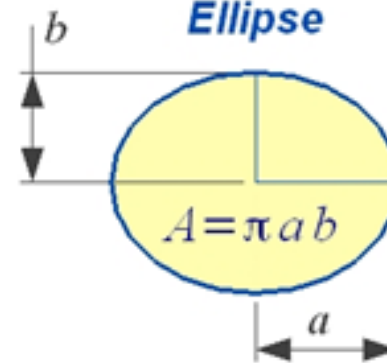
**Trapezoid**



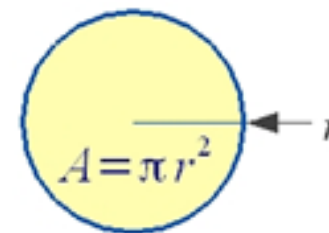
**Triangle**



**Ellipse**

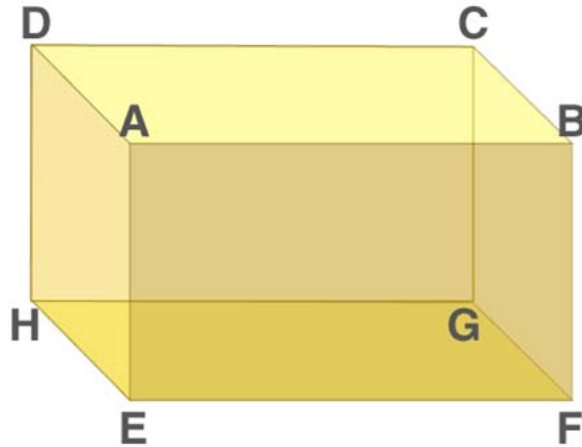


**Circle**



## Important Fact and Formulae

Following are important facts and formulae used in questions for volume calculations.

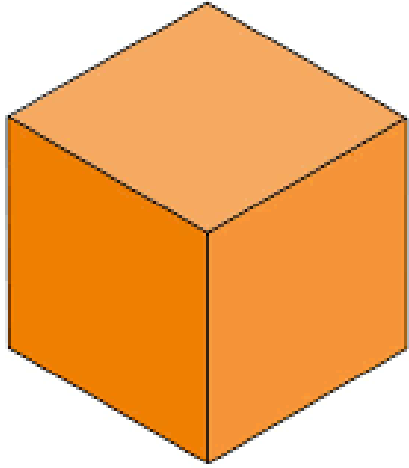


### Cuboid

Let Length=L, Breath =b and Height =h units. Then,

- . Volume =  $(L*b*h)$  cubic units.
- . Surface area= $2(Lb+bh+Lh)$  sq. units.
- . Diagonal = $\sqrt{(L^2+b^2+h^2)}$  units.

## Cube

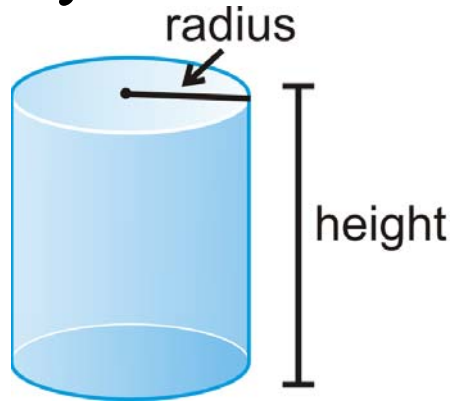


Let each edge of a cube be of length  $a$ .

Then,

- Volume =  $a^3$  cubic units.
- Surface area =  $6a^2$  sq. units.
- Diagonal =  $\sqrt{3}a$  units.

## Cylinder

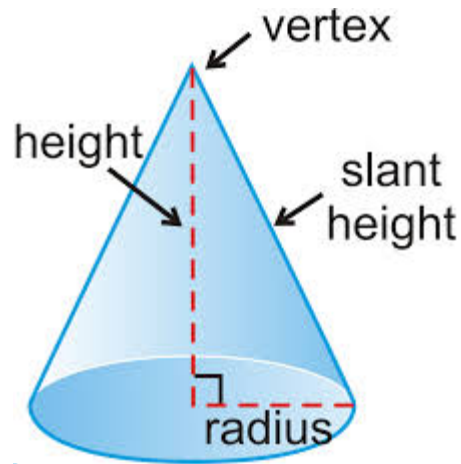


Let radius of base =  $r$  and Height (or length) =  $h$ . Then,

- Volume =  $(\pi r^2 h)$  cubic units.
- Curved surface area =  $(2\pi r h)$  sq. units.
- Total surface area =  $(2\pi r h + 2\pi r^2)$  sq. units. =  $2\pi r (h + r)$  sq. units.



