Real Numbers

Theorems

1. Let p be a prime number. If p divides a^2, then p divides a, where a is a positive integer

2. $\sqrt{2}, \sqrt{3}$ are irrational number

3. Let x be a rational number whose decimal expansion terminates. Then x can be expressed in the form, $\frac{p}{q}$ where p & q are coprime, the prime factorisation of q is of the form 2^n5^m, where n, m are non-negative integers

4. Let $x = \frac{p}{q}$ be a rational number such that the prime factorisation of q is of the form 2^n5^m, where n, m are non-negative integers. Then, x has a decimal expansion which terminates.

5. Let $x = \frac{p}{q}$ be a rational number, such that the prime factorisation of q is not of the form of $2^n 5^m$, where n, m are non-negative integers. Then, x has a decimal expansion which is non-terminating repeating and recurring

Prime Factorization Method

To obtain H.C.F. & L.C.M.
For any two positive integers, a and b
H.C.F. (a, b) × L.C.M. $(a, b) = a \times b$
For Example
$f(x) = 3x^2y$
and $g(x) = 6xy^2$
H.C.F. $= 3xy$
and L.C.M. $= 6x^2y^2$

Fundamental Theorem of Arithmetic

Every composite number can be expressed as a product of primes, and this factorization is unique, apart from the order in which the prime factors occur

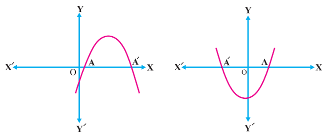
Composite Number
$x = p_1 \times p_2 \times p_3 \ldots \times p_n$,
where $p_1, p_2, \ldots, p_n$ are prime numbers

Trace the Mind Map
- First Level
- Second Level
- Third Level

Polynomials

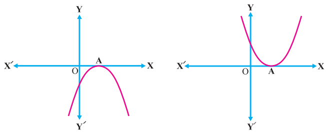
Zeroes of Polynomial : Graphically

Case 1 : Graph cuts X-axis at 2 points



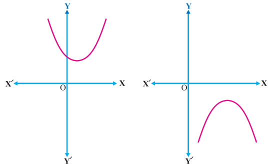
Number of Zeroes = 2

Case 2 : Graph cuts X-axis at exactly one point



Number of Zero = 1

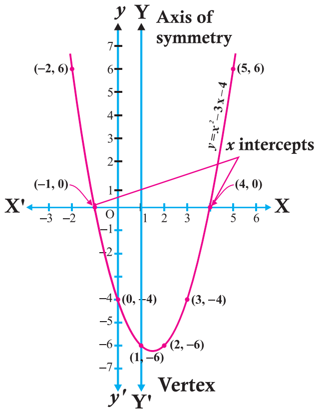
Case 3 : Graph does not cut X-axis



Number of Zero = 0

Graphical Representation of Quadratic Polynomial

Parabola



$y = x^2 - 3x - 4$

Degree of Polynomial

Highest power of x in Polynomial, $p(x)$

Types

Polynomial	Degree	General Form
Linear	1	$f(x) = ax+b$ $a \neq 0$
Quadratic	2	$f(x) = ax^2+bx+c$ $a \neq 0$
Cubic	3	$f(x) = ax^3+bx^2+cx+d$ $a \neq 0$

Relationship Between Zeroes and Coefficients of Quadratic Polynomials

Quadratic

If α and β are zeroes of Quadratic Polynomial $ax^2 + bx + c$

Then, Sum of zeroes

$\alpha + \beta = -\frac{b}{a}$

Product of zeroes

$\alpha\beta = \frac{c}{a}$

Cubic

If α, β and γ are zeroes of Cubic Polynomial $ax^3 + bx^2 + cx + d$

Then, Sum of zeroes,

$\alpha + \beta + \gamma = -\frac{b}{a}$

Sum of products of the zeroes taken two at a time

$\alpha\beta + \beta\gamma + \gamma\alpha = \frac{c}{a}$

Product of zeroes

$\alpha\beta\gamma = -\frac{d}{a}$

Trace the Mind Map

- First Level
- Second Level
- Third Level

Pair of Linear Equations in Two Variables

Algebraic Methods

By Substitution

Solve : $7x - 15y = 2$ ... (i)

$x + 2y = 3$ ... (ii)

