In the name of Allah, the most merciful, the most beneficent!

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Enabling success for everybody!

THE BEST BOOK *for* NTS GAT & HEC HAT

Preparation & Practice Guide

New Comprehensive Edition

Covering Latest Syllabus

(1500+ Practice Questions *from* **Past Papers** *with* **Full Explanations**)

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Ask any question from this book for FREE
WhatsApp: **03208045008**

Preface

This new edition of the HAT & GAT Book by Earnest Prep is a complete preparation guide featuring concept-based lessons and updated practice questions. Unlike the previous edition, the new edition focuses more on recently tested topics and provides greater attention to detail with new updates.

Key upgrades include:

- 10 full-length practice tests from past papers (3 are covered in book, remaining 7 paid - online course)
- Expansion of beginners' study plan to 5 days (compared to 3 days in the previous edition)
- Added explanations (including explanation (hints) of 10 practice tests which was not there previously)
- Addition of new topics according to latest syllabus update from both GAT and HAT.
- Practice through usage of vocabulary so it becomes hard to forget those words.

The book is structured in three focused stages:

1. **Beginners Refresher**: 5-day crash course to build basic foundations to prepare both for GAT & HAT.
2. **Preparation Plan:** 12-day schedule with lessons and exercises, including full answer explanations.
3. **Practice Session:** 10 full tests with real exam- questions and detailed solutions so nobody needs a tutor.

NOTE: As the book already exceeded 550 pages, so 7 of the 10 tests will be available in online course.

It covers all three sections of the test: Quantitative, Verbal, and Analytical.

Perfect for those who have 1 month preparation time, just 3–4 hours of study daily is enough. Those with more time can follow the plan flexibly. On the other hand, those who have just 2 weeks should cover 2-days lessons in one day to complete the 30-days study plan in just 2 weeks.

How The Best Book for GAT & HAT by Earnest Prep Differs from Others?

1. Beginner-Friendly (Easy to Understand)

This book starts with a beginner's refresher for those who are struggling in basic math & logic. It is especially helpful for students from medical, social sciences & arts backgrounds, as it builds foundational reasoning skills.

2. Skill-Focused Lessons (Covering all Possible Scenarios)

Each lesson not only explains GAT General & HAT concepts clearly, but also builds required sets of skills that help enable you get any hard-level question solved simply & easily. You will be highly encouraged to use mental processing and put less burden on your hand-work when it comes to calculation. It saves not only a couple of seconds in every question but also give you confidence to perform better.

3. Readymade Study Plan

The book includes a study plan, which covers all three sections (Quantitative, Analytical, and Verbal) daily. Just 4 hours a day is enough to finish your prep in 1 month. Those who have 15 days for their exam, study 8 hours daily and cover two days stuff in one day to complete in half month.

4. Free Support on WhatsApp

Though all practice questions come with detailed explanations, still if you're stuck, you can send a photo of the question via WhatsApp (03208045008) and get free help—no extra charges.

5. Practice from Past Papers (Experience the Real GAT & HAT Practice Tests)

At the end, you'll find 10 full-length past-paper tests. These help you predict your actual score. On average, your real GAT or HAT score will be about 10 points higher than your average practice test score in this book. Because these practice tests include mainly hard-level questions that most of the people need to practice before test.

GAT General Test Types & Paper Pattern

Basically, there are four categories of NTS GAT General test namely: GAT A, GAT B, GAT C and GAT D. These types are based on different field of study that graduates choose for their MS/MPhil program. Each type includes three sections: *Quantitative Reasoning*, *Verbal Reasoning*, and *Analytical Reasoning*. Each category differs in weightage given to the three sections as shown below:

GAT Category	Field of Study	Quantitative Section	Verbal Section	Analytical Section	Total Weightage
GAT A	Business and Engineering & Technology	35%	35%	30%	100%
GAT B	Arts, Humanities & Social Sciences	30%	50%	20%	100%
GAT C	Agriculture & Veterinary Sciences, Biological & Medical Sciences, and Physical Sciences	35%	45%	20%	100%
GAT D	Religious Studies (Madrassa Background)	30%	50%	20%	100%

For full program list to know which GAT you should take, visit:

https://gatpreponline.com/

HAT Test Types & Paper Pattern

Higher Education Aptitude Test (HAT) also has five categories namely: HAT-I, HAT-II, HAT-III, HAT-IV, and HAT-V. However, HAT has a bit different weightage for the same three sections: *Quantitative Reasoning*, *Verbal Reasoning*, and *Analytical Reasoning*, as shown below:

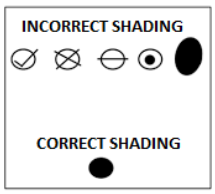
HAT Category	Field of Study	Quantitative Section	Verbal Section	Analytical Section	Total Weightage
HAT 1	Engineering & Technology, Physics, Statistics, Computer Sciences, Mathematics	40%	30%	30%	100%
HAT 2	Management Sciences, Business Education	30%	30%	40%	100%
HAT 3	Psychology, Law, Arts & Humanities, and Social Sciences	25%	40%	35%	100%
HAT 4	Agriculture & Veterinary Sciences, Biological & Medical Sciences, Physical Sciences Education, Media & Mass Communication	30%	40%	30%	100%
HAT 5	Religious Studies (Madrassa Background)	30%	40%	30%	100%

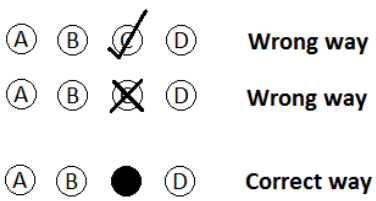
For full program list to know which GAT you should take, visit:

https://gatpreponline.com/

Suggestion to Fill Bubble Sheet

Always use marker instead of ball point. Encircling the answer sheet is much quick and easier through use of marker (either black or blue). This saves lots of minutes that can be utilize in answering few more questions.





About the Author

Mubasher Jan, the author of this book, is the founding mind behind Earnest Prep, an institute dedicated to preparing students for exams like GRE, GMAT, GAT, SAT, ACT, and LSAT. With years of teaching experience, he understands the strengths and weaknesses of students from diverse academic backgrounds.

Mubasher consistently ranked at 99th percentile in these exams in every attempt. Drawing from this success, he developed this book to help students build essential skills: *problem solving*, *critical thinking*, *logical reasoning*, and *quick & correct decision-making*.

He has also worked with the Higher Education Commission (HEC) of Pakistan under the US-Pak Knowledge Corridor project, training university faculty and students for GRE and admissions abroad. His training sessions have been conducted at leading institutions including the University of Azad Jammu & Kashmir, Mehran University of Engineering & Technology (MUET), University of Sindh and etc. More so, Mubasher continues to create exam prep books & courses to empower students with the skills needed to succeed in competitive exams.

Acknowledgment of Contributors

This book would not have been possible without the support of many individuals. While it's not possible to name everyone, the following key contributors deserve special mention:

- *Madam Shaista Baloch*, currently serving as PA to Director Admissions at the University of Sindh, provided valuable support through her strong public relations skills and trusted reputation.
- *Naveed Answer*, who is an advocate High Court is a partner & consultant at various law-firms, contributed with his professional expertise and guidance to handle matters related to legal affairs.
- *Dr Asad Khan*, Assistant Professor at Pak-Austria Fachhochschule Institute of Applied Sciences and Technology, also played a key role of public awareness about this book. His excellent reputation and support were instrumental in spreading awareness of this guide.

We sincerely thank all contributors for their help and encouragement for spreading awareness of The Best Book for GAT & HAT by Earnest Prep – written by Mubasher Jan.

About Earnest Prep

Earnest Prep is a test preparation institute based in Lahore, Pakistan, offering both books and online courses for graduate and postgraduate admission tests worldwide. These include, but are not limited to GMAT, GRE, GAT, GAT (KSA), LSAT, SAT, and ACT.

The institute aims to equip students with the skills needed to excel in competitive exams. In the near future, on-campus and live online classes will also be launched to further support learners across Pakistan and beyond.

You can also prepare for GRE, GMAT, LSAT, and SAT online courses in addition to online classes.

For more information, please visit: https://earnestprep.com/

Our Top Scorer

1. Fareeha Naseer S/O Ghulam Naseer Ud Din (live in Village Burg Agra, Phalian, Mandi Bahauddin) from Physical Sciences background, has scored 99th percentile rank in GAT held on 12th Jul, 2025.
2. Abeer Saqib S/O Saqib Naeem with roll# 25839-10023 appeared in GAT General (background: Engineering & Tech.) held recently. She also got 99.86 percentile in GAT taken on 29th Nov, 2025.

Visit for details to see GAT result card of our top scorers: https://gatpreponline.com/

Table of Content

20 Days Study Plan *for* GAT & HAT

(5 days Basic Refresher *for* beginners)

Day 01

Before starting your test prep, it's important to understand the basics of HAT and GAT. The first 5 days of the study plan focus on building basic foundations, which majority of us have forgotten. 30-day study plan covers:

- 5 days will include basics of the GAT & HAT syllabus.
- 12 days include topic-wise lessons with practice from real HAT & GAT questions
- 3-days practice session covers 3 full practice tests (free), and 7 additional tests (paid), all have questions from past papers of last five years.

If you study 4 to 5 hours daily, you can complete the book in 20 days. Pl study 9 hours a day to finish in 10 days.

Basic Quantitative Reasoning

First, it is extremely important to read something much important about *Quantitative Reasoning*:

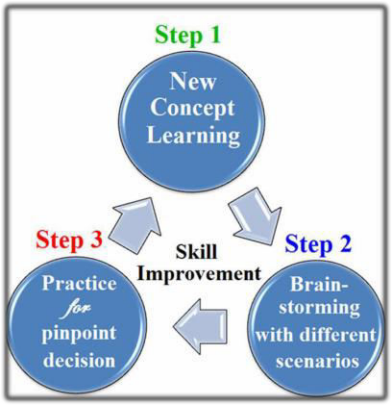
What is tested in Quantitative Reasoning?

In this section, your math knowledge isn't directly tested. Instead, it measures how well you can analyze and reason through a quantitative problem in a short span. Your thinking & reasoning skills matter more than calculations. It mainly tests your problem-solving skill and time-management.

Trick to Get 99th Percentile Score in Quantitative Section

Keep the following important points in mind, that will help you achieve the target score in quantitative:

- ⇨ **Train Your brain:** Start solving as much as possible mentally. Use paper only for complex steps, and skip unnecessary written steps. This will save couple of seconds in every question.
- ⇨ **Stay Calm:** Don't worry if a question takes time during initial stage of preparation. Focus on accuracy first, and then gradually consider speed later on in practice session.
- ⇨ **Stay Motivated:** If quant is your weak point, don't lose hope. The more time you spend, the sooner it becomes your strength.
- ⇨ **Don't just practice, cycle through learning:** Shift between Concept Learning → Brainstorming → Quality Practice. This helps develop deep understanding and high-level problem-solving skills.



- ⇨ **Build speed gradually:** Once you're getting correct answers in a topic (e.g. percentages), begin to feel a sense of urgency. Still remember, you must focus on accuracy first, then add speed.
- ⇨ **Stay confident on hard questions:** If you get stuck, remember: every question is solvable within 1 minutes using concepts from this book. Just think creatively, do a good practice, and trust Allah.

Digits

Digits are the backbone of the whole math. Total ten digits exists as mentioned below:

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

When a question uses the word *digit*, it refers to one of the 10 digits: 0 to 9. Any number you see, whether it's 13, 205, 7823, or 1,000,000 (i.e. one million) is made by combining these basic digits in different positions (units, tens, hundreds, thousands, and so on etc.). The placement of digits is critical that can change the whole game.

Why Understanding Digits Matters in GAT & HAT?

In GAT (Graduate Assessment Test) and HAT (Higher Education Aptitude Test), you often deal with:

- Number properties
- Place value problems
- Simple calculations
- Number patterns
- Digit-related word problems

A solid grasp of basic digits helps you quickly spot the right answer.

Concept-based Scenarios

Let's look at some basic example scenarios where knowing digits is useful:

Scenario 1: Sum of Digits in a Number

Question: Is 5322 divisible by 3?

Solution:

One traditional way is a long method to manually check if 5322 divisible by 3: However, tests like GAT or HAT evaluate your *problem-solving* skill, while you are given a very limited time. So, it is imperative to know short tricks with smart thinking, and do long and explanatory questions in a matter of few seconds.