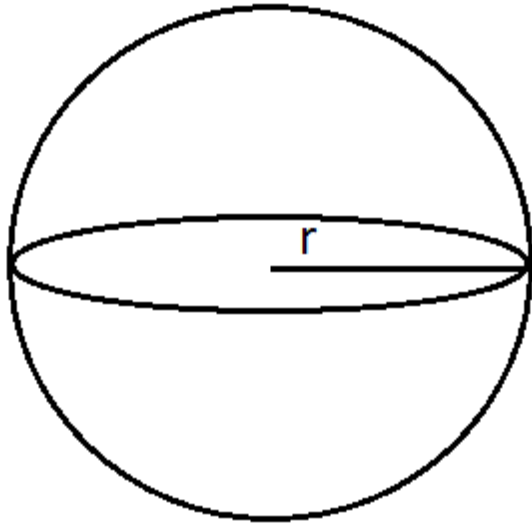
# Cone



Let radius of base= $r$  and Height (or length) =  $h$ . Then,

- Slant height= $\sqrt{h^2+r^2}$  units.
- Volume =  $(1/3 \pi r^2 h)$  cubic units.
- Curved surface area =  $(\pi r L)$  sq. units.
- Total surface area =  $(\pi r L + \pi r^2)$  sq. units.

# Sphere



Let the radius of the sphere be  $r$ . then,

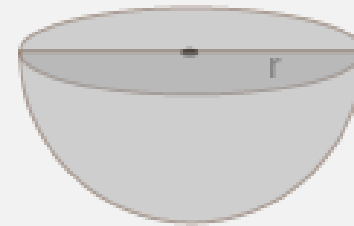
- Volume =  $(\frac{4}{3} \pi r^3)$  cubic units.
- Surface area =  $(4\pi r^2)$  Sq. unit.