Solution : From equation (ii), $x = 3 - 2y$

Substitute this value of x in eq. (i)

$7(3 - 2y) - 15y = 2$

$-29y = -19 \Rightarrow y = \frac{19}{29}$

Now, from $x = 3 - 2y$

$x = 3 - 2\left(\frac{19}{29}\right) = \left(\frac{49}{29}\right)$

By Elimination

Solve : $x + 3y = 6$ ... (i)

$2x - 3y = 12$ ... (ii)

Now, Adding equation (i) and (ii)

$3x = 18$ or $x = 6$

Again, from (i) ×2– (ii)

$3y = 0$ or, $y = 0$

Hence, $x = 6, y = 0$

General Form

$a_1x + b_1y + c_1 = 0,$

$a_2x + b_2y + c_2 = 0$

where $a_1, b_1, c_1, a_2, b_2, c_2$ are real numbers.

Solution Graphically

Each solution (x, y), corresponds to a point on the line representing the equation and vice-versa

Graphical Representation

Pair of Lines : $x + 2y - 4 = 0$

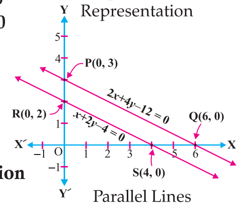
$2x + 4y - 12 = 0$

$\frac{a_1}{a_2} = \frac{1}{2}, \frac{b_1}{b_2} = \frac{2}{4}, \frac{c_1}{c_2} = \frac{-4}{-12}$

Compare the Ratios : $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$

Algebraic Interpretation : No solution *i.e.,* Inconsistent

Graphical Representation



Parallel Lines

Pair of Lines : $x - 2y = 0$

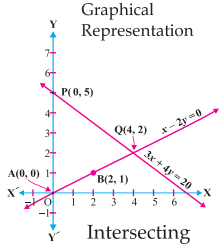
$3x + 4y - 20 = 0$

$\frac{a_1}{a_2} = \frac{1}{3}, \frac{b_1}{b_2} = \frac{-2}{4}, \frac{c_1}{c_2} = \frac{0}{-20}$

Compare the Ratios: $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$

Algebraic Interpretation : Exactly one solution *i.e.,* consistent (unique)

Graphical Representation



Intersecting Lines

Pair of Lines : $2x + 3y - 9 = 0$

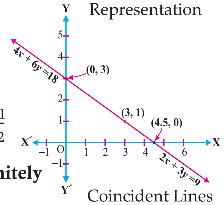
$4x + 6y - 18 = 0$

$\frac{a_1}{a_2} = \frac{2}{4}, \frac{b_1}{b_2} = \frac{3}{6}, \frac{c_1}{c_2} = \frac{-9}{-18}$

Compare the Ratios : $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$

Algebraic Interpretation = Infinitely many solutions *i.e.,* consistent.

Graphical Representation



Coincident Lines

Trace the Mind Map

- First Level
- Second Level
- Third Level

Quadratic Equations

Meaning

Equation of degree 2, in one variable

Standard Form

$ax^2+bx+c = 0$,
a, b, c are real numbers and $a \neq 0$

For Quadratic Equation

$\boxed{ax^2} + \boxed{bx} + \boxed{c} = \boxed{0}$

- ax^2 → Quadratic term $a \neq 0$
- bx → Linear term
- c → Constant term
- 0 → Expression set equal to 0

Nature of Roots

For quadratic equation $ax^2+bx+c = 0$, $b^2 - 4ac$ is Discriminant (D)

1. D > 0
   Two distinct real roots
2. D = 0
   Two equal real roots
3. D < 0
   No real root (imaginary)

Solutions of Quadratic Equations

By Quadratic Formula

Roots of $ax^2+bx+c = 0$ are given by

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

By Factorization

Find roots of $6x^2 - x - 2 = 0$.