When solving hard-level questions in GAT or HAT exams, finding sum, average, or difference of digits is often required in first steps. That's why learning the basics of digits is so important.

Any number is divisible by 3 only if the sum of its digits is a multiple of 3 (i.e. it comes in table of 3, which results to 0, 3, 6, 9, 12, 15, and so on). So, let's find sum of digits of the required number 5322:

5+3+2+2 = 12 (which is a multiple of 3 i.e. 3 times four gives us 12)

So, YES! 5322 is definitely divisible by 3

📌 This rule is NOT applicable for all divisibility, and only used to check whether a number is divisible by 3 or divisible by 9. We will learn divisibility rule of other digits later on.

Scenario 2: Place Value of a Digit

Question: What is the place value of 7 in the number 7,312?

Solution: Place value = 7×1000 = **7000**

📌 We will learn Place Value in detail later-on within this beginner's study plan.

Scenario 3: Number of Digits

Question: How many digits are in the number 9,325?

Solution:

Count: 9, 3, 2, 5 → **4 digits**

So, 9,325 is a four-digit number.

Why is this scenario important?

Real Question from Past Paper: What is the greatest possible difference between two different four-digit positive integers?

First step, you should be aware of the term four-digit integer, and positive integer. We will learn solving such hard-level questions later-on only after learning the basics. So, please hold on for some time, and don't rush! However, if you are also learning from the online course (which includes Video Tutorials), your speed of learning will definitely go much faster. (Visit https://earnestprep.com/ for online course with video lesson if you want to go at fast pace.)

Scenario 4: Distinct Digits or Different Digits

If the question says that *a, b, c, d,* and *e* are *distinct* or *different* digits, it means no two of them can be the same (i.e. each must be unique). However, without the presence of these words, they can have same value. For instance,

If the sum of two digits, let's say *a* and *b*, is 10 (i.e. $a + b = 10$), only the following pairs of digits can do so:

1 + 9	4 + 6
2 + 8	5 + 5
3 + 7	

If the question says the sum of two *distinct* digits is 10, then the pair 5 + 5 is not valid because the digits must be *different*. Always read such conditions carefully. Additionally, if the question states that the sum of two *even* digits is 10, i.e. the question also states that both of the digits are even*, the following pairs of digits can do so:

2 + 8 and 4 + 6

*Remember that even are those numbers that are divisible by 2 or multiple of 2 (i.e. that comes under table of 2).

Similarly, if the product* of two digits is 10, only the one pair of digits can do so: 2×5

*Remember that product means multiplication in mathematics.

📌 Product of 10 and 1 is also 10, but the question states that the product of two *digits*, i.e. both numbers must be digits, while 10 is not the digit, rather it's a two-digit number. So, this pair (i.e. 10 and 1) is not possible.

Example scenario: *a* and *b* are distinct digits such that their product is 12 and their sum is 7, what is the *positive* difference between *a* and *b*?

> Or question may ask, the greater of the two digits is how much larger than the smaller digit? Remember that, both of the statements mean the same thing.

Solution

As it is given that *a* and *b* are distinct digits, so both must be amongst ten digits (i.e. 0 – 9), but must be different (as *distinct* means *different*). Also, given that the product of the two digits is 12 (i.e. $a \times b = 12$).

Now, think in your mind that which two of the ten known digits results to 12 after multiplication?

> **Mental Brainstorming:** Start with digit 0 and check if multiplying it by any digit gives 12. It doesn't. Now, Try 1. Still no, since the highest digit (9) gives only 9 × 1 = 9. Now, try 2. Ask: what digit multiplied by 2 gives 12? The answer is 6. i.e., 2 × 6 = 12. Likewise, 3 × 4 = 12. By thinking this way, you'll find that (2, 6) & (3, 4) are the only pairs that multiply to give 12.

The digits must be 2 & 6 or 3 & 4. But the question also says that $a + b = 7$, so the correct pair is 3 & 4. We can't say which of the two digits is a and which one is b, but the pair is certain. We need the positive difference, which is:

Higher digit – lower digit = 4 – 3 **= 1** *Answer!*

Numbers

Digits combine to form infinite numbers. For instance:

… –4.8, –4.0, –3.5, –2.0, –1.1, –0.33333, 0, 0.01, 0.5, 0.99, 1.0, 2.09, 3.0, 4.001, …

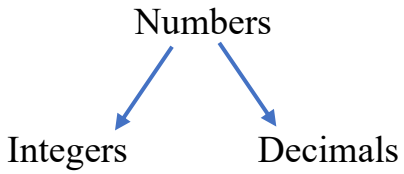
A digit is also a number. And there are infinite numbers between two consecutive digits (1 and 2, or 2 and 3 etc.).

Numbers are of two basic types:

I. Integers (i.e. 0, ±1, ±2, ±3, ±4, ±5, …)

II. Non-integers or decimals (i.e. –2.5, –1.75, 0.2, 0.5, 2.5, …)

When it is given in a question that a, b, and c are numbers, then these could be integers or decimals.



I. Integers

Numbers that have 0 decimals (i.e. that have no digit, except 0, after the *decimal point*) are integers. For instance:

… –4.0, –3.0, –2.0, –1.0, 0.0, 1.0, 2.0, 3.0, 4.0, …

Or simply

… –4, –3, –2, –1, 0, 1, 2, 3, 4 …

Note that 4.001 is not an integer, because it has 001 in its decimal, that is not 0. Also note that 0 is an integer; and it's an important integer.

There are infinite integers. i.e.:

– ∞, … – 1Billion, … –1Million, … – 1000, … – 2, – 1, 0, 1, 2, … 1000, … 1Million, …. 1Billion, … ∞

∞ is symbol for infinite, which cannot be defined (i.e. undefined).

Many people argue that infinite and undefined are different things. Technically, both may be different but you should always consider these two as same. This is never tested in skill-based exams. Your test is not about technicalities of math, rather it's about quantitative reasoning skill; i.e. how efficiently you give reason to solve specific problem. In other words, your *problem-solving skill* is tested.

📌 *As an integer is a type of number, so all integers are also numbers, but any number may not always be named as integer. For instance, 25 is an integer and also named as a number, but 2.5 (spoken as: two-point-five) is a number but it cannot be named as an integer. To understand it clearly, as you know New York is a city of United States. People living in New York are also living in United States; but people living in United States are not necessarily living in New York. THINK LOGICALLY!*

We hope that you will not confuse in using such terms (i.e. *numbers* and *integers*). If a question state that *"a and b are two* ***different*** ***numbers*** *such that a is twice as much as …"*, following ways are possible about *a* and *b*:

I. Both *a* and *b* are integers
II. Both *a* and *b* are decimals
III. *a* is decimal but *b* is integer
IV. *a* is integer, but *b* is decimal.

Do not write these in paper, rather just think these possibilities in your mind. Your brain works much faster than your hand. On other hand, if the question states that *"a and b are two different integers such that a is twice as much as ……"*, always believe only first possibility is true about *a* and *b*.

A *single digit integer* must be of single digit i.e. each of the ten digits as discussed at beginning, is a *single digit integer*. While a *two-digit integer* must be of two digits i.e. it must be of the form of *xy* (e.g. 23, 57, 72, etc.), where *x* and *y* are any of the ten digits, but *x* cannot be 0. Note that, 01, 02, 03 … are not two-digit integers. For instance, 10 is the least possible two digit integer. But remember that when its digits are reversed (i.e. 01) it would no longer be a two-digit integer, rather it will become a single digit integer (i.e. 1). Similarly, in case of 20, 30, and 40 etc. are two-digit integers, but when their digits are reversed, they would no longer be two-digit.

Also, note that 99 is the greatest possible two-digit integer and 98 is the greatest possible two digit integer having **distinct** digits. Some questions contain statements such as: "*When the digits of a two-digit integer are reversed, the resultant integer is 17 greater than the original integer. What is the ……*" Here you should know the definitions of digits and that of integers. This example is advance level scenario, and the purpose of this example is not to learn how to answer this, but to understand what is meant by the question and meaning of each word stated in the question. You cannot solve such problems without knowing the basics. If you understand the question statement properly, the rest is simply arithmetic.

📌 *10 is the least possible two-digit integer, whereas 99 is the greatest possible two-digit integer and 98 is the greatest possible two-digit integers with distinct digits.*

II. Decimals (non-integers)

Numbers that have at least one non-zero digit in their *decimal place* are known as decimals. Decimal place is the place that is on the right side of *decimal point* or *dot* (i.e. "**.**") in a number. For instance:

… –4.8, –3.5, –2.9, –1.1, –0.33333, 0.00000001, 0.999999, 2.09, 3.222, 4.001, …

Here, 001 is in the decimal place of 4.001 i.e. on the right side of *decimal point*.

📌 *There are infinite numbers (of decimals type) between any two adjacent integers (i.e. there are infinite numbers exist between 0 and 1). For instance, 0.1, 0.00001, 0.00000000000000000000001, 0.00000009, 0.9, 0.99999999 and so on. You cannot count.*

Example Scenario: If the sum of two different positive numbers is 100, what is the maximum possible value of the highest of those numbers?

First think and answer by your own, then go for solution and explanation as stated below. The more you do brainstorming, the more quickly you will learn problem solving skill. This task may feel tedious at beginning, but ultimately, it will be your best friend in helping you to make such things in your figure tips and make you expert!

Solution: Many people will answer 99. But few would answer 99.99. Unfortunately, both answers are incorrect!

The greatest number would be 99.9999999…… and so on, which cannot be determined. In other words, the greatest number less than 100 cannot be determined, because it would be 99.9999999…… and so on. So, the answer is **cannot be determined**. Mathematically, this number is written as:

$$99.\overline{9}$$

Where the bar at tope of 9 in decimal place means that this digit will repeat infinitely.

You may argue that 99.99 is the approximate value of the highest number less than 100. Actually, you need to give exact value unless it's stated in the question to answer approximately.

Note that there are infinite numbers that are greater than 99, but less than 100. So, you cannot determine the greatest number that exist between 99 and 100.

Similarly, if the sum of two different positive numbers is 100, what is the minimum possible value of the smallest of those numbers?

Again, if the least number is required, it is neither 1, nor 0.01. In fact, it is 0.0000000000000000……1, which **cannot be determined** too.

Key Points

- Digits are the integers from 0 to 9 inclusive.
- Pay close attention to words such as **distinct** or **different** and **positive** or **negative** while reading question wording.
- *Numbers* and *integers* are two **different** things. ***Integers* are a type of *numbers***. Every *integer* is also a *number*, but every *number* is not necessarily an *integer*.
- All *digits* are also *integers*, and all *integers* are also named as *numbers*.
- There are infinite *numbers* exist between any two consecutive (i.e. adjacent) *integers*.

Arithmetic Operations on Integers vs Decimals

Let's apply the four arithmetic operations (i.e. +, –, ×, ÷) in integers and decimals. For that purpose, study the complete table mention below to understand it:

Comparison	Addition or Subtraction (±)	Multiplication (×)	Division (÷)
integer *vs* integer	integer ± integer = integer	integer × integer = integer	integer ÷ integer = either
integer *vs* decimal	integer ± decimal = decimal	integer × decimal = either	integer ÷ decimal = either
decimal *vs* integer	decimal ± integer = decimal	decimal × integer = either	decimal ÷ integer = decimal
decimal *vs* decimal	decimal ± decimal = either	decimal × decimal = either	decimal ÷ decimal = either

Here, *either* means any of the result is possible (i.e. either *integer* or *decimal*). Also, ± means either plus or minutes.

Addition or Subtraction: When the two *integers* add or subtract, the result would always be an *integer*. And when one *integer* is added to a *decimal* or subtracted from the *decimal*, the result would always be a *decimal* (i.e. non-integer). Also, when the two numbers are *decimals*, then the result of addition or subtraction would be either an *integer* or a *decimal*.

Multiplication: In division, only when two *integers* multiply the result would always be an *integer*. In all other comparisons, the result would be either an *integer*, a *decimal*.

Division: In division, only when a *decimal* is divided by an *integer*, the result would always be a *decimal*. In all other comparisons, the result would be either an *integer* or a *decimal*.

Consecutive Digits

Any number of adjacent digits are named as consecutive digits. They come one after the other in order, and never skip any digit in that order.

