PREFACE

Pocket Notes Mathematics is specially compiled to help students prepare for important tests and examinations.

Important formulae and concepts are presented in point form for quick recap and ease of understanding. Students will find this handy, practical and useful for test preparation.

The Editorial Team

CONTENTS

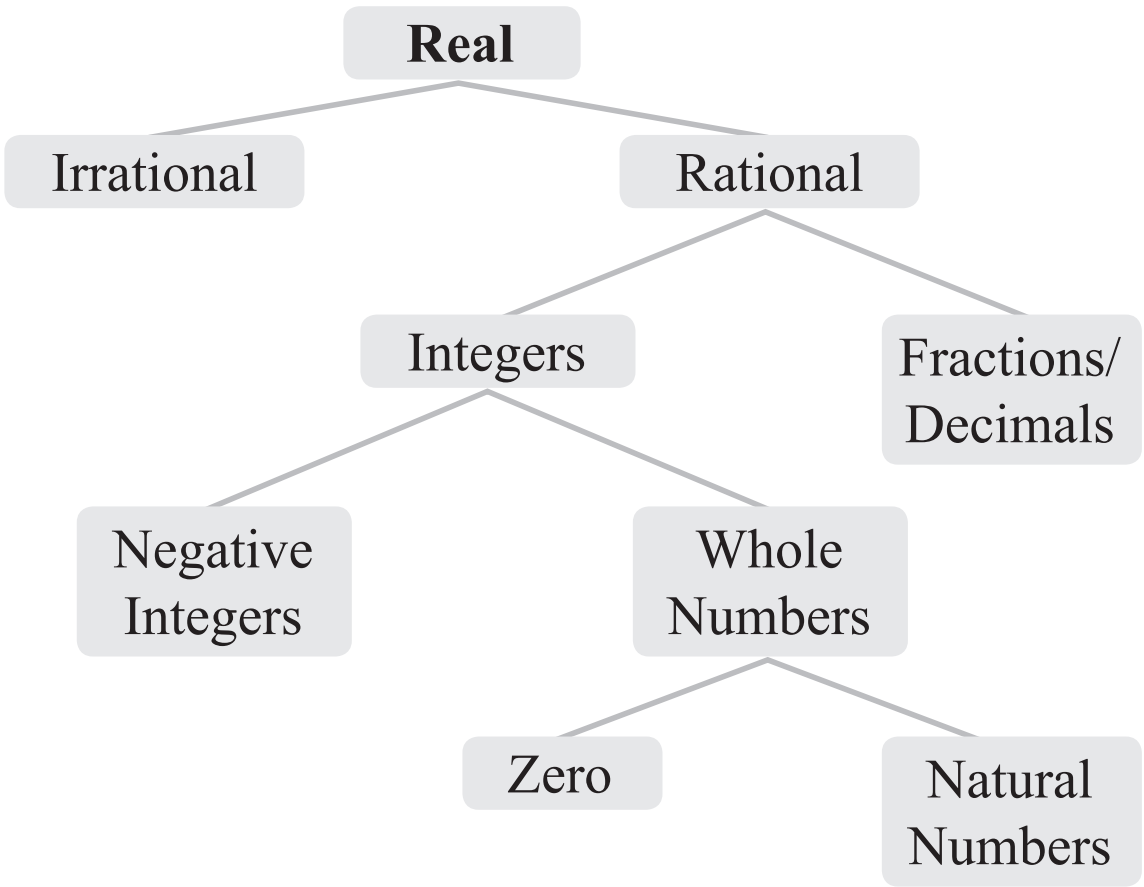
Number and Algebra

Geometry and Measurement

Statistics and Probability

Types of Numbers

Integers	$-3, -2, 1, 0, 1, 2 \ldots$
Whole	$0, 1, 2, 3, 4 \ldots$
Natural	$1, 2, 3, 4 \ldots$
Prime	$2, 3, 5, 7, 11, 13 \ldots$
Rational	$-\frac{3}{2}, -\frac{2}{2}, -\frac{1}{2}, 2, \sqrt{9} \ldots$
Irrational	$-\sqrt{3}, \pi, \sqrt{2}, \sqrt{5}$



Highest Common Factor (HCF) and Lowest Common Multiple (LCM)

Number 1 $= 2^3 \times 3^2 \times 7^2$

Number 2 $= 2 \times 5^2 \times 7$

HCF $= 2 \times 7 = 14$

(Choose the smallest number in each column.)