## Hemisphere

$$\text{Volume } V = \frac{2}{3} \pi r^3$$

$$\text{Surface area } A = 2\pi r^2$$

$r$  → radius

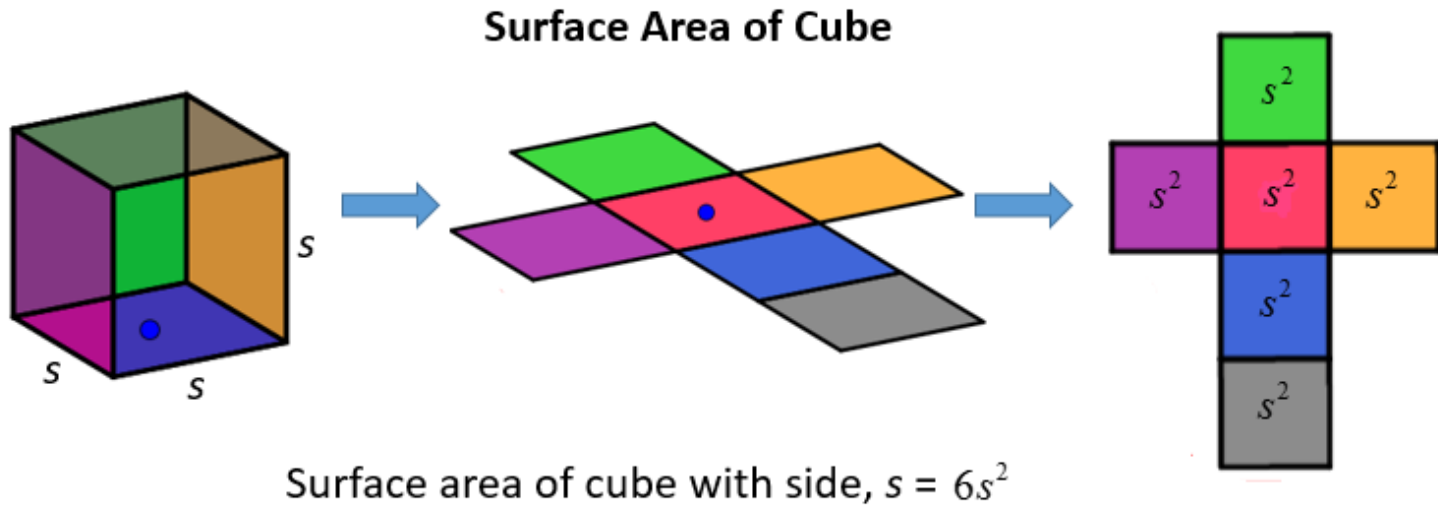


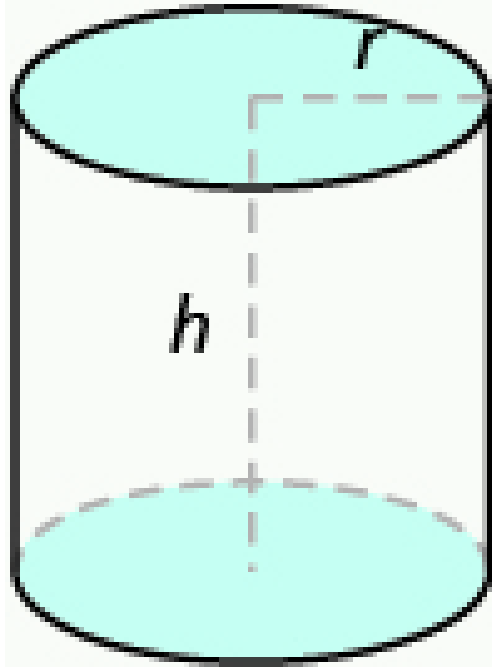
Hemisphere

Let the radius of the hemisphere be  $r$ . then,

- (i) Volume =  $(\frac{2}{3}\pi r^3)$  cubic units
- (ii) Curved surface area =  $(2\pi r^2)$  Sq. unit
- (ii) Total surface area =  $3\pi r^2$  sq. unit.

Note: **1 litre = 1000cm<sup>3</sup>**



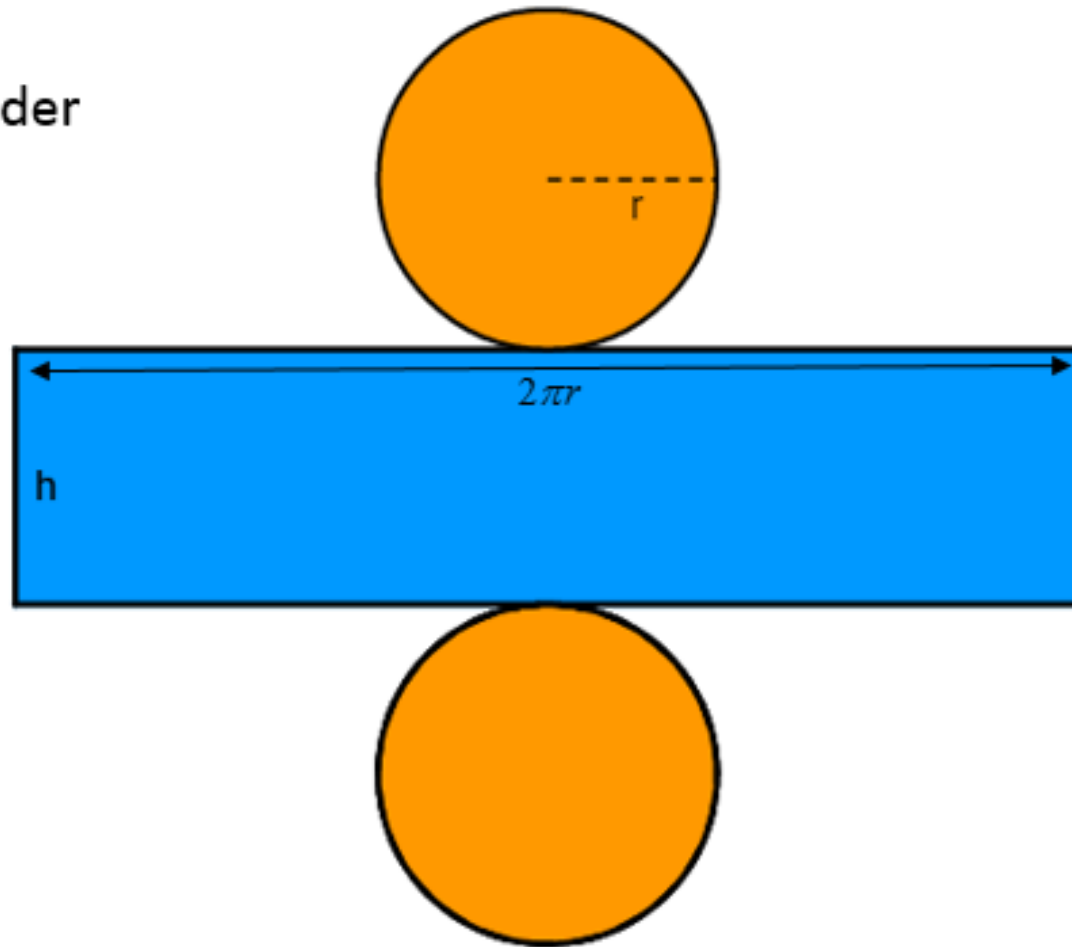
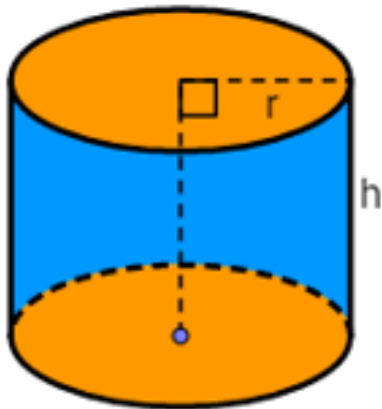