Key Concept Set-01: Identify Consecutive

- 3, 4, 5 → consecutive digits
- 6, 7, 8, 9 → consecutive digits
- 1, 3, 5 → NOT consec. (skipping some digits)

Key Concept Set-02: Digits Making Integer

- One-digit integer: 5
- Two-digit integer: 23 (2 and 3 are digits)
- Three-digit integer: 748 (7, 4, 8 are digits)
- Four-digit integer: 5286

Key Concept Set-03: Place Value of a Digit (Digit placement in numbers)

Digit placement is the place where a digit is placed in a number. In order to understand this, consider the following number *(nine thousand eight hundred seventy-six point five four three)*:

$$9876.543$$

Remember that the placements of the above digits are as follows:

6 → Unit digit

7 → Tens digit

8 → Hundreds digit

9 → Thousands digit

5 → Tenth digit

4 → Hundredth digit

3 → Thousandth digit

Note that '**.**' is named as *'decimal point'* or simply *'point'*. For instance, 2.5 is spoken as two point five.

Approximation of decimals: You might have studied this concept at high school level. But many of you have learned in wrong way. For instance, while approximating 24.49 to nearest integer, many of you have learned that first you should eliminate 9 on the hundredth digit that will approximate the tenth digit to 5. And this results to 24.5 which can be approximated to 25. This concept is, in fact, wrong!

Always consider all the digits after decimal point combined (e.g. in given case of 24.49 tenth and hundredth digit combined i.e. 49). As it is less than 50, so the nearest integer would remain 24 when we approximate 24.49 to nearest integer. Note that the minimum number that can be approximated to 25 is 24.50 (or simply 24.5).

Few people also confuse and ask that why 24.50 = 24.5? Note that $24.5 \neq 24.05$. You can write as much zeros as you want at right most side of decimal place i.e. 24.50 or 24.5000000. It would not make any difference. But placing 0 to left of a digit at decimal place will change the value. That's the reason why:

$$24.50 \neq 24.05$$

In fact, 24.05 is less than 24.50. On other hand, you may write as much zeros as you want to left side of an integer (e.g. 24 = 024 = 0000024), it will not make any difference, but you cannot write zeros on right side (e.g. $24 \neq 240 \neq 2400000$).

Similarly,

$14.4999 \approx 14$

$14.5000 \approx 15$

$14.5001 \approx 15$

Note that ≈ is a sign for approximation and it is read as *'is approximately equals to'*.

Question: What digit is in the thousands place in 53,729 (fifty-three thousand, seven hundred, twenty-nine)?

Solution:

9 → Unit digit
2 → Tens digit
7 → Hundreds digit
3 → Thousands digit
5 → Ten-thousands digit

Alternatively:

Place:	Ten-thousands	**Thousands**	Hundreds	Tens	Unit / Ones
Value:	10,000	1,000	100	10	1
Digits:	5	**3**	7	2	9
		↑			
		thousands place			

Therefore, thousands placement has digit: **3** ***Answer!***

Key Concept 4: Reversing Digits

Question: What is the number if you reverse the digits of 731?

Solution:

Original number:	7	3	1
Place values:	hundreds	tens	unit
Reversing order:	1	3	7

Hence, reversing the given digits = **137** ***Answer!***

Key Concept 5: Finding a Missing Digit

Question: One even digit is missing in 4_7. If the given number is divisible by 3, what is the missing digit?

Rule: A number is divisible by 3 if the sum of its digits is divisible by 3.

Try options: 2, 4, 6, and 8 – all even digits one by one. Only 4 will work as below:

- 447 → 4+4+7 = 15
- (15 ÷ 3 = 5) → Correct

Answer: **4**

Types of Integers

On the basis of sign (i.e. + or –), integers are of three types:

I. *Negative integers* (All integers less than zero are negative integers: –1, –2, –3, –4, …)
II. *Neutral integer* (An integer which is neither negative nor positive: Only 0)
III. *Positive integers* (All integers greater than zero are positive integers: 1, 2, 3, 4, …)

If it is given in question that *a, b* and *c* are positive integers, you cannot assume any of these as 0 or negative. Because 0 is not among positive integers.

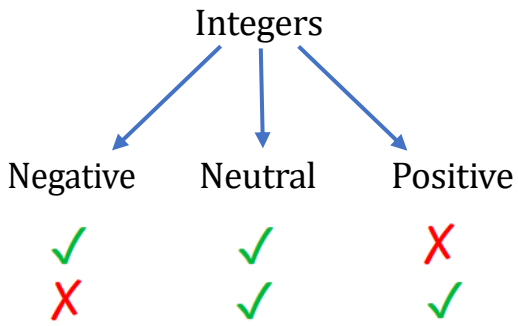
Sub-types

Integers are further categorized as:

I. *Non-positive integers* (Integers that are not positive i.e. negative or neutral: 0, –1, –2, –3, –4, …)

II. *Non-negative integers* (Integers that are not negative i.e. positive or neutral: 0, 1, 2, 3, 4, …)

Diagrammatically,



	Negative	Neutral	Positive
Non-Positive integer:	✓	✓	✗
Non-Negative integer:	✗	✓	✓

Thus, if it is given in a question that *a, b* and *c* are non-positive integers, you may assume any of these as 0 or negative. Also, if it is given that *a, b* and *c* are non-negative integers, then assume any of these as 0 or positive.

📌 *0 is a non-positive as well as non-negative integer. In other words, 0 is neither a positive nor a negative integer, rather it's the only neutral integer.*

Example Scenario: If *x, y* and z are *non-positive* distinct integers, which of the following MUST be true?

I. $x + y < 0$
II. $xy > 0$
III. $xyz = 0$

A. I only
B. II only
C. I & II
D. I & III
E. All of the above

📌 *$a < b$ is mathematical symbol for "a is less than b", and $a > b$ is mathematical symbol for "a is greater than b". So, $x + y < 0$ means sum of x and y is less than 0 (i.e. negative). On other hand $xy > 0$ means product of x and y is greater than 0 (i.e. positive).*

Solution: First of all, you should play more with logics than with simple math. Trust me your brain is a miracle, i.e. you can think, analyze and process logically much faster than you do on a piece of paper. In **The Best book of GAT & HAT Preparation** – *by* ***Earnest Prep***, you will be encouraged to think logically more often and use your hand working on a piece of paper only rarely, while solving every question. The practice of doing this will help you to become expert, so you will able to answer questions without doing lengthy working on a piece of paper and answer in such short span of time.

It is given that *x, y* and z are *non-positive* and *distinct* (i.e. different) integers, so you can only think about 0 or negative integers. Also note that two or more integers cannot be 0 simultaneously, because *x, y* and z are *different* integers. And that's why it is emphasized to pay close attention to each word in the question. So, let's analyze each of the three statements one by one:

Clearly, **statement I** gives negative result, because both of the integers simultaneously cannot be 0, as given that

the two integers are distinct (i.e. must be different). The sum of two negative integers or the sum of one negative and 0 is always a negative integer. Thus, this statement **MUST be true**.

Statement II, on other hand, may give result either positive or 0. The reason is that either both x and y are negative or one of them is 0 while other is negative. This means that product of x and y could be greater than 0, also the product may equal to 0. Thus, this statement Can be true but **NOT MUST be true** (not always true)!

Therefore, **choice A is correct**.

Few people may have tried to plug in values to each statement in order to solve. I strongly discourage you to plug in values. Because in several questions including this one, sometimes the statement satisfies the condition (i.e. Statement III gives 0 and sometimes it doesn't give 0 result). If you plugin (0, –1, and –2) values for x, y and z, the product of x, y and z would be 0. So, you may wrongly select this statement as Must Be true, which is not the case!

Must be true, Could be true, & Cannot be true

When the question asks any of these, it is vital to know the difference between these three terms. Let's learn this. For that purpose, let's discuss a simple question scenario:

If $x > 3$, which of the following MUST be true, Could be true, and CANNOT be true?

I. $x > 0$
II. $x > 5$
III. $x < 0$

Statement I ($x > 0$): Given that x is greater than 3, this means x will always be greater than 0. Because any number, which is greater than 3, is always greater than 0 (i.e. positive). *In fact, there's not a single case exists where x could be equal to 0 or less than 0*, so this statement **MUST be true**.

Statement II ($x > 5$): Given that x is greater than 3, so x can be any number greater than 3. In such situation, I recommend to think extreme possible values (i.e. maximum and minimum). Minimum value of x can be 3.000000……1 (Simply the least number/decimal greater than 3), while maximum is infinite. Or, if the question states that x is an *integer*, then minimum value of x would be 4 in that case. Now given that, if x is an integer, it can be 4, 5, 6, 7, 8,…… so x CAN be greater than 5, but not always, so it's not MUST be greater than 5. As, x can also be equals to or less than 5, so this statement is **COULD be true**, but not MUST be true.

Statement III ($x < 0$): This statement **CANNOT be true**, because given that x is greater than 3, which means x cannot be negative.

Key Concept 6: How many Integers Exists

Scenario 1: How many integers exist between 150 and 832 inclusive*?

* Inclusive means including both initial and final (i.e. including 150 and 832)

Solution: Think logically! And start from small scale, and think in your mind how to find integers between 2 and 5 inclusive?

After a bit of brainstorming, you have to come about: $5 – 2 = 3$

However, when we subtract 2 from 5, the integer 2 itself eliminated. To understand it, consider a scale or distance from 0 to 5. Now, if a distance from 0 to 2 (let's say it 2 meters), is removed from the distance between 0 to 5 (i.e. 5 meters), what is the procedure? We subtract 2 meters from 5 meters. But when we do so, the digit 2 itself is removed. Therefore, in case of inclusive we must add one integer, which was removed in the subtraction procedure. Thus, the final answer would be $5 – 2 + 1 = 4$ (Note that this is the case of inclusive)

Similarly, finding the number of integers between 150 and 832 inclusive will involve same procedure as follows:

$832 - 150 + 1 =$ **683** ***Answer!***

Scenario 2: How many integers exist between 115 and 322?

Solution: This is the case of not inclusive, meaning both initial and final integers (i.e. 115 and 322) should not be counted.

However, when we subtract 115 from 322, the initial integer (i.e. 115) is removed, but the final integer is not. So, we need to remove one integer additional to get the answer as follows:

$322 - 115 - 1 = 206$

Let's move on to a hard-level scenario without explaining the solution. The purpose is only to give you an idea.

Hard-level scenario: In 10,000 to 19,999, how many different integers have 1 as the unit digit?

You can try this at this beginning stage, but don't worry if it's not solved yet. In fact, brainstorming is so important for you to become expert with numbers. At this stage, we will not discuss this question, but will explain it in advance-level preparation plan. Let's move on to an important basic concept of dividing by digits.

Key Concept 7: Checking Divisibility with Digits

Dividing A Number by digit 0

Think Logically: Imagine if someone asked you to divide a full chocolate bar into two people. How much chocolate will each get? Clearly, you will answer half chocolate. Fair enough!

Mathematically, $\frac{1\ chocolate}{2\ people} = \frac{1}{2}$ chocolate per person

Similarly, if you are asked to share that chocolate bar with one person, how many pieces will be shared? Clearly, only that single person will get the whole chocolate – meaning the person will receive full 1 chocolate. Very well!

Mathematically, $\frac{1\ chocolate}{1\ people} = 1$ chocolate per person

Let's continue, and share chocolate in half person (just for sake of understanding). Now, here comes the tricky point! Just think logically and ask how many chocolates per person (i.e. one full person) is required?

Definitely, if half person requires 1 chocolate, then full person requires 2 chocolates. Thus, 2 chocolates required per person. Great!

Mathematically,

$\frac{1\ chocolate}{\frac{1}{2}\ person} = 1 \div \frac{1}{2}$ chocolate per person

$= 1 \times \frac{2}{1}$ (As per reciprocal rule)

= 2 chocolate per full person

Alternatively, $\frac{1}{2}$ person requires chocolate = 1

Multiplying both side of the equation by 2 to get chocolate required by 1 person, we'll get:

$2 \times \frac{1}{2}$ person requires chocolate = 2×1

1 person requires chocolate = 2

Theoretically, it means you need to think how many halves (of the chocolate pieces) fit into one whole chocolate bar? The answer is two.

Let's move ahead and understand the sequence/pattern. What would happen if we share chocolate in quarter person (again just for sake of understanding). Now, how many chocolates per person (i.e. one full person) is required? Clearly, it would be 4.

Similarly, when sharing one-tenths, it will give 10 chocolate per person, and so on.