Solution : $6x^2 + 3x - 4x - 2 = 0$

$3x(2x + 1) - 2(2x + 1) = 0$

$(3x - 2)(2x + 1) = 0$

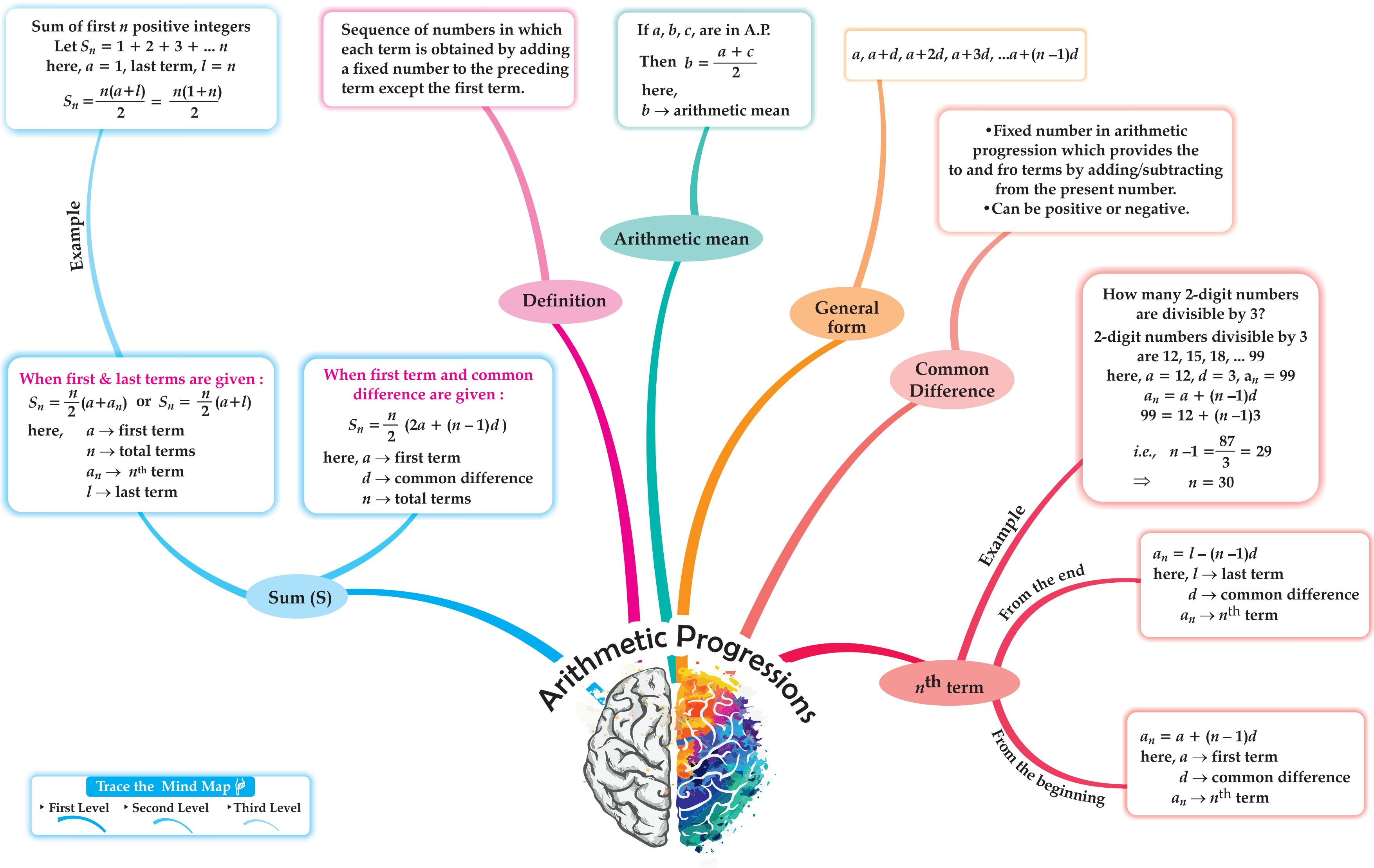
Either $(3x - 2) = 0$ or $(2x + 1) = 0$

$\Rightarrow$ $x = \frac{2}{3}$ or $x = \frac{-1}{2}$

The roots of $6x^2 - x - 2 = 0$ are $\frac{2}{3}, \frac{-1}{2}$

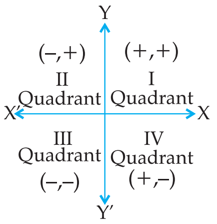
Trace the Mind Map

- First Level
- Second Level
- Third Level


Arithmetic Progressions
Definition
Sequence of numbers in which each term is obtained by adding a fixed number to the preceding term except the first term.
Arithmetic mean
If a, b, c, are in A.P. Then $b = \frac{a + c}{2}$ here, $b \rightarrow$ arithmetic mean
General form
$a, a+d, a+2d, a+3d, ...a+(n-1)d$
Common Difference
•Fixed number in arithmetic progression which provides the to and fro terms by adding/subtracting from the present number.
•Can be positive or negative.
n^{th} term
From the beginning
$a_n = a + (n-1)d$ here, $a \rightarrow$ first term $d \rightarrow$ common difference $a_n \rightarrow n^{th}$ term
From the end
$a_n = l - (n-1)d$ here, $l \rightarrow$ last term $d \rightarrow$ common difference $a_n \rightarrow n^{th}$ term
Example
How many 2-digit numbers are divisible by 3?
2-digit numbers divisible by 3 are 12, 15, 18, ... 99
here, $a = 12, d = 3, a_n = 99$
$a_n = a + (n-1)d$
$99 = 12 + (n-1)3$
i.e., $n - 1 = \frac{87}{3} = 29$
$\Rightarrow n = 30$
Sum (S)
When first term and common difference are given :
$S_n = \frac{n}{2}(2a + (n-1)d)$
here, $a \rightarrow$ first term $d \rightarrow$ common difference $n \rightarrow$ total terms
When first & last terms are given :