LCM $= 2^3 \times 3^2 \times 5^2 \times 7^2$

(Choose the largest number in each column.)

When A is a multiple of B, A must have all the 'make-up' of B.

Example:

Find the least value of n if $18n$ is a multiple of 12.

Solution:

$18n = 2 \times 3^2 \times n$

$12 = 2^2 \times 3$

Comparing $2 \times 3^2 \times n$ with $2^2 \times 3$,

$\therefore\ n = 2$

($18n$ must have all the factors of 12.)

Perfect Squares and Cubes

Perfect squares: Powers must be in multiples of 2.
E.g. $2^4 \times 3^2 \times 5^2$
Perfect cubes: Powers must be in multiples of 3.
E.g. $2^3 \times 7^6$

Approximation

decimal place(s): d.p.
significant figure(s): s.f.

Round off to	1 d.p.	2 d.p.	1 s.f.	2 s.f.
0.1357	0.1	0.14	0.1	0.14
10.0458	10.0	10.05	10	10
12 345.678	12 345.7	12 345.68	10 000	12 000

Standard Form

$A \times 10^n$, $1 \leqslant A < 10$

Percentage

$$\text{Decimal/Fraction} \underset{\times 100}{\overset{\times 100}{\rightleftarrows}} \text{Percentage (\%)}$$

$$\% \text{ Change} = \frac{\text{Final} - \text{Initial}}{\text{Initial}} \times 100$$

Examples:

Your pocket $ increases by 150%:

Original	Increase By	Final
100%	150%	100% + 150% = 250% of original
$10	$15	$10 + $15 = $25

Your pocket $ decreases by 40%:

Original	Decrease By	Final
100%	40%	100% – 40% = 60% of original
$10	$4	$10 – $4 = $6

Speed

- $\text{Speed} = \dfrac{\text{Distance}}{\text{Time}}$
- $\text{Average speed} = \dfrac{\text{Total distance travelled}}{\text{Total time taken}}$
- Conversion of units:

$$\frac{2\text{ km}}{1\text{ h}} = \frac{2 \times 1000\text{ m}}{60\text{ min}} = 33.3\text{ m/min}$$

$$\frac{500\text{ m}}{1\text{ min}} = \frac{\frac{500}{1000}\text{ km}}{\frac{1}{60}\text{ h}} = 30\text{ km/h}$$

Scales and Maps

$1 : 20000 \rightarrow 1$ cm on map = 20 000 cm actual

$\rightarrow 1$ cm = 0.2 km (Length scale)

Representative Fraction (R.F.) $= \frac{1}{20\,000}$

Area scale:

$$(1 \text{ cm})^2 = (0.2 \text{ km})^2$$
$$1 \text{ cm}^2 = 0.04 \text{ km}^2$$

Direct and Inverse Proportion

A is proportional to $B \rightarrow A = kB$

A is inversely proportional to $B^4 \rightarrow A = \frac{k}{B^4}$

Example:

40 men built a house in 96 hours. How many men are needed to build the same house in 30 hours?

Solution:

$$96 \text{ hours} \rightarrow 40 \text{ men}$$
$$1 \text{ hour} \rightarrow 40 \times 96 \text{ men}$$
$$30 \text{ hours} \rightarrow \frac{40 \times 96}{30} \text{ men}$$
$$= 128 \text{ men}$$