> Here's the most interesting point to note: the more we divide it into fractions (like 0.5 or $\frac{1}{2}$, 0.25 or $\frac{1}{4}$, and 0.1 or $\frac{1}{10}$), the higher the result it gives. So, imagine if we divide 1 by 0.000000000000001, how much will it result? Clearly, it would be even more bigger value. So, the more we move closer to 0 when dividing, the higher the result it gives. However, what about 0? If we divide it by 0, it will result to a so big number which cannot be found. (i.e. infinite)

Thus, $\frac{1}{0} = \infty$ (i.e. infinite, which is too big number which cannot be determined or counted)

In other words, there is no number which can be divisible by 0.

Note that, a number is divisible by other if it results to a whole number (i.e. 0, 1, 2, 3, 4, 5, …)

📌 *Some of you might ask, why learning the whole concept, if we can just remember that when a number is divided by the digit 0, it results to infinite? Remember that, there's a difference between remembering a concept and learning a skill. If you want to be on top in quantitative reasoning section, focus on learning skill.*

Dividing A Number by Digit 1

When any whole number is divided by 1, it results to the same whole number. Hence, all numbers are divisible by the digit 1.

Dividing A Number by Digit 2

When the ***last digit*** (unit digit, i.e. right most digit) of an integer is divisible by 2 (i.e. last digit is even), then that integer is divisible by 2. For instance, 954776 is divisible by 2, because the last digit is even (i.e. 6).

Dividing A Number by Digit 3

Question 2: If a three-digit number 4_7 is divisible by 3, find the missing digit, which should be even?

Solution:

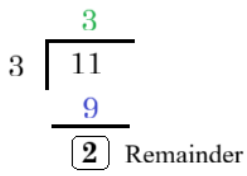
A number is divisible by 3 if the sum of its digits is divisible by 3. So, let's say the required digit is x. So, according to the given condition:

$4+x+7 = 11+x$

Find possible values of x such that $11+x$ is divisible by 3

Think logically!

Let's find the remainder when 11 is divided by 3:



Do these all-backend calculations in your mind, so it will sharpen your reasoning skill:

Now, think 2 + what digit gives multiple of 3. (i.e. results to 3, 6, or 9)

Clearly, it's 1, 4, and 7.

However, the question says the missing digit is even. Hence, 4 is the only answer!

Alternatively:

Again, please do this all backend calculations in your mind, as it is so important to learn quantitative reasoning skill.

Split $11+x$ such that it becomes completely divisible by 3:

$11+x = 9 + (2+x)$

We know that 9 is completely divisible, so think 2 + what digit makes it completely divisible by 3?

Another alternate way was already mentioned before.

Dividing A Number by Digit 4

When the *last two digits* of an integer is divisible by 4, then that integer is divisible by 4. For instance,

954776 is divisible by 4, because the last two-digits (i.e. 76) is divisible by 4.

Dividing A Number by Digit 5

When the last digit of an integer is either 0 or 5, then it is divisible by 5.

Scenario 1: What is the missing non-zero digit in 25_ such that the number is divisible by 5?

Solution: All the multiples of 5 has unit digit either 0 or 5, as follows:

(Multiples of 5 are: **5**, 1**0**, 1**5**, 2**0**, 2**5**, 3**0**, 3**5**, 4**0**, 4**5**, 5**0**, …)

As it is given that the missing digit is a non-zero digit, so it has to be 5.

So, missing digit = **5** ***Answer!***

Scenario 2: A number ends in 5. Which digit must be added to make it divisible by 5?

Solution:

Thinking process must start from the problem (i.e. what we need). We need to ensure the number has to be divisible by 5. Now, a number is divisible by 5 only if it ends with either 0 or 5 (i.e. its unit digit is either 0 or 5). So, there are two possible answers: 0 or 5.

Dividing A Number by Digit 6

As you know 6 is multiple of both 2 and 3, so when both the rule for 2 and rule for 3 are valid for an integer, then that integer is divisible by 6. For instance, 99774 is divisible by 6 because its last digit is even as well as its sum of digits is divisible by 3.

Dividing A Number by Digit 7

There's no as such rule for 7, you need to divide by 7 to check whether an integer divisible by 7.

Dividing A Number by Digit 8

When the *last three digits* of an integer is divisible by 8, then that integer is divisible by 8. For instance,

954776 is divisible by 8, because the last three-digits (i.e. 776) is divisible by 8.

Dividing A Number by Digit 9

When *sum of all the digits* of an integer is divisible by 9 (i.e. multiple of 9), then the integer is divisible by 9. For instance, 99774 is divisible by 9, because sum of digits (i.e. 9+9+7+7+4 = 36), is divisible by 9.

Dividing A Number by Integer 10

When the last digit of an integer is 0, then that integer is divisible by 10.

Dividing A Number by Integer 11

If the difference between the sum of its digits in odd places and the sum of its digits in even places is either 0 or a multiple of 11, then that number will be divisible by 11.

For example, is 693 divisible by 11?

Solution:

Sum of its digits in odd places: 6 + 3 = **9**

Sum of its digits in even places**: 9**

Difference = 9 – 9 = 0 (So, *693 is divisible by 11*)

Similarly, is 72,457 divisible by 11?

Solution:

Sum of its digits in odd places: 7 + 4 + 7 = **18**

Sum of its digits in even places: 2 + 5 = **7**

Difference = 18 – 7 = 11 (*72,457 is divisible by 11*)

Is 91,580 divisible by 11?

Solution:

Sum of its digits in odd places: 9 + 5 + 0 = **14**

Sum of its digits in even places: 1 + 8 = **9**

Diff. = 14 – 9 = 5 (*91,580 NOT divisible by 11*)

Dividing A Number by Integer 12

As you know that 12 is multiple of both 4 and 3, so when both the rule for 3 and rule for 4 is valid for an integer, that integer is divisible by12. For instance, 73152 is divisible by 12 because its sum of digits is divisible by 3 (i.e. 7+3+1+5+2) as well as last 2 digits (i.e. 52) is divisible by 4.

Consecutive Integers

The series of *integers* that has common difference of 1 is called *consecutive integers*. In other words, the series of *integers*, where the difference between any of the two adjacent terms is 1 is called consecutive integers. For instance, n is an integer:

n, n+1, n+2, n+3, ……

This is general form of *consecutive integers*, because in this series of integers, the difference between any two adjacent integers is always remain 1.

Suppose in any question it is given that the sum of 5 *consecutive integers* is 45, and you are asked to find the greatest of those 5 *consecutive integers*. Always use the general form of *consecutive integers* and equate the sum of those 5 *consecutive integers* to the given sum (i.e. 45) as shown below:

$n + n+1 + n+2 + n+3 + n+4 = 45$

Note that the 1st integer is n (i.e. n+0), 2nd integer is n+1, 3rd integer is n+2, and so on…

Thus, the 5th integer would be n+4, rather than n+5.

So, you have:

$n + n+1 + n+2 + n+3 + n+4 = 45$

⇨ $5n + 10 = 45$ (Note that variable will add to same variable i.e. all *n's* will be added)

⇨ $5n = 35$

⇨ $n = 7$ (Dividing the previous equation by 5 on both sides)

At this stage, you need to analyze the general form of consecutive integers and see which one of the five integers is greatest? You can see that $n + 4$ is the greatest, so simply put the value of n and get the required answer:

Thus, Greatest integer = $n + 4$ = **11** *Answer!*

Similarly, if the smallest integer is required to find, you can say smallest integer among those five integers is n, so in that case the answer would be 7. Also, if the sum of first two integers is required, then simply add n and $n+1$: i.e. $n + n+1 = 2n+1$

And simply put value of n to get answer accordingly.

Think outside the box: The sum of 12 consecutive integers is 6, what is the least of those integers?

First, try by your own, then go down for explanation. Your brainstorming exercise is extremely important to improve in quantitative reasoning.

Solution

Let's suppose following are the 12 consecutive integers: n, $n+1$, $n+2$, $n+3$, $n+4$ ..... $n+11$

According to the given condition: $n + n+1 + n+2 + n+3 + n+4$ ..... $n+11 = 6$

As you know that all variable (n) will be added, and all integers from 1 to 11 need to be added. All n will be added to give $12n$, but how to add consecutive integers from 1 to 11? Use following way for finding sum of 11 consecutive integers:

$1 + 2 + 3 + 4 + \ldots\ldots + 10 + 11$

$= (1+11) + (2+10) + (3+9) + \ldots\ldots$

Each pair sums to 12. Now, problem arise that how many pairs are there?

Answer is very simple. To understand it, let's think how many pairs of 10 integers will be possible? Clearly half as many (i.e. 5), because every two integer makes one group. That means 10 integers will make 5 groups. But in case of 11 integers, number of groups will remain 5, but one integer would be left alone, and that integer is the middle of these 11 integers as follows:

$1 + 2 + 3 + 4 + 5 + \boxed{6} + 7 + 8 + 9 + 10 + 11$

$(1+11) + (2+10) + (3+9) + (4+8) + (5+7) + 6$

As there are 5 pairs having sum 12 each, and one integer 6 is left

So, Sum = $(12 \times 5) + 6 = 66$ (Short-cut)

Given that, sum of these 12 consecutive integers (i.e. $n + n+1 + n+2$ …… $n+11$) is 6, so:

⇨ $12n + 66 = 6$

⇨ $12n = -60$ (Subtracting both sides by 66)

⇨ $n = -5$ *Answer!* (Dividing both sides by 12)

Alternate method for those who are good in quantitative reasoning

As mentioned earlier in the book, quantitative reasoning is more about thinking in mind than just math. Some smart people may have tried solving simply in mind and they come up with the same answer, and that is absolutely correct. They use the below reasoning:

It is given that there are 12 consecutive integers, but their sum is 6. But how strange is this. Isn't it? I mean, the sum of 12 (a lot of integers) gives only a small sum of 6?

Yes! In fact, this is not strange, and you should know the consecutive integers doesn't limit us to consecutive positive integers only. So, there must be some negative integers and with same positive integers such that the sum of these negatives and positive would cancel out to 0 except for 6. So, only 6 and 0 would be left, and rest of all integers will cancel out. This is possible when we add 12 consecutive integers from –5 to 6, such that all positive and negative integers from –5 to 5 would cancel out as follows:

$(-5 + -4 + -3 + -2 + -1 + 0 + 1 + 2 + 3 + 4 + 5) + 6$

$= 0 + 6 = 6$

Thus, the least integer will be **– 5**

Evens & Odds

On basis of even and odd classifications, integers can be categories into two types:

1. *Even integers* (Integers that are divisible by 2: 0, ±2, ±4, ±6, ±8, ….)
2. *Odd integers* (Integers that are **NOT** divisible by 2: ±1, ±3, ±5, ±7, ±9, ….)

📌 *0 is an even integer, because it is divisible by 2. Many people confuse it while assuming that 0 is neither positive nor negative, thus they wrongly assume that 0 is neither an even nor an odd. In fact, being positive or negative is a different thing and being an even or an odd is a different thing. Every integer must be either an even or an odd. As 0 is an integer, so it must be either even or an odd. As it is divisible by 2, so it must be even.*

📌 *Remember that an integer **a** is divisible by **b** if and only if a divided by b results to an integer. Mathematically:*

$$\frac{a}{b} = \textit{Integer}\ (\text{i.e. not a } \textit{decimal})$$

We know that when 0 is divided by 2, it gives an integer (i.e. 0). Mathematically, $\frac{0}{2} = 0$

Thus, 0 is an even integer!

So, 0 is divided by 2, it results to 0 (an integer). Therefore, 0 is divisible by 2. We'll learn about this further later on while discussing Factors & Multiples.

📌 *Remember that non-integers are not odd, because all odd are those **integers** that are not divisible by 2.*

📌 *Even or Odd integers can also be written as Even or Odd numbers, because all integers are numbers. Also, we know that decimals (i.e. non-integers) are neither even nor odd, because both even and odd are integers. Therefore, you'll sometimes see **'even/odd integer'** and sometimes **'even/odd number'** or simply **'even/odd'**. So don't confuse with these terms.*

Arithmetic Operation on Evens & Odds

Comparison	Addition/Subtraction (±)	Multiplication (×)	Division (÷)
even *vs* even	even ± even = even	even × even = even	E ÷ E = either or decimal
even *vs* odd	even ± odd = odd	even × odd = even	E ÷ O = even or decimal
odd *vs* even	odd ± even = odd	odd × even = even	O ÷ E = decimal
odd *vs* odd	odd ± odd = even	odd × odd = odd	O ÷ O = odd or decimal

Here, decimal means that the result is not an integer (i.e. neither *even* nor *odd*). Also, E = even; O = odd.