$S_n = \frac{n}{2}(a+a_n)$ or $S_n = \frac{n}{2}(a+l)$
here, $a \rightarrow$ first term $n \rightarrow$ total terms $a_n \rightarrow n^{th}$ term $l \rightarrow$ last term
Example
Sum of first n positive integers
Let $S_n = 1 + 2 + 3 + ... n$
here, $a = 1$, last term, $l = n$
$S_n = \frac{n(a+l)}{2} = \frac{n(1+n)}{2}$
Trace the Mind Map
First Level
Second Level
Third Level

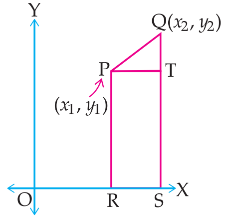
Lines (In Two-Dimensions)

Meaning



Distance formula

$$PQ = \left|\sqrt{(x_2-x_1)^2 + (y_2-y_1)^2}\right|$$



Example

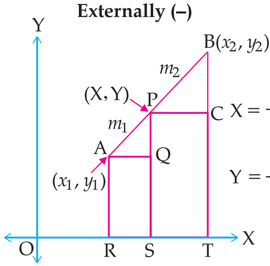
Are the following points vertices of a square : (1, 7), (4, 2), (–1, –1), (–4, 4)?
A= (1, 7); B = (4, 2); C = (–1, –1); D = (–4, 4)

$$AB = \left|\sqrt{(1-4)^2 + (7-2)^2}\right| = \sqrt{34} \text{ Unit}$$
$$BC = \left|\sqrt{(4+1)^2 + (2+1)^2}\right| = \sqrt{34} \text{ Unit}$$
$$CD = \left|\sqrt{(-1+4)^2 + (-1-4)^2}\right| = \sqrt{34} \text{ Unit}$$
$$DA = \left|\sqrt{(1+4)^2 + (7-4)^2}\right| = \sqrt{34} \text{ Unit}$$
$$AC = \left|\sqrt{(1+1)^2 + (7+1)^2}\right| = \sqrt{68} \text{ Unit}$$
$$BD = \left|\sqrt{(4+4)^2 + (2-4)^2}\right| = \sqrt{68} \text{ Unit}$$

Since, AB = BC = CD = DA and AC = BD.
All four sides and diagonals are equal
Hence, ABCD is a square

Section formula

Internally (+)
Externally (–)



$$X = \frac{m_1x_2 \pm m_2x_1}{m_1 \pm m_2}$$
$$Y = \frac{m_1y_2 \pm m_2y_1}{m_1 \pm m_2}$$

Example

Find point of trisection of line segment AB, A(2, –2) and B(–7, 4)

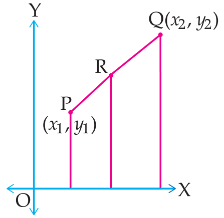
A P Q B
(2, –2) (–7, 4)

Coordinate of $P = \left(\frac{1(-7)+2(2)}{1+2}, \frac{1(4)+2(-2)}{1+2}\right)$
= (–1, 0)