Volume:  $V = \pi r^2 h$  or  $V = Bh$

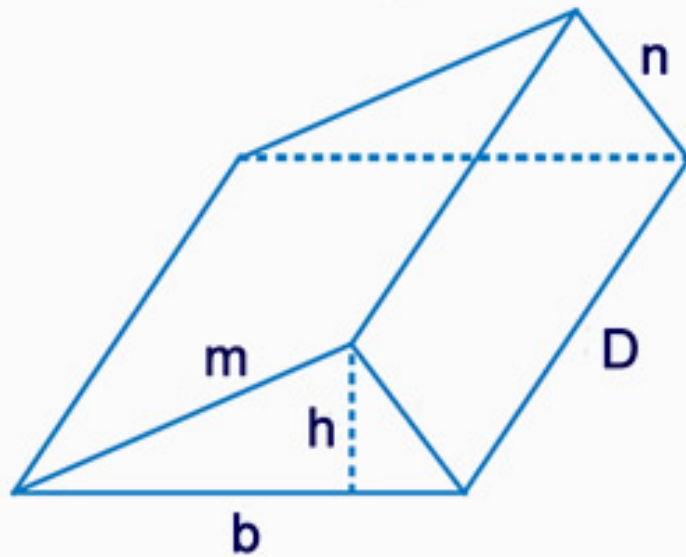
Surface Area:  $S = 2\pi r^2 + 2\pi rh$

Surface area of cylinder

$$= 2\pi r^2 + 2\pi rh$$



# Irregular Triangular Prism



For Triangular Prisms, the best general approach is to draw a “Net” of the Prism.

From the Net we can work out the Area of the Triangular Ends, and the three rectangles, and then add them all up.

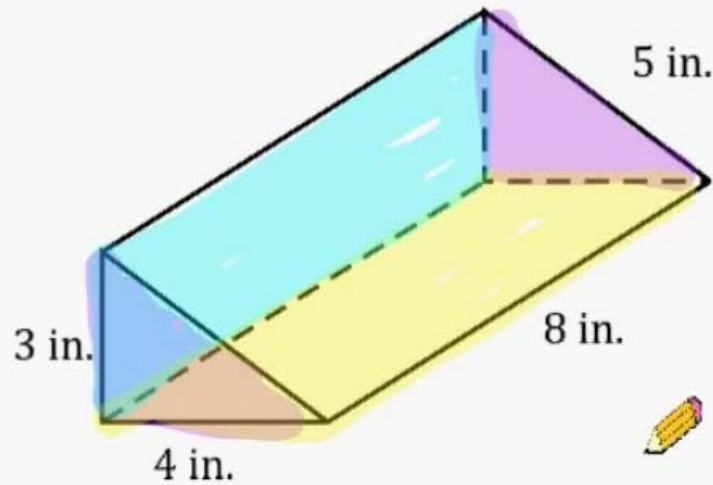
We could work out that the above Prism's Formula as :

$$TSA = 2 \times (b \times h) / 2 + (D \times b) + (D \times m) + (D \times n)$$

But it is probably easier to use a Net and the General Formula:

$$TSA = 2 \times \text{Triangle End} + \text{Bottom Rectangle} + \text{Left Rectangle} + \text{Right Rectangle.}$$

What is the surface area of the triangular prism?