Addition or Subtraction: When both of the integers are different (i.e. one is *even* and other is *odd*), the result will always be *odd*. But when both of the integers are same (i.e. either both are *even* or both are *odd*), the result will always be *even*.

Multiplication: When at least one of the integers is *even*, the result will always be *even*. The result would be *odd* only when both of the integers are *odd*.

Division: Only when odd is divided by *even*, the result would be *non-integer* (i.e. neither *even* nor *odd*). In all other cases, the result could be *even* integer, an *odd* integer, or a decimal (i.e. either *an integer or a decimal*).

This basic concept of evens and odds is extremely important. Especially, you should know that when there are several integers multiplying each other, if at least one of the integers is *even*, then the result would always be *even*. For instance, the product of the tree integers *x, y,* and *z* will always be *even*, if at least one of the integers is *even*.

$x \times y \times z$ = Even

For instance, $2 \times 3 \times 5 = 30$ Even

Please, avoid plugin values, just remember this concept. I always discourage for plugin values, but only extreme values to make analysis and solve. The practice of thinking more and doing less through *The Best Book for GAT (General)* – by ***Earnest Prep*** will keep you in track and you will become expert enough to solve many questions without doing any written work.

> Remember that your brain works thousands of times faster than your hand. For instance, if somebody ask you "Can you swim?" You will answer spontaneously and say "YES!" or "NO!". You simply recall what you know about swimming, and your brain start processing and checking whether you have done this before? Based on the record, your brain give output that you respond spontaneously after listening the question. You will not believe that your brain does lots of work but very quickly and helps you to answer spontaneously. In fact, answering this question becomes very normal for you and easy, because your brain is used to answer such things (i.e. you made a habit of involving your brain to do 100% job in such situation). That's why you answer it quickly. You do not make any written stuff. Similarly, if you start practice of thinking more in your brain (i.e. brainstorming) and doing less on piece of paper, your speed.

Many people start plugin values in such sort of questions, i.e. they start supposing some values and simply plugin to see which choice will give an odd. But we strongly recommend to avoid plugin as much as you can, because plugin some values gives specific result (i.e. perhaps *odd*), but plugin some different might give a different result (i.e. perhaps *even*). For instance,

Example Scenario: If *a, b* and *c* are consecutive integers*, which of the following MUST be *odd*?

A) $a + b + c$
B) $a + c$
C) ab
D) abc
E) $ab + 1$

*Consecutive integers are the integers that have no integer skipped between them. i.e. 4, 5, and 6 are three consecutive integers.

Solution

Incorrect way: → By putting $a = 1$, $b = 2$ and $c = 3$, the sum of *a, b* and *c* would be 6 (i.e. *even*). Is that mean the sum of any three consecutive integers always an *even*? **No!**

For instance, by putting $a = 2$, $b = 3$, and $c = 4$, the sum of the tree consecutive integers becomes 9 (i.e. *odd*).

> That's why we suggest to **avoid plugin** as much as you can, and instead simply **think logically** and remember the relationship of evens and odds as mentioned in the table of arithmetic operations with evens.

Correct Way: It is given that *a, b* and *c* are consecutive integers, and we know that for any two consecutive integers, one of them must be even and the other one adjacent to that must be odd. But we cannot tell whether the first of those is even or it's an odd. So, we need to imagine both of the scenarios **in our mind** (i.e. **1.** consider first of the three consecutive integers as even and **2.** consider the first integer as odd) as below:

1) If we consider *a* as *even*, then *b* must be *odd* and *c* must be *even* for *a, b* & *c* are consecutive integers.
2) If we consider *a* as *odd*, then *b* must be *even* and *c* must be *odd* for *a, b* & *c* are consecutive integers.

According to first scenario, $a + b + c$ would be odd, while according to second scenario, the sum would be even. Thus, **Choice A is NOT must be odd**. We are repeating again, please do such things in your mind!

Few of you may argue that this way is bit difficult. But trust me, if you become use to such way, you will be like an expert in quantitative reasoning and able to get full marks in this section. You just need to practice of doing such things in your mind. Do enough practice that such things will become in your fingertips.

Similarly, there are two scenarios for Choice B:

1) Both *a* and *c* are even.
2) Both *a* and *c* are odd.

Few people may want to ask why not *a* is *even* with *c* is *odd*? Well, this scenario cannot be possible because *a* and *c* are not adjacent integers, rather there is one integer (i.e. *b*) exists between *a* and *c*. This means, if *a* is *even*, then *c* must also be *even* because *b* will be *odd*. And if *a* is *odd* then *c* must also be *odd*, because *b* will be *even*. In short, consecutive integers *a, b* and *c* are either (*even*, *odd*, and *even*) or (*odd*, *even* and *odd*). According to both scenarios, the sum of *a* and *c* always give *even*. Thus, **Choice B CANNOT be odd**.

There's only one possible scenario for third choice, i.e. the product of any two consecutive integer is always an *even*. This is because one of the two consecutive integers (i.e. *a* or *b*) is *even*. So, the product of *a* and *b* would always be *even*. Thus, **Choice C CANNOT be odd**.

Similarly, fourth choice would also result to *even* because three consecutive integers always include at least one *even* integer, so their product would always be *even*. Thus, **Choice D CANNOT be odd**.

Finally, we have left with choice E, which must be the correct answer. Because the product of two consecutive integers (i.e. *ab*) always gives *even*, so *even* + *odd* (i.e. *ab* + 1) is always *odd*. Thus, **Choice E MUST be an odd**.

Note that the explanation of this technique seems lengthy, while that of plugin method looks as if it is short. But trust me this technique of using brain more than hands is far quicker, authentic and helpful especially in advance level questions. It looks lengthy at beginning because you are not used to do such things in your mind; so, when you will become expert, this technique will be in your fingertips, and you will just see the question and able to answer quickly without doing any paper work. Additionally, chance of getting the correct answer is 100%.

Similarly, let's suppose if *a, b, c* and *d* are consecutive integers, which of the following MUST be *even*?

A) ac

B) bd

C) ad

D) $ab + c$

E) $bc + d$

Note that, for instance in Choice A, *a* and *c* multiplying (i.e. $ac = a \times c$)

Solution

You need to process your brain bit quickly as you go ahead in this book, but first focus more on accuracy than speed. Let's begin with choice A, and do it a bit faster than as we did previously.

According to the given condition, either (both *a* and *c* are even) or (both *a* and *c* are odd). So, **this choice is NOT Must be even**. Similar with choice B, either (both *b* and *d* are even) or (both *b* and *d* are odd). So, **this choice is NOT Must be even**.

According to the choice C, as we know the product of *a* and *d* is always even (because either *a* or *d* must be even). That means one of these is always be even, and will result to an even. So, **Choice C MUST be even**.

Similarly, the rest of the two choices would not be "MUST be even". For instance, choice D: *ab* must be even, but *c* can be either even or odd. So, result is not MUST be even. Same is the case with choice E.

So far, we have learned basics of numbers, integers, positive integers, negative integers, even and odd integers etc. Additionally, we analyzed how such basic concepts is tested in some actual questions. Now is the best time to learn bit about *arithmetic rules* and its application with practice.

Key Points

- **Avoid plugin** as much as you can, and **think logically** so you will damn sure on your answer.
- Skip as much steps as you can on paper work, and allow your brain to do the rest of the task.
- The **sum** of two integers will be even if either *both integers are even* or *both integers are odd*.
- The **product** of two or more integers would always be even if at least one integer is even.
- In consecutive integers, use general form and follow the sequence or pattern then solve for *n*.
- Most of the time, you will need to think logically rather than just do math. This saves plenty of time.

Basic Analytical Reasoning

Before going ahead, it is extremely important to read the answers of the following frequently asked questions about GAT *Analytical Reasoning* section:

Important Frequently Asked Questions

What is tested in Analytical Reasoning?

This section grades you on how efficiently you can reason to solve logical puzzle based on given sets of conditions (what we call it as *limitations*) in such a short span of time. Sometimes, it is also called group reasoning, where group of information is given and you need to answer based on the given information. If you can accurately extract information in a diagrammatic style, such questions become easier. In this section, your brain's work of *analyzing* & *diagramming / sketching* the information is much more critical. This section tests your *Analytical skill* in addition to *Time Management*.

What's the trick to get 99th percentile rank in Analytical Reasoning Section?

Keep the following important points in mind, this would help you in achieving the target score in this section:

- Read the group information carefully, and draw sketch accurately. Never miss any information in your sketch, as your sketch will tell whether you will answer correctly or incorrectly. In other words, making an accurate sketch is the key to succeed in *Analytical* section.
- Once, sketch is done, never go back to the group information and save as much time as you can from the given sketch, because there's very limited time in exam, and if you want to complete analytical section within time, you need lot of good practice which is available in *The Best Book for GAT & HAT– by* ***Earnest Prep***.
- In preparation stage, give much time in learning how to make sketch and do plenty of practice. Once you become expert in making accurate sketch, you will become champion in *Analytical Reasoning*.
- Never get panic or feel anxious, when it takes plenty of minutes to solve a question in preparation stage, because you need to practice your brain with such new sort of question types. Once, your brain get habit to deal with such questions, you will able to answer quickly. So, be self-motivated!
- Remember, that once you complete the 20-days study plan as mentioned in this book, analytical reasoning section will become in your fingertips. And you can get 99th percentile rank in analytical section.

You should know the exact meaning of the following questions:

- ✓ Which of the following **Must be true**?
- ✓ Which of the following **Could be true**?
- ✓ Which of the following **Cannot be true**?
- ✓ All of the following **will be true EXCEPT**?
- ✓ All of the following **could be true EXCEPT**?
- ✓ Each of the following **cannot be true EXCEPT**?

Must be true

It is a situation where the given information is always true or there's no any possible situation where the given information is false. In other words, there's 100% chance that the information is true, or there's 0% chance that the given information is false.

To understand this, let's suppose, if X is the father of Y and Z. Then, age of X **must be** greater than age of Y. Also, age of X **must be** greater than age of Z. But age of X is not must be greater than combined ages of Y and Z.

Could be true

It is a situation, when the given information may possibly be true or there's a possibility that the information may be false. In other words, we are not certain whether the information is true, but there's just some possibility or chance that the information can be true.

To understand this, let's suppose the same example, i.e.: if X is the father of Y and Z. Then, age of X **could be** greater than combined ages of Y and Z. It means there's a possibility that age of X can be greater than the sum of the ages of Y and Z. But this information is not must be true. Also, we cannot say that this information cannot be true, because there's a possibility exist.

Cannot be true

It is a situation where the given information is always false or there's no any possible situation where the given information is true. In other words, there's 100% chance that the information is false, or there's 0% chance that the given information is true. To understand this, let's suppose, if X is the father of Y and Z. Then, age of Y **cannot be** greater than age of X. Also, age of Z **cannot also be** greater than age of X. So, if any answer choice violates any of the two previous statements, that Cannot Be True, and will be the correct answer!

Will be true EXCEPT

It means, all of the given choices will always be true, except one choice, which either **Can Be False** or **Must Be False**. So, the choice which can be false, is correct.

To understand this, let's consider, if X is the father of Y and Z, all of the following will be true EXCEPT the last choice (which is Could be true but not Must be true. So, Will be True Except = Not Must be True):

A) Age of X is greater than age of Y
B) Age of X is greater than age of Z
C) Combined ages of X and Y is greater than age of Z
D) Combined ages of X and Z is greater than age of Y
E) Height of Z is greater than height of X

Could be true EXCEPT

It means, all of the given choices can be true, except one choice, which **Cannot Be True** or **Must Be FALSE**. So, the choice which cannot be true, is correct.

To understand this, let's consider, if X is the father of Y and Z, all of the following can be true EXCEPT the last choice:

A) Both Y and Z are sons of X
B) Both Y and Z are daughters of X
C) Age of Y is greater than age of Z
D) Height of Z is greater than height of X
E) Age of Y is greater than age of X

Cannot be true EXCEPT

It means, all of the given choices are false, except one choice, which **Can Be True** or **Must Be True**. So, the choice which can be true, is correct.