Coordinate of Q

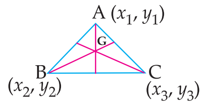
$Q = \left(\frac{2(-7)+1(2)}{2+1}, \frac{2(4)+1(-2)}{2+1}\right)$
= (–4, 2)

Mid-point of a Line Segment



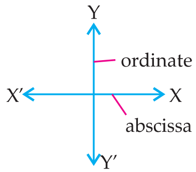
$$R\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$$

Centroid



$$G = \left(\frac{x_1+x_2+x_3}{3}, \frac{y_1+y_2+y_3}{3}\right)$$

Coordinate axes



Horizontal = X–axis (Abscissa)
Vertical = Y–axis (Ordinate)

Trace the Mind Map
- First Level
- Second Level
- Third Level

Triangles

Theorems

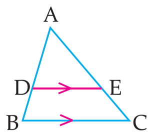
Summary

In ΔABC, let $DE \parallel BC$. Then,

(i) $\frac{AD}{DB} = \frac{AE}{EC}$

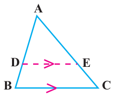
(ii) $\frac{AB}{DB} = \frac{AC}{EC}$

(iii) $\frac{AD}{AB} = \frac{AE}{AC}$



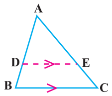
1. If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio.

If, $DE \parallel BC$ then $\frac{AD}{DB} = \frac{AE}{EC}$

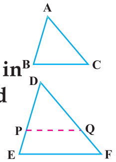


2. If a line divides any two sides of a triangle in the same ratio, then the line is parallel to the third side.

If $\frac{AD}{DB} = \frac{AE}{EC}$ then, $DE \parallel BC$



3. If in two triangles, corresponding angles are equal, then their corresponding sides are in the same ratio (or proportion) and hence the two triangles are similar.(AAA criterion)

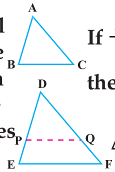


If $\angle A = \angle D$, $\angle B = \angle E$, $\angle C = \angle F$

then, $\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$

$\Delta ABC \sim \Delta DEF$

4. If in two triangles, sides of one triangle are proportional to (*i.e.*, in the same ratio of) the sides of the other triangle, then their corresponding angles are equal and hence the two triangles are similiar.(SSS criterion)

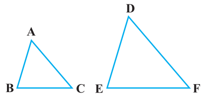


If $\frac{AB}{DE} = \frac{BC}{EF} = \frac{CA}{FD}$

then, $\angle A = \angle D$, $\angle B = \angle E$, $\angle C = \angle F$

$\Delta ABC \sim \Delta DEF$

5. If one angle of a triangle is equal to one angle of the other triangle and the sides including these angles are proportional, then the two triangles are similar.(SAS criterion)



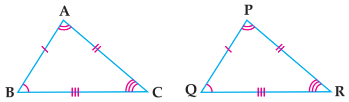
If $\frac{AB}{DE} = \frac{AC}{DF}$ & $\angle A = \angle D$