$$\Delta \text{ one} = (4 \times 3) \div 2 = 6$$

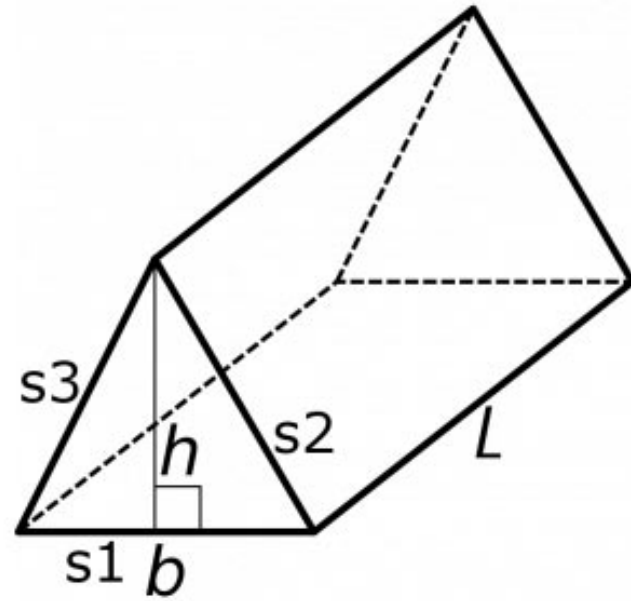
$$\Delta \text{ two} = (4 \times 3) \div 2 = 6$$

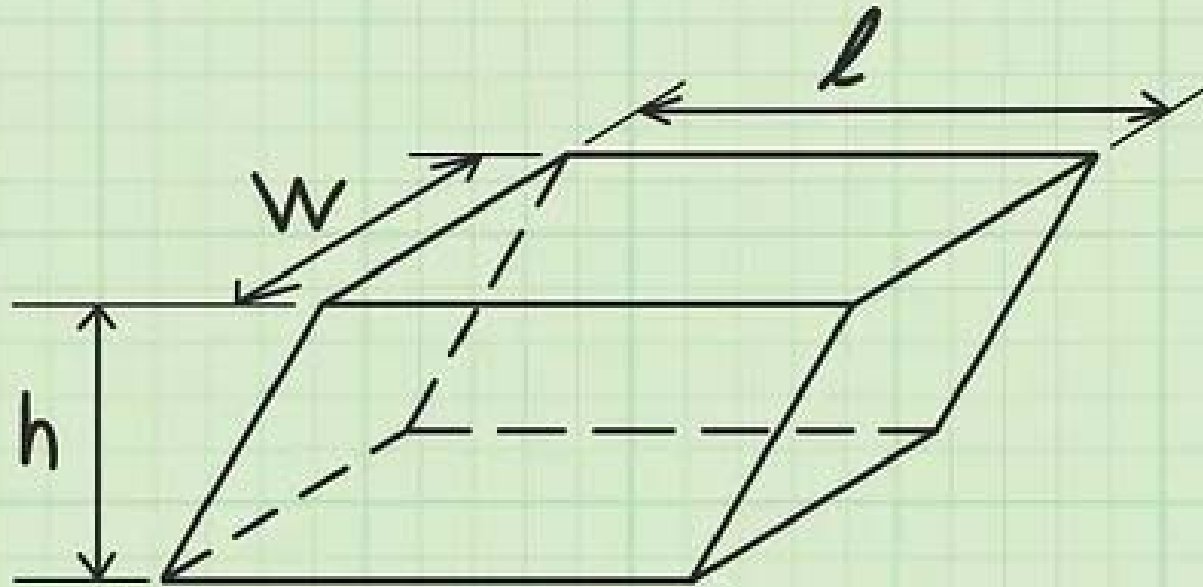
$$\square \text{ one} = 4 \times 8 = 32$$

$$\square \text{ two} = 3 \times 8 = 24$$



$$A = bh + L(s_1 + s_2 + s_3)$$





$$A = 2(lh + lw + hw)$$

# Surface Area

$$SA = LA + \text{area of the 2 bases}$$

The base is a parallelogram!