To understand this, let's consider, if X is the father of Y and Z, all of the following cannot be true EXCEPT the last choice:

A) Age of Y is greater than age of X
B) Age of Z is greater than age of X
C) X has no child
D) X, Y and Z are siblings
E) X is having least height among X, Y and Z

GAT & HAT Analytical questions are presented in groups of three to seven questions. Each group is based on a short passage followed by a set of conditions. There are some basic strategies that would help you in solving *GAT Analytical Reasoning* questions at beginner stage.

Basic Strategies

- Always count the number of questions that each group has; and start from the group that contains largest number of questions. It'll be a loss when you give huge time to that group that contains only few questions.
- Utilize maximum one and a half minutes per question on average. i.e., if there are 4 questions in a group, spend no more than 6 minutes to this group. If a question left after 6 minutes over, then take a minute more, otherwise if more than one questions still left; just move on to next group and avoid further waste of time, because next group may be relatively easier for you.
- Always draw intelligent drawing (i.e., shape the information of the group in picture form) of each group while reading the passage containing information. There's no hard and fast rule for drawing these. Everybody has his own way of solving the questions and create different drawing at the spot.
- Make changes in the drawing accordingly with the additional information that are subject to limitations in the group question. And let's call it as your original drawing.
- When the drawing finalizes according to all information of group, then move on the first question of the group and change the drawing according to the question, if necessary. And answer the first question, while using the drawing.
- While solving the next question, always revert back to the original drawing rather than the drawing used in first question after changes. And similarly, while solving 3rd and 4th questions use the original drawing to find the answer.

📌 *If you successfully answered the first question from the group having several questions and proceeded to answer the second one, just forget about the information given in the first question; just consult the information in the passage including conditions. Similarly, if you answered the second question of the group of several questions and proceeded to the third one, just forget about the information given in first and second questions of the group; again, consult the information in the passage of the group together with the conditions.*

To understand the general format of the question, consider the following simple example scenario at this beginner stage. In advance level, we'll discuss actual questions scenarios with medium and hard difficulty levels questions with according strategies. After covering that complete, you will become expert in analytical reasoning section.

Basic Analytical Reasoning example scenario

Answer Question 1 – 4 based on information below

Five people (namely: A, B, C, D, and E) took GAT exam, and were ranked according to the given condition:

Mr. A was amongst top Three in the exam. Mr. B was on Fourth rank. And C was on the adjacent rank next to E.

1. Which of the following MUST be on the last rank?

a) Mr. A
b) Mr. B
c) Mr. C
d) Mr. D
e) Mr. E

2. Which of the following MUST be on the first rank, if B was on next adjacent rank next to A?

a) Mr. A
b) Mr. B
c) Mr. C
d) Mr. D
e) Mr. E

3. All of the following could be the true ranking of persons from top to bottom EXCEPT?

a) A, E, C, B, D
b) E, C, A, B, D
c) E, A, C, B, D

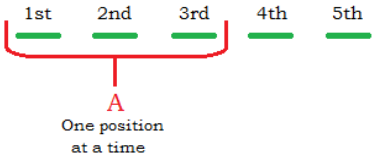
4. How many possible arrangements of ranking of five persons can be made?

a) 0
b) 1
c) 2
d) 3
e) 4

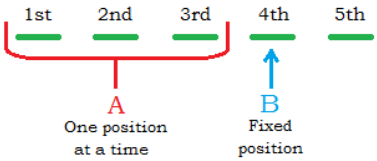
Answers Explanations

To answer these questions, always make arrangements according to the conditions given in question. i.e.:

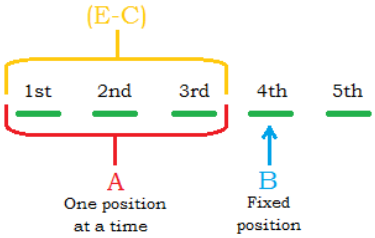
- ⇨ First condition (i.e. first restriction / limitation) tells information about the possible positions of **A**, who may only be placed on first three positions as shown below:



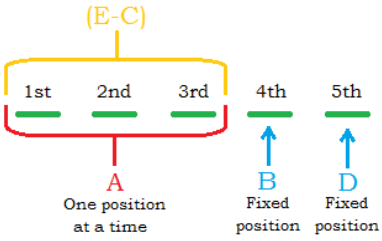
- ⇨ Second condition (or restriction) tells information about the position of **B**, which must be placed at fourth position/rank, i.e. fixed at fourth rank, so let's sketch it:



- ⇨ Third and final condition tells information about the places of **C** and **E**, that must be place on adjacent places, i.e., place side-by-side; such that **C** must place after **E** place. The word *"next to"* suggests that **C** must place just after the rank of **E**, i.e., not before **E**. Because both have to be place together, so neither **C** nor **D** can place at 5^{th} position/rank and, therefore, can be placed at first three positions, as shown below:



Finally, one person **D** is left with only a position of 5^{th}; so it must be fixed on this position, as shown below:



> Based on the given information, the above sketch is our final sketch, and we will not go back to the question for group information, rather we will consult with this final version of our sketch to answer all questions.

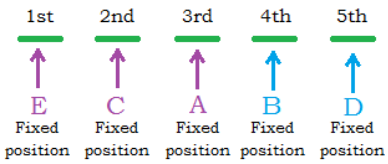
Now, let's answer each question one by one after making diagrammed sketch of the information given in question.

1. Answer: (**Choice d**)

The answer of first question is (Choice d) because we can see that only **D** is the person that got the 5^{th} rank.

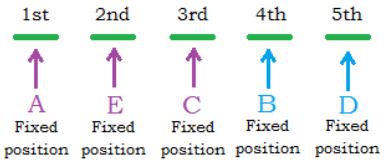
2. Answer (**Choice e**)

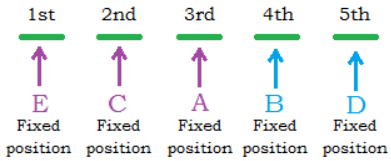
This question makes further restriction to **A**, by stating specific place for **A**. Because the position of **A** becomes on the place that has next adjacent place of **B**, who is at 4^{th} rank, therefore the rank of **A** is 3^{rd} here according to the information of question. So, we should change the original diagram according to the information of this question and solve for the first position, as shown below:



3. Answer (**Choice c**)

To answer this type of question, always start from the original drawing and place the persons to the ranks that are fixed. So we should place **B** at 4^{th} and **D** at 5^{th} rank respectively that are fixed. Now as there are 3 persons remaining with three ranks such that **E** & **C** will place together, i.e., **A** can't be placed between **E** and **C**. Therefore, only two arrangements are possible. To solve it we need to suppose (**E-C**) as one pair that can't be separated or interchanged (i.e. can't be placed as (**C-E**), as **C** will have rank after **E**. These two possible arrangements are shown below:





Except these two arrangements/orders of ranking, any arrangement would be incorrect. So only **choice (c)** cannot be the possible arrangement of ranking from Top to Bottom.

4. Answer (**Choice c**)

Refer to the explanation of Question 3 above. As there are only two possible arrangements of ranking, therefore **choice (c)** would be the right answer.

Basic Verbal Reasoning

Before going ahead, it is extremely important to read the answers of the following frequently asked questions about GAT *Verbal Reasoning* section:

Important Frequently Asked Questions

What is tested in GAT Verbal Reasoning?

This section grades you on your comprehension, vocabulary, analogies and some grammatical knowledge. This section requires practice of very good resource as available in *The Best Book for GAT & HAT Preparation – by* ***Earnest Prep***. In this section, your speed of reading and understanding the passage and vocabulary in addition to grammar is tested. Although, vocabulary is tested in three ways: *Synonyms*, *Antonyms* and *Text Completion*. In this book, approx. 500 words are covered that are more than enough. These words are frequently tested in tests.

What's the trick to get 99th percentile rank in GAT Verbal Reasoning Section?

Keep the following important points in mind, this would help you in achieving the target score in this section:

- ✓ If you are not good in reading, always make a habit of reading especially newspaper (e.g. DAWN newspaper), and especially Editorial page, which is on the back of the newspaper when you completely open the paper.
- ✓ If you want to become expert in verbal section, you should love reading a lot. Try to buy good novels that you can read at night time before sleep. If you make this habit, you will definitely see significant difference. Those who are extremely good in verbal, they have habit of reading novels daily.
- ✓ Each verbal question type has specific strategy and concepts, which are discussed in this book. Always keep in mind those strategies while answering the verbal reasoning question.
- ✓ If you hate reading, you should start loving it, because without passion of reading, you cannot get 99th percentile in verbal section. And passion of reading will help you to do more and more practice and hence get improve your performance in this section gradually.
- ✓ Do not waste your time in learning thousands of vocabulary words, rather simply remember 650 frequently used words for GAT & HAT that is part of 20-days study plan in this book. If you follow the 20-days study plan, you can complete these 650 frequently use HEC & NTS vocabulary.

Basic Sentence Structure

She *(subject)* goes *(verb)* to school *(object / complement)* in the morning *(Modifier)*.

Subject: The part of sentence, which performs the action (i.e. which do the verb)

Verb: The action which the subject performs. {i.e. goes is an action performed by She*(subject)*}

Complement: The part of sentence to which the action is done, (i.e. to school is a complement)

Modifier: The part of sentence which gives additional information and not necessarily contains a subject, or a verb or both subject and verb. (i.e. in the morning is a *modifying phrase*. We'll discuss modifiers, phrases and clauses later on in advance level preparation plan i.e. Day 4 and 5.)

Sentence

A sentence is a group of words that makes complete sense. In order to make complete sense, the words must include a *subject* and a *verb*. For instance:

Example of short Sentences (containing both ***subject*** and *verb*):

- **He** goes
- **Baby** cries
- **She** walkup
- Bring **a chair**
- Open **the door**
- Have **a look**

Note that the subject may also come after the verb, i.e. the subject not necessarily come at start of the sentence.

Subject

The subject is the sentence which performs the action. It is the person or thing that performs, or is responsible for, the action of the sentence. Often it comes at beginning of the sentence and precedes the verb, but sometimes it comes after the verb.

Every sentence in English must have a subject. Commands will not have a visible subject, however, the subject [you] is understood. Example:

Work quickly! = **You** work quickly!

The subject can be a single noun:
Cats chase mice.
Children like candy.

The subject can also be a noun phrase, which is a group of words ending with a noun. A noun phrase CANNOT begin with a preposition (See more under Prepositions and Prepositional Phrases later in the book):

This blue colored car is in the garage.
That hot red dress looks fabulous.

Verb

A verb normally reveals the action of the sentence. Every sentence must also have a verb in order to make a complete sense, otherwise the sentence cannot be called as complete sentence. The verb can be a single word:

Wasif likes eating cookies.

They play snooker.

The verb can also be a verb phrase. A verb phrase contains one, or more, auxiliary (i.e. helping) verbs and one main verb. The main verb is always preceded by the auxiliary verbs.

Sana has been talking to her new friend.
His mother is visiting his school today.
Bilal has returned from school.
Hamid is playing in a tournament tomorrow.

Compliment (Object)

A complement (object) is usually a noun or a noun phrase, which provides more information about the verb. Often, it follows the verb in a sentence relaying active voice.

A complement (object) answers the question *what*, *whom* or *where*?

Examples of complements

Ahmed threw *the stone* in the flowing river.	(*What* did Ahmed throw?)
The hungry bird ate *a worm*.	(*What* did the bird eat?)
He called *Janice* after the party.	(*Whom* did he call?)
She was chewing *gum* in class.	(*What* was she chewing?)
The ball hit *Mike* during the game last night.	(*Whom* did the ball hit?)
He goes *to school* in the morning.	(*Where* does he go?)

Modifier

A modifier tells the time, place, or manner of action. The modifier usually follows the complement. Not every sentence requires a modifier. Prepositional phrases are commonly used as modifiers (See more under Prepositions and Prepositional Phrases later in the book).

Examples of prepositional phrases

under the house, *after breakfast*, *in the morning*

Adverbs and adverbial phrases are also used as modifiers, or modifiers of time. A modifier of time will usually come last when more than one modifier is used.

Examples of adverbs and adverbial phrases:

yesterday, *quickly*, *last semester*, *overhead*, *quite awful*

A modifier answers the question of *where*, *when* or *how*?