then, $\Delta ABC \sim \Delta DEF$

Similarity

(i) Corresponding angles are equal

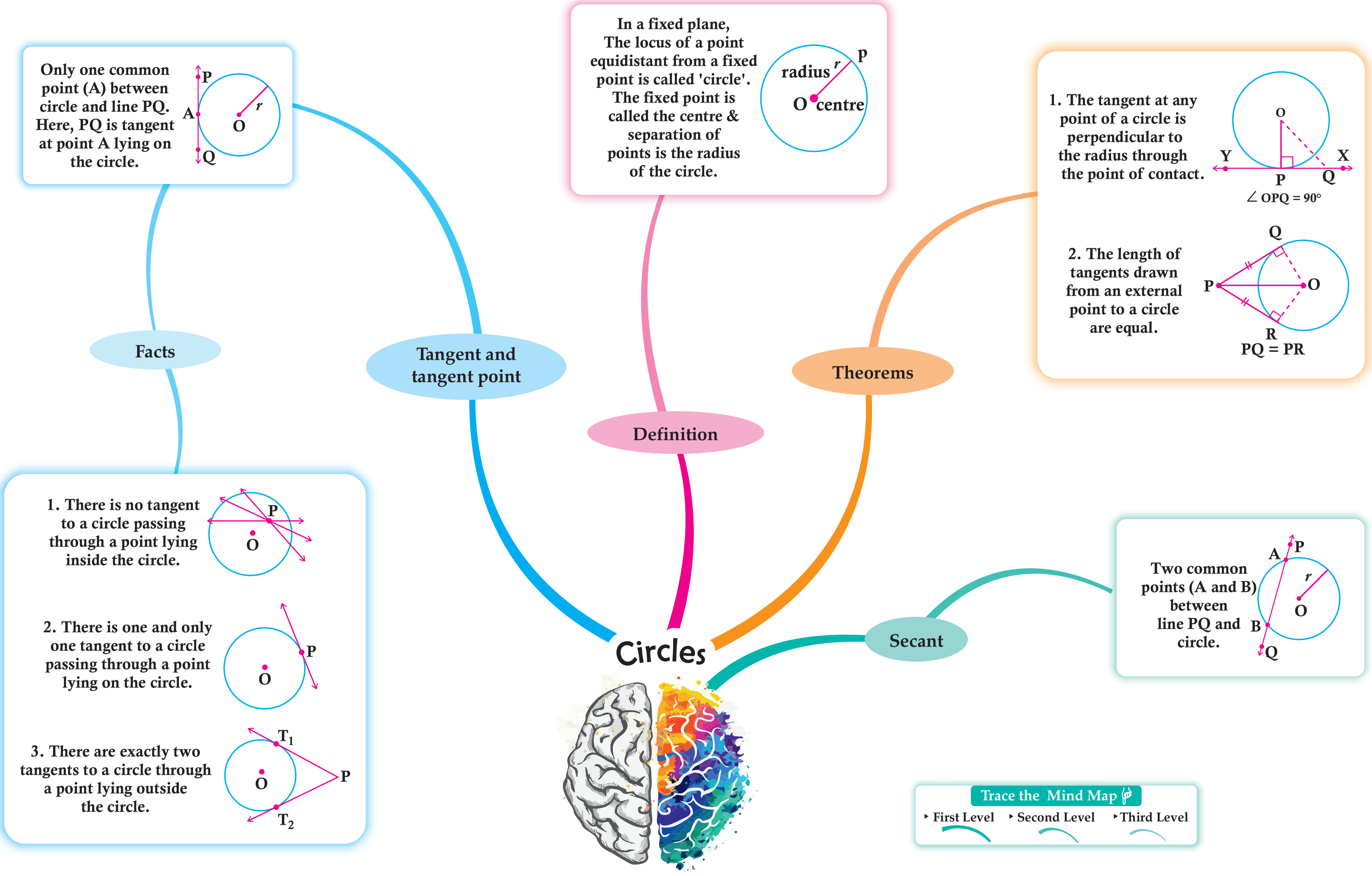
(ii) Corresponding sides are in the same ratio



$\Delta ABC \sim \Delta PQR$

Trace the Mind Map

- First Level
- Second Level
- Third Level

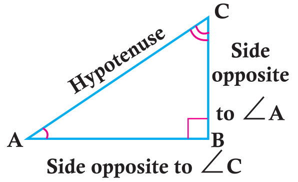

Circles
Tangent and tangent point
Only one common point (A) between circle and line PQ. Here, PQ is tangent at point A lying on the circle.
P
A
Q
O
r
Facts
1. There is no tangent to a circle passing through a point lying inside the circle.
2. There is one and only one tangent to a circle passing through a point lying on the circle.
3. There are exactly two tangents to a circle through a point lying outside the circle.
P
O
T_1
T_2
Definition
In a fixed plane, The locus of a point equidistant from a fixed point is called 'circle'. The fixed point is called the centre & separation of points is the radius of the circle.
radius
r
p
O
centre
Theorems
1. The tangent at any point of a circle is perpendicular to the radius through the point of contact.
O
Y
X
P
Q
∠ OPQ = 90°
2. The length of tangents drawn from an external point to a circle are equal.
Q
P
O
R
PQ = PR
Secant
Two common points (A and B) between line PQ and circle.
A
P
B
Q
O
r
Trace the Mind Map
First Level
Second Level
Third Level