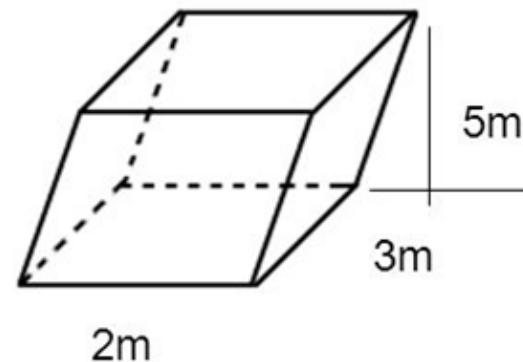
$$P = 5 + 5 + 3 + 3 = 16$$

$$h = 2$$

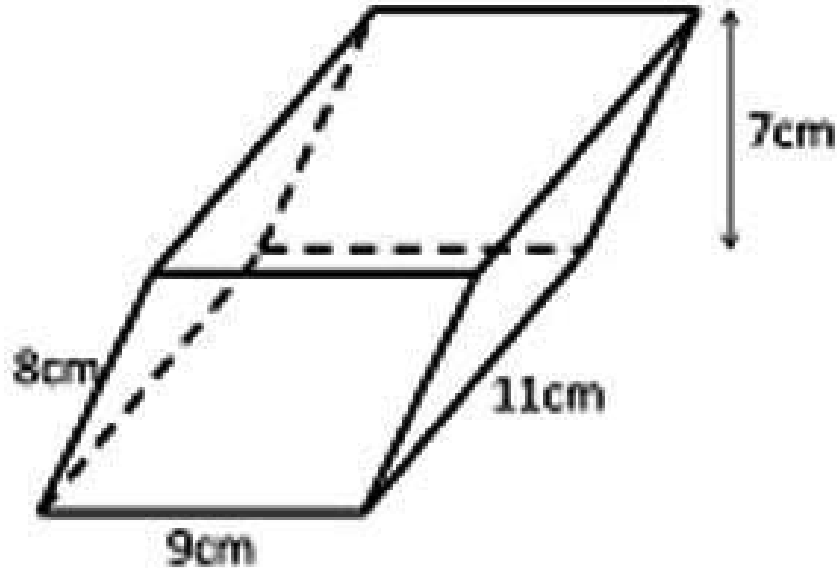
$$LA = Ph = 16(2) = 32 = LA$$

$$A = l \times w \text{ or } b \times h \quad A = (3)(5) = 15$$

$$SA = 32 + 15 + 15 = 62\text{m}^2$$



## Surface Area of Prisms



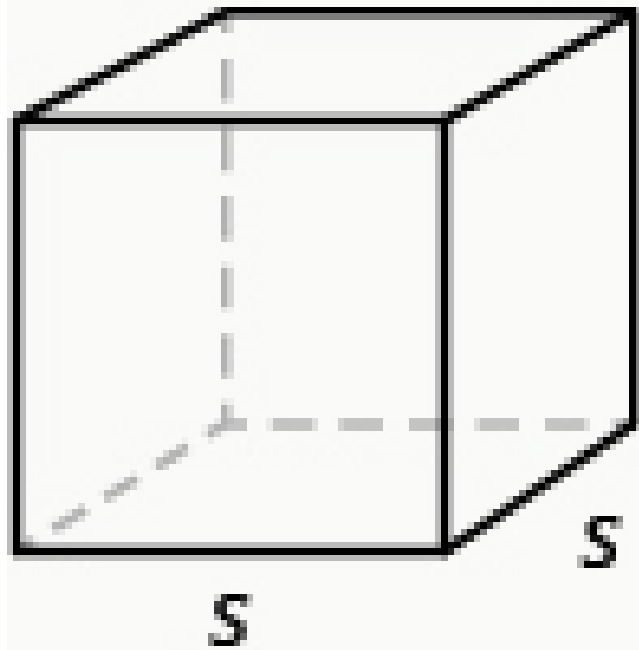
$$\begin{aligned}\text{Area of Parallelograms} \\ &= 9 \times 7 \\ &= 63\text{cm}^2\end{aligned}$$

$$\begin{aligned}\text{Area of Rectangles 1} \\ &= 11 \times 9 \\ &= 99\text{cm}^2 \\ 99 \times 2 \\ &= 198\text{cm}^2\end{aligned}$$

$$\begin{aligned}\text{Area of Rectangles 2} \\ &= 8 \times 11 \\ &= 88\text{cm}^2 \\ 88 \times 2 \\ &= 176\text{cm}^2\end{aligned}$$

$$\begin{aligned}\text{TOTAL SURFACE AREA} \\ &= 63 + 198 + 176 \\ &= 437\text{cm}^2\end{aligned}$$