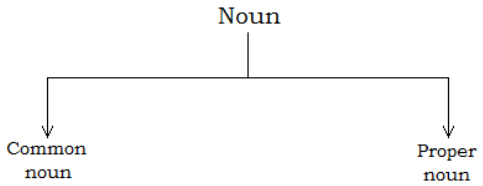
Examples of modifiers

She is earning her degree at Punjab University.	(*Where* is she earning her degree?)
Bilal fell down the stairs	(*Where* did Bilal fall?)
Bilal fell down yesterday.	(*When* did Bilal fall?)
The cheetah was running quite fast.	(*How* was the cheetah running?)
We have an appointment at ten o'clock tomorrow.	(*When* do we have an appointment?)
The soldier fired the gun repeatedly.	(*How* did the soldier fire the gun?)

Parts of Speech

1. Noun*(n)*

It's the name of *person*, *place*, *thing* or *idea*. There are two types of nouns as shown below:



Common noun: It's the name of common things: *child*, *president*, *school*, and *season*.

As you see there is no specific one child in the world; in fact, there are many children. Similarly, there are no specific one president, one school and one season in the world; in fact, there are many of these in the world. So, in short, common noun names any specific *group of things* rather than one specific thing.

Proper noun: It's the name of specific people, things or places: *Governor Jinah*, **Forman Christian College**, *ARY News*, *Spring season* and Ahmed etc.

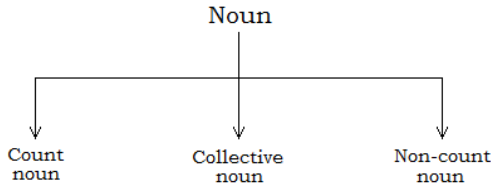
Noun can come anywhere in a sentence. The underlined words below are nouns.

The School-bus arrived.
After getting his awesome test score, Bilal got admitted to six best universities.

A sentence may have unlimited common and proper nouns, as long as the sentence continues to make sense.

Singular noun names one person, place or thing (cat, house), while a plural noun names more than one person, place or thing (cats, houses).

Nouns can further be categorized as **count nouns**, **non-count nouns**, and **collective nouns**, as shown below:



Count noun: it can be counted: *pen*, *blocks*, *ducks*, and *drops of water* (one pen, seven blocks, two thousand ducks, and hundred drops of water).

Non-count noun: It cannot be counted: *flow*, *grass*, *wood*, and *water* (two flow?, three flow…?; two grass?, three grass…?; two wood?, three wood…?; two water?, three water…? All doesn't make sense.)

Notice that drops of water are count noun, while water is non-count noun.

Collective noun: Singular count nouns that identify a group: *panel*, *committee*, *choir*, *faculty*, *team*, *army*, and *jury*.

1. Pronoun*(pr)*

It's a person, place, thing, or idea that replaces a noun.

Pronouns such as *he*, *we* and *them*, are words that are used to replace a noun.
When Ms. Laiba told Asim that he could take home their classroom sandwich for summer, he called his mother and told her that she needs to pick it up after school.

Antecedent: The noun to which a pronoun refers/replaces is called an antecedent.

Imran called his mother for early breakfast, because he has to go early to school.

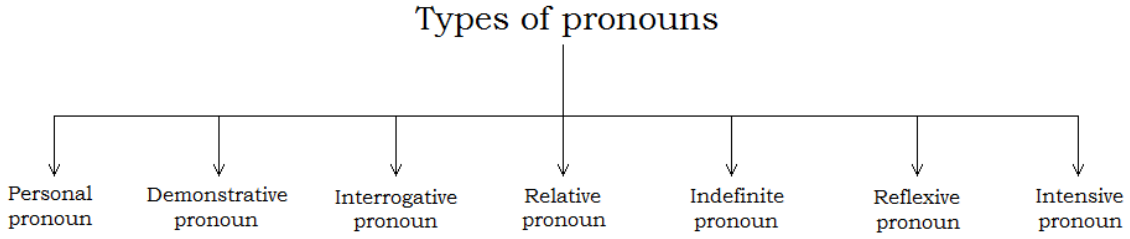
In the sentence above, Imran is antecedent for 'his' and 'he'. In other words, antecedent is a parent word to whom pronoun/pronouns refer. While most pronouns will have an antecedent, beware of the occasional sentence without an antecedent. Take the following sentence for example:

Everyone must take a seat before the match begins.

Everyone does not have an antecedent because it understood that everyone refers to all of the people in the ground-seats at the time the match begins.

Types of pronouns

There are seven different types of pronouns as shown below, and a basic understanding of each is important for succeeding on preparation of Sentence Correction part of this exam.



1. Personal Pronouns

As the name implies, these pronouns get personal; they refer to specific person or thing, and include persons, like I, he, hers, and us.

Although she was best known for her art, Roza also published cook books.
After the kids watched the movie, the baby-sitter served them dinner.

***a*. Demonstrative pronouns**

Demonstrative pronouns demonstrate. They point to nouns that are nearly in time or space. There are four demonstrative pronouns: this, that, these and those.

These shirts should be marked half price.
That cannot happen again.

***b*. Interrogative pronouns**

This type of pronoun interrogates, or asks questions. The four main interrogative pronouns are who, whom, which, and what.

Who took the last slice of pizza? Which band member is your favorite?

***c*. Relative pronouns**

Relative pronouns relate. They connect a phrase to the antecedent. There are four specific relative pronouns: who, whom, that, and which.

The nurse who gave you the injection has the day off.

Notice that who is also a relative pronoun, but important point is that in relative pronoun, who always come just after the noun to whom it refers.

The only thing that matters is your safety.

You see that pronouns 'who' and 'that' refers to their immediate nouns that came before these pronouns.

***d*. Indefinite pronouns**

These pronouns are not definite; they refer to a person or thing that is identified, but is not specific. There are dozens of indefinite pronouns, and some examples include everybody, few, each, and somebody.

Many of the balloons pepped before they were released.
You can put anything on the pizza you want.

***e*. Reflexive pronouns**

Reflexive pronouns reflect back onto the noun. They are myself, yourself, herself, himself, itself, ourselves, yourselves, and themselves.

The CEO does the hiring himself.
I gave myself a haircut.

f. Intensive pronouns

These pronouns intensify or emphasize the antecedent. They take the exact same form as reflexive pronouns, but they follow the noun more closely.

I myself would prefer to eat in the non-smoking section.
The office manager herself said that we're all getting bonuses.

Several pronoun concepts are tested in sentence correction, including pronoun-antecedent agreement and implied and ambiguous pronouns. These potential errors are covered in detail later on. Your ability to quickly spot a pronoun and its antecedent can save your valuable time.

Remember, you do not have to memorize the names of the seven types of pronouns. You simply must understand that pronouns take many different roles in a sentence.

3. Verb*(vb)*

It's a word showing action or state of being.

Every sentence must contain a verb. The simplest sentence in the English language is only three letters long, containing a pronoun and a verb.

I am

I do

Most sentences are more descriptive, but they all contain at least one verb:

I went to the Joyland Park.

The journey was too long.

Some verbs are made up of more than one word. Helping-verbs*(hv)* such as be, shall, can, must, and would are added to action verbs to help express time and mood. Look at the following sentence:

The student is playing at football ground.

In this sentence, *is* joins *playing* to show that the student is currently at football ground. If the word *was* were substituted for the word *is*, the sentence could have taken on a new meaning because then the student had played at the football ground in the past. Other helping verbs include can, could, may, might, must, need, ought to, shall, should, will, would, and used to. The verb phrase may contain several helping verbs:

In January, Asif will have been working here for four years.

The **helping-verbs***(hv)* in this sentence indicate that Asif began working in past and will continue working into future. Helping verbs are necessary to convey timing.

Linking verbs*(lv)* on other hand, rather than showing action, links a noun or pronoun to additional information about that noun or pronoun:

The smoked herring is*(lv)* delicious.

In this sentence the noun herring, is not performing any action (such as swimming or fleeing). Instead, a linking verb provides information about the herring: it is delicious. Look another:

I am*(lv)* a sales representative for a paper company.

Other linking verbs include sensory verbs (*see*, *hear*, *taste*, *smell*, *feel*) and verbs that reflect a state of being (such as appear, become, prove, remain, seem).

Sara seems*(lv)* happy.

The dirty sock smells*(lv)* repulsive.

Remember that many linking verbs can also be regular verbs that show action: The boy smells*(vb)* the dirty sock.

In this sentence, the word *smells* is an action verb because it shows what the boy is doing. To test a sensory verb or a state of being verb for its classification as a linking verb or an action verb, substitute the verb to be in the sentence. If the sentence still makes sense, the original verb is a linking verb. If the sentence no longer makes sense, the original verb is an action verb:

The dirty sock smells repulsive.

The dirty sock is repulsive.

Smells = linking verb

This sentence makes sense, so *smells* is functioning as *linking verb* in the original sentence.

The boy smells the dirty sock.

The boy is the dirty sock

Smells = action verb.

The second sentence does not make sense in this example; thus, smells occur as an action verb in the first sentence.

Verbals: are words that are based on verbs, but function as other parts of speech in sentence. One type of verbal is infinitive, which is root of the verb combined with the word to:

To draw

To eat

To remember

To waste

Infinitives can act as adjectives and adverbs but are most often nouns:

I learned*(vb)* to cook*(n)* when I was in college.

Some students may struggle with this concept, wanting to group to cook with the verb, learned. But replace to cook with a true noun:

I learned*(vb)* biology*(n)* when I was in college.

This should help you clearly see that to cook is a noun which follows the verb.

Another verbal is the *gerund*. Gerunds are often mistaken with verbs because they end in *–ing*, but gerunds function as a noun. Look at how running can be used as an action verb or a gerund:

I was*(hv)* running*(vb)* for my life!

Running*(n)* is*(lv)* my favorite form of exercise.

Again, if you have trouble visualizing running as a noun in the second sentence, replace it with an unquestionable noun:

Running is my favorite form of exercise.

Aerobics is my favorite form of exercise.

Few students will question that aerobics is a noun, and it should help you see that running functions as a noun in the same sentence.

The final verbal is the participle. Participles are verb forms that function as adjectives and most often end in *–ing* (present participles) or *–ed* (past participles). Look at below examples how the word frighten can be used as verb and as verbal adjective:

The dog is*(hv)* frightening*(vb)* the mailman.
The frightening*(adj)* dog lunged at the mailman.
The frightened*(adj)* dog hid from the mailman.

As with the two previous verbals, substitute a true adjective into the sentence in order to confirm the verbal is a participle:

The frightening*(adj)* dog lunged at the mailman.
The scary*(adj)* dog lunged at the mailman.

The frightened*(adj)* dog hid from the mailman.
The timid*(adj)* dog hid form the mailman.

Because every sentence contains a verb, errors with verbs are extremely popular test questions, and we'll discuss verb tense and verb form in more detail later.

Every sentence must contain a verb, so it should be no surprise that verb errors are prevalent on such exams. If you can discern verbs from infinitives, gerunds, and participles, you can quickly catch errors in agreements, tense, and form. Verbs are thoroughly covered later on.

4. Prepositions*(prep)*

Preposition – word used to link a noun or pronoun to other words.

Prepositions describe a relationship or situation between words in the sentence. Try to define one, like *above, around* or *on*. The most common prepositions include:

about, across, after, against, among, around, as, at, before, behind, between, by, during, for, from, in, including, into, like, off, on, over, through, to, towards, under, upon, with, within, and *without*.

Prepositions never come alone; they are always in a prepositional phrase. Prepositional phrases begin with a preposition and end with a noun or pronoun, which is called the object of the preposition. Look at several prepositional phrases with the preposition and its object identified:

to*(prep)* the store*(n)* from*(prep)* a distant land*(n)*

Prepositions most often describe time (at, by, during), place (above, on, within), or movement (to, towards). Because many prepositions are only two or three letters long, they are popular errors on such exams. The test makers hope that you will not notice an error in such a small word.

5. Adjectives*(adj)*

Adjective – words which describes or modifies a noun or a pronoun.
Adjectives are called modifiers because they modify a noun or pronoun in a sentence.

They make an apple shiny and read or an orange juicy and sweet.

Adjectives make our language more colorful and descriptive, and most authors are armed with an arsenal of adjectives. Take this passage from a famous novel "The Great Gatsby", by F. Scott Fitzgerald:

'A stout, middle-aged man, with enormous owl-eyed spectacles, was sitting somewhat drunk on the edge of a great table, starting with unsteady concentration at the shelves of books.'

Remove the adjectives and adjective phrases and the sentence loses its brilliance:
'A man was sitting somewhat drunk on the edge of a table, staring with concentration at the shelves.'

We no longer know the man's appearance, his age, or the degree of his concentration. Plus, we have lost details about the table and the shelves. Adjectives help make the literary world more vivid and interesting.

Adjectives most often come before the noun or pronoun they are modifying:

The choppy*(adj)* water*(n)* caused the small*(adj)* boat*(n)* to roll.
I bought an inexpensive*(adj)* purse*(n)* in a charming*(adj)* French*(adj)* village*(n)*.

Adjective can also come after a linking verb to modify the noun or pronoun before the linking verb:

The water*(n)* is*(lv)* choppy*(adj)*.
They*(pro)* are*(lv)* inexpensive*(adj)*.

Errors with adjectives will be discussed later, but it is important to know that adjectives are often confused with the next part of speech, adverbs.

The determiners 'a', 'an' and 'the' are a special group of adjectives called *articles*, we'll discuss these as well later.

6. Adverbs*(adv)*
Adverbs – words which describes or modifies a verb, and adjective, or another adverb.

Adverbs are also modifiers. However, unlike an adjective which modifies a noun or pronoun, adverbs modify a verb, an adjective, or another adverb. Three examples follow.

Adverb modifying a verb:
Shumaila quickly*(adv)* ran*(vb)* down the field.

Adverb modifying an adjective:
Shumaila ran down the very*(adv)* long*(adj)* field*(n)*.

Adverb modifying another adverb:
Shumaila ran*(vb)* quite*(adv)* slowly*(adv)* up the field.

It is true that most words that end in *–ly* are adverbs: *quickly*, *sadly*, *loudly*, and *carefully*. But adverbs do not have to end in *–ly*, such as *quite* and *very*. Also, not all words that end in *–ly* are adverbs. Words such as friendly, lonely, and sparkly are adjectives.

Exercise – Using Adjectives and Adverbs

Underline the correct adjective or adverb in parentheses. Then write *Aj* for adjective, or *Av* for adverb, in the blank at the end of the sentence to determine in what capacity the chosen word is used.

Example: He likes (sad, sadly) movies. *Adj*

1. They sing (good, well). _____
2. Ellen's chocolate cake is (delicious, deliciously). _____
3. The students speak (fluent, fluently) English. _____
4. The students speak English (fluent, fluently). _____
5. This is an (awesome, awesomely) painting. _____
6. The lady at the opera sang (beautiful, beautifully). _____
7. (Incredible, Incredibly), the baby survived the plane crash. _____
8. That is a (considerable, considerably) fee to enter the game. _____
9. The fee is (considerable, considerably) more than I expected. _____
10. He needs to swim (fast, fastly) in order to beat the champion. _____

Adjectives and Adverb Phrases

One more final note about adjectives and adverbs before their specific errors are discussed later: phrases—especially prepositional phrases—can also take on the modifying role of an adjective or an adverb:

Shumaila runs*(vb)* like the wind*(adj)*.

'Like the wind', typically a prepositional phrase, takes the role of an adverb. It tells the reader how Shumaila runs, thus modifying a verb. 'Like the wind' is an adverb phrase. Look at another:

Shumaila, the star athlete at my high school, runs every day.

The noun phrase, *the star athlete at my high school*, has become an adjective. It modifies Shumaila, the main noun, making it an adjective phrase.

Read again the sentence from famous novel *The Great Gatsby*:

'A stout, middle-aged man, with enormous owl-eyed spectacles, was sitting somewhat drunk on the edge of a great table, starting with unsteady concentration at the shelves of books.'

Now, study it with the adjectives and adverbs underlined:

A*(adj)* stout*(adj)*, middle-aged*(adj)* man, with enormous owl-eyed spectacles*(adj phrase)*, was sitting somewhat*(adv)* drunk*(adv)* on the edge of a great table*(adv phrase)*, staring with unsteady concentration*(adv phrase)* at the shelves of books*(adv phrase)*.

Now, look at the sentence with all of the adjectives and adverbs removed: Man*(n)* was*(hv)* sitting*(vb)*, staring*(vb)*. This exercise makes it easy to see why adjectives and adverbs are so important to English language.

7. Conjunctions *(conj)*

Conjunctions – word which links words or phrases.
There are three types of confections: coordinating conjunctions, subordinating conjunctions, and correlative conjunctions.

Coordinating conditions: These are the most common, of which there are seven:

and but or yet for nor so

Coordinating conjunctions are those connecting words used to join nouns, pronouns, verbs, prepositional phrases, adjectives, and even adverbs:

Nouns: Pakistan or Bilal
Pronouns: he or she
Verbs: going or play
Prepositions: of the people, for the people, and by the people Adjectives: red, white, and blue
Adverbs: quickly but quietly

Coordinating conjunctions are also used to join two complete sentences:

Toni wrecked the car. She was not injured.
Toni wrecked the car, but she was not injured.

Such type of sentence completion usually come in GAT & HAT exam, where you need to select best conjunction rather than a vocabulary word for the blank. As in above example, you must select conjunction *'but'*.

Similarly, see another example:
You may choose to be quiet. You may choose to leave.
You may choose to be quiet, *or* you may choose to leave.

Taking two complete sentences and joining them with a coordinating conjunction is called coordination. **It takes two equally important sentences and fuses them together with a comma and a conjunction**.

Subordinating conjunctions include words like although, once, rather than, and until. They are also used to join two sentences, but one of the sentences is rearranged to become a phrase:

The car was low on gas. Sana turned off the air conditioner.
Because the car was low on gas, Sana turned off the air conditioner.

I decided not to invest in the internet. I put my savings into a restaurant.
Rather than investing in the internet, I put my savings into a restaurant.

Correlative conjunctions: These are a type of coordinating conjunction, but they are like twins. Correlative conjunctions include:
either ... or neither ... nor both ... and ... not only ... but also not ... but as ... as

Look at few examples:

I can *either* take the bus *or* participate in a carpool.
The amazing piano player is *both* blind *and* deaf.
Swimming is *not only* great exercise *but also* an enjoyable pastime.

Conjunctions are common parts of speech, and therefore they are common errors on such exams.

8. Interjections*(int)*

Interjection – word used to convey emotion
Finally, Interjections are added to a sentence to show emotions, so they do not affect any other part of the sentence. Words like Wow, Oh, and Eh? are interjections. Because they are not common in formal writing, writing, interjections are not tested in GAT & HAT. Hurray!

This is the perfect time to study HEC & NTS vocabulary (Frequently used wordlist). So, let's learn 25 words for the first day and learn its usage in sentence.

Vocabulary Set-01 (650 GAT & HAT Frequently Used Words)

Sr#	Word	Meaning	Synonyms	Antonyms
001.	concise	brief and to the point	succinct; terse; brief; short; lessen; abridge	prolix; discursive; protracted; circumlocutory; verbose
002.	laconic	using few words	taciturn; reticent; terse; brusque; brief	garrulous; loquacious
003.	succinct	spoken or written in a clear and precise manner	terse; concise; curt; pithy; compact; condensed	prolix; discursive; protracted; circumlocutory; verbose; wordy
004.	brusque	rudely abrupt or harshly brief	curt; abrupt; petulant; brief	polite; courteous; kind
005.	abridge	shorten a written text	abbreviate; concise; shorten	augment; amplify; protract
006.	brevity	quality of succinct expression (derived from the word brief)	conciseness; pithiness; succinctness; laconism; economy	longevity; permanence
007.	conspire	plan together secretly to commit an unethical or illegal act	collude; devise; collaborate; contrive	leave; neglect; disagree
008.	concur	agree	accord; harmonize; cohere; consent	clash; disagree; deny; dissent
009.	concord	a state of harmony; mutual agreement	unanimity; consensus; harmonize	discord; agitate; disunity; disturb; hostility
010.	congenital	existing at birth	innate; inherited; inborn; indigenous	non-native; unconstitutional
011.	schism	a division into political or religious faction (i.e. groups)	alienation; faction; rift; divergent; division; discord; fissure; dissension	agreement; harmony; peace; accord; unity; conformity
012.	incisive	intelligent; keen; insightful	acute; keen; astute; canny; perspicacious; judicious; shrewd	weak; stupid; incompetent; innocent; vacuous; vapid; obtuse
013.	judicious	reasonable; sensible; showing sound judgement; careful	prudent; astute; cautious; circumspect; sagacious; shrewd; sober; rational	rash; improvident; careless; irrational; imprudent; ignorant; inattentive; unsound; unrealistic; unwise
014.	astute	keen; intelligent; crafty	sagacious; shrewd; incisive; canny; perspicacious; adroit; insightful; discerning	vacuous; vapid; obtuse; foolish; stupid; inept; idiotic; naïve; imbecile; asinine
015.	scrutinize	to examine carefully	analyze; peruse; scan; watch; check; investigate; study	forget; ignore; neglect; misunderstand
016.	pragmatic	concerning to practical outcomes; down-to-earth	efficient; logical; practical; realistic; sober	idealistic; imaginative; irrational; excited; impractical; unreasonable
017.	perjure	to lie under oath; bear false witness	prevaricate; deceive; delude; equivocate; falsify; forswear; mislead; trick; lie	honest; sincere; attest; certify; prove

018.	prudent	wise; intelligent; careful	judicious; sensible; cautious; reasonable; shrewd; frugal; economical; circumspect	improvident; rash; careless; expensive; foolish; hasty; reckless; stupid;
019.	jurisdiction	area of authority; scope; zone; limits; range	domain; authority; control; command; power; territory; supervision; district	incapacity; submission; surrender; weakness
020.	adjure	order; to command solemnly as under oath	beseech; command; charge; entreat; implore; obligate	answer
021.	adjudge	determine based on law	adjudicate; arbitrate; award; decide; decree; determine	defer; hesitate; ignore; leave
022.	acumen	keenness of judgement; ability to understand and reason	shrewdness; perspicacity; discernment; awareness; intellect; intelligence; judgement; vision; wisdom; acuteness; cunning;	ignorance; insensitivity; stupidity; mistake; ineptness;
023.	inscrutable	beyond comprehension or imagination; difficult	abstruse; enigmatic; recondite; impenetrable; ambiguous; arcane	clear; comprehensible; intelligible; fathomable; obvious;
024.	allegation	blame; charge	charge; contention; accusation; assertion	exculpation; denial
025.	affirmation	declaration of the truth of something	confirmation; assertion; certification; ratification; testimonial	negation; denial; veto; nullify

Practice Exercise

1. Hamza is amazingly _____ at such a young age of 5 years: He adeptly persuaded his reluctant parents to let him stay up to watch another hour for cartoon series on television.

A) concise
B) astute
C) verbose
D) adjure
E) capricious

2. Because we are short on time, _____ appreciated; we need to leave in five minutes to catch the bus.

A) circumlocution
B) allegation
C) pontification
D) brevity
E) affirmation

3. Those not used to Imran's _____ speaking style found him to be _____ and did not like him at first.

A) affirmative … incisive
B) surly … congenial
C) laconic … brusque
D) circumlocutory … direct
E) garrulous … phlegmatic

Write the word whose meaning is given:
(*brusque, succinct, astute, prudent, perjure, garrulous, judicious*)

From the above words, write the word whose meaning is given below:

4. keenness of judgement: _____
5. talkative: _____
6. rudely abrupt: _____
7. intelligent: _____
8. false witness: _____
9. reasonable: _____
10. speak precisely and clearly: _____

Answers & Explanation

1. B: The colon (:) introduces an explanation. Adeptly means with great skill. A young age of 5 years would have to be pretty *sharp* or *smart* enough to persuade reluctant parents.

concise: brief and to the point
astute: shrewd; smart; sharp
verbose: wordy
adjure: order; command
capricious: changeable; unpredictable

2. D: A person short on time would likely appreciate something that is quick, which makes quickness a good choice.

circumlocution: speaking irrelevant or not speaking to the point
allegation: charge; accusation
pontification: speaking in a pompous manner
brevity: briefness; short and quick
affirmation: positive assertion; declaring truth

3. C: They didn't like him at first, so the second blank is a negative word. The first blank should describe a speaking style that would cause some-one to think that he is described by the second word.

affirmative: declaring truth
surly: irritable; ugly; rude
laconic: short; lacking words; brief
circumlocutory: using too many words
garrulous: very talkative
incisive: keen; insightful; intelligent
congenial: friendly; favorable
brusque: rudely abrupt in speech
direct: to the point
phlegmatic: lacking energy; calm; emotionless

4. astute
5. garrulous
6. brusque
7. prudent
8. perjure
9. judicious
10. succinct

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