# The surface area of a cube

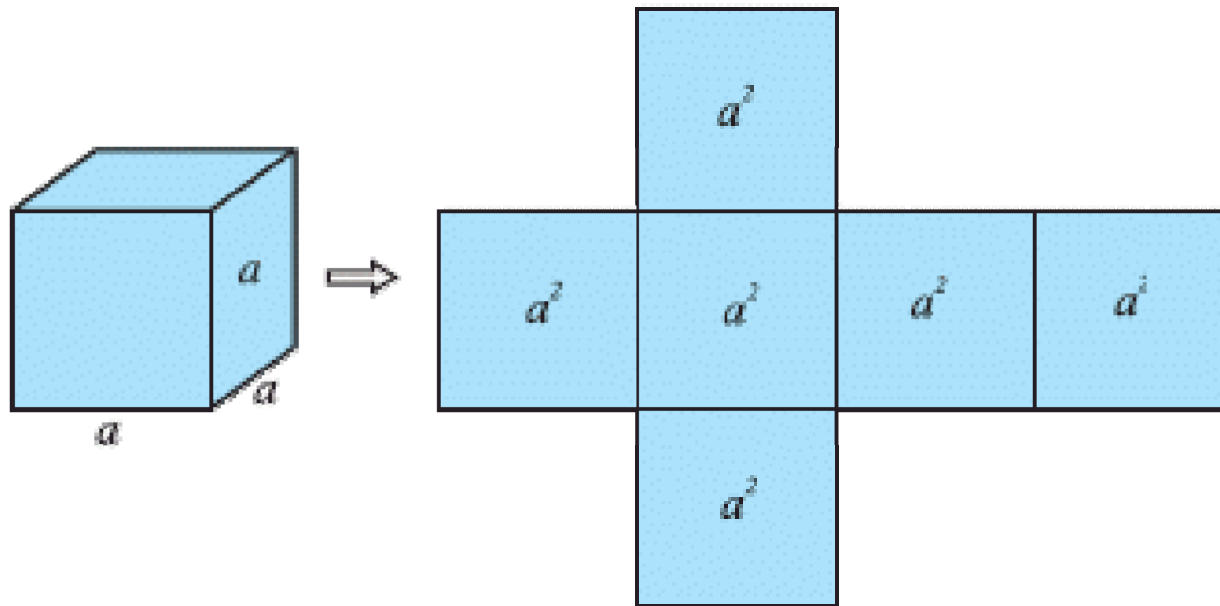


Volume:  $V = s^3$

Surface Area:  $S = 6s^2$

$$\text{Surface Area of a Cube} = 6a^2$$

where  $a$  is the edge of the cube.



# Aptitude - Area Calculation

## Important Fact and Formulae

### Rectangle/Square

- . Area of a rectangle = Length x Breadth
- . Length of a rectangle = Area / Breadth
- . Breadth of a rectangle = Area / Length
- . Perimeter of a rectangle =  $2(\text{Length} + \text{Breadth})$
- . Area of 4 walls =  $2(\text{length} + \text{Breadth}) \times \text{height}$
- . Area of a Square =  $(\text{side})^2 = 1/2(\text{diagonal})^2$

## Triangle

- Area of a triangle =  $(1/2 \times \text{Base} \times \text{Height})$
- $\Delta = \sqrt{\{S(S-A)(S-B)(S-C)\}}$ , where  $S = 1/2(a+b+c)$
- Area of equilateral triangle =  $\sqrt{3}/4 \times a^2$
- Radius of a in circle of an equilateral triangle of side  $a = a/2\sqrt{3}$
- Radius of a circumcircle of an equilateral triangle of side  $a = a/\sqrt{3}$
- Radius of in circle of a triangle =  $\Delta/S$ , Where  $s = 1/2(a+b+c)$



## Circle

- . Area of a circle =  $\pi R^2$
- . Circumference =  $2\pi R$
- . Arc length =  $2\pi R\vartheta/360$ , where  $\vartheta$  is a central angle.
- . Area of Sector =  $1/2(\text{arc length} \times R) = \pi R^2\vartheta/360$
- . Area of Semicircle =  $1/2\pi R^2$

## Other shapes

- . Area of a parallelogram = (base x height)
- . Area of a rhombus =  $1/2(\text{product of diagonals})$
- . Area of a trapezium =  $1/2 (\text{sum of parallel sides}) \times$   
(distance between them)

Q 18 - The difference between the length and breadth of a rectangle is 33 m. If its perimeter is 134 m, then its area is:

<u>A - 800 m<sup>2</sup></u>	<u>B - 850 m<sup>2</sup></u>	<u>C - 900 m<sup>2</sup></u>	<u>D - 950 m<sup>2</sup></u>
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**Answer - B**

**Explanation**

We have:  $(l - b) = 33$  and  $2(l + b) = 134$  or  $(l + b) = 67$ .

Solving the two equations, we get:  $l = 50$  and  $b = 17$ .

$\therefore$  Area =  $(l \times b) = (50 \times 17) \text{ m}^2 = 850 \text{ m}^2$ .

Q 19 - The length of a rectangular plot is 40 meters more than its breadth. If the cost of fencing the plot at 53 per meter is Rs. 10,600, what is the length of the plot in meters?

<u>A - 100 m</u>	<u>B - 80 m</u>	<u>C - 60 m</u>	<u>D - 55 m</u>
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**Answer - A**

**Explanation**

Let breadth =  $X$  meters. Then, length =  $(X + 40)$  meters.

Perimeter =  $10600/53 = 200$  m

$$\therefore 2[(X + 40) + X] = 200 \quad 2X + 40 = 100 \quad 2X = 120$$

$$\Rightarrow X = 60.$$

Hence, length =  $x + 40 = 100$  m.

Q 20 - The ratio between the length and the breadth of a rectangular park is 2: 1. If a man cycling along the boundary of the park at the speed of 18 km/hr completes one round in 10 minutes, then the area of the park (in sq. m) is:

<u>A - 5000 m<sup>2</sup></u>	<u>B - 50 m<sup>2</sup></u>	<u>C - 50000 m<sup>2</sup></u>	<u>D - 500000 m<sup>2</sup></u>
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**Answer - D**

**Explanation**

Perimeter = Distance covered in 10 min. =  $18000/60 \times 10 = 3000$  m

Let length =  $2X$  meters and breadth =  $X$  meters.

Then,  $2(2X + X) = 3000$  or  $X = 500$ .

Length = 1000 m and Breadth = 500 m.

$\therefore$  Area =  $(1000 \times 500) \text{ m}^2 = 500000 \text{ m}^2$ .

Q 21 - A wheel makes 2000 revolutions in covering a distance of 44 km. Find the radius of the wheel.

A - 12 m

B - 14 m

C - 13 m

D - 15 m

**Answer - B**

**Explanation**

Distance covered in one revolution =  $((44 \times 2000)/1000) = 88\text{m}$ .

$$\Rightarrow 2\pi R = 88$$

$$\Rightarrow 2 \times (22/7) \times R = 88$$

$$\therefore R = 88 \times (7/44) = 14 \text{ m.}$$

Q 22 - The area of a circular field is 6.7914 hectares. Find the cost of fencing it at the rate of Rs. 2.20 Per meter.

<u>A - Rs. 20328</u>	<u>B - Rs. 10528</u>	<u>C - Rs. 20444</u>	<u>D - Rs. 24562</u>
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**Answer - A**

### **Explanation**

$$\text{Area} = (6.7914 \times 10000) \text{ m}^2 = 67914 \text{ m}^2.$$

$$\pi R^2 = 67914$$

$$\Rightarrow (R)^2 = (67914 \times (7/22)) \Leftrightarrow R = 147 \text{ m}.$$

$$\text{Circumference} = 2 \pi R = (2 \times (22/7) \times 147) \text{ m} = 924 \text{ m}.$$

$$\text{Cost of fencing} = \text{Rs. } (9240 \times 2.20) = \text{Rs. } 20328.$$

Q 23 - How numerous meters of floor covering 63cm wide will be required to cover the floor of a room 14m by 9m?

A - 200 m	<u>B - 210 m</u>	<u>C - 220 m</u>	<u>D - 185 m</u>
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Answer : A

Explanation

Width of the carpet =  $63/100$ m. Let its length be x mtr.

Then,  $x * 63/100 = 14 * 9$   $\Rightarrow x = (14 * 9 * 100/63) = 200$ m

$\therefore$  length = 200 m

Q 24 - The range of the biggest circle that can be drawn inside a rectangle with sides 18cm and 14cm is:

<u>A - 49 cm<sup>2</sup></u>	B - 154 cm <sup>2</sup>	<u>C - 378 cm<sup>2</sup></u>	<u>D - 1078 cm<sup>2</sup></u>
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Answer : B

Explanation

Radius of the circle =  $(1/2 * 14) = 7\text{cm}$

Area of the circle =  $(22/7 * 7 * 7) \text{ cm}^2 = 154 \text{ cm}^2$



Q 25 - The surface area of a cube is  $1728 \text{ cm}^2$ . Find its volume.

<u>A - <math>3456\sqrt{2} \text{ cm}^3</math></u>	<u>B - <math>256\sqrt{2} \text{ cm}^3</math></u>	<u>C - <math>125\sqrt{2} \text{ cm}^3</math></u>	<u>D - <math>144\sqrt{2} \text{ cm}^3</math></u>
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**Answer - A**

**Explanation**

Let the edge of the cube be X. Then,

$$6X^2 = 1728$$

$$\Rightarrow X^2 = 288$$

$$\Rightarrow X = 12\sqrt{2} \text{ cm.}$$

$$\begin{aligned} \text{Volume} &= X^3 = (12\sqrt{2})^3 \text{ cm}^3 \\ &= 3456\sqrt{2} \text{ cm}^3. \end{aligned}$$

**PROGRAMME CONTINUES.....**