Trigonometry and Trigonometric Identities

Trigonometry

Study of relationships between the sides & angles of a triangle

Trigonometric Ratios



Sine of $\angle A = \frac{BC}{AC}$

Cosine of $\angle A = \frac{AB}{AC}$

Tangent of $\angle A = \frac{BC}{AB}$

Cotangent of $\angle A = \frac{AB}{BC}$

Secant of $\angle A = \frac{AC}{AB}$

Cosecant of $\angle A = \frac{AC}{BC}$

Note: How to learn the relation

"Some people have" $\sin\theta = \frac{P}{H}$

"Curly Brown Hair" $\cos\theta = \frac{B}{H}$

"through proper Brushing" $\tan\theta = \frac{P}{B}$

Values of trigonometric ratios between 0° to 90°

∠A	0°	30°	45°	60°	90°
sin A	0	$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{\sqrt{3}}{2}$	1
cos A	1	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{2}$	0
tan A	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	(∞) Not defined
cot A	(∞) Not defined	$\sqrt{3}$	1	$\frac{1}{\sqrt{3}}$	0
sec A	1	$\frac{2}{\sqrt{3}}$	$\sqrt{2}$	2	(∞) Not defined
cosec A	(∞) Not defined	2	$\sqrt{2}$	$\frac{2}{\sqrt{3}}$	1

Relation of tan with sin & cos

Express tan A and cos A in terms of sin A

Solution : Since, $\cos^2 A + \sin^2 A = 1$

$\cos^2 A = 1 - \sin^2 A$ *i.e.* $\cos A = \sqrt{1 - \sin^2 A}$

$\tan A = \frac{\sin A}{\cos A} = \frac{\sin A}{\sqrt{1 - \sin^2 A}}$

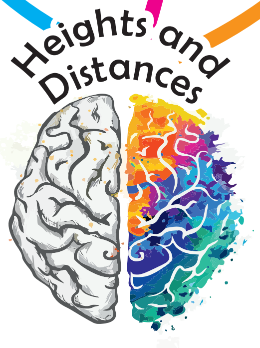
Trigonometric Identities

$0 \le A \le 90°$ $\cos^2 A + \sin^2 A = 1$

$0 \le A < 90°$ $1 + \tan^2 A = \sec^2 A$

$0 < A \le 90°$ $\cot^2 A + 1 = \text{cosec}^2 A$

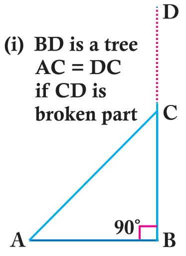
Trace the Mind Map
- First Level
- Second Level
- Third Level



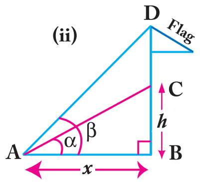
Examples of Distance

Height / Length of an object

(i) BD is a tree
AC = DC
if CD is
broken part



(ii)



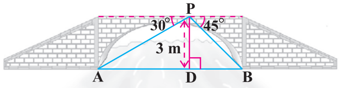
Find flag length

$\tan \alpha = \frac{h}{x}$ ...(i)

$\tan \beta = \frac{h+DC}{x}$ ...(ii)

and solve it

To determine width AB



From figure, AB = AD + DB

In right ΔAPD, ∠A = 30°, ∠D = 90°

$\tan 30° = \frac{PD}{AD}$ *i.e.*, AD = $3\sqrt{3}$ m

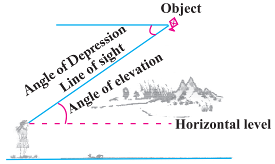
In right ΔBPD, ∠B = 45°, ∠D = 90°

$\tan 45° = \frac{PD}{BD}$ *i.e.*, BD = 3

∴ AB = $(3\sqrt{3} + 3)$ m = $3(\sqrt{3} + 1)$ m

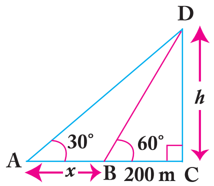
Measuring Angles

Angle of Elevation is equal to Angle of Depression



Examples Height

Distance between two objects



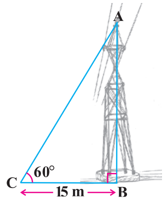
Find x and h

$\tan 60° = \frac{h}{200}$ ...(i)

$\tan 30° = \frac{h}{x+200}$ ...(ii)

and solve both equations

To determine height of object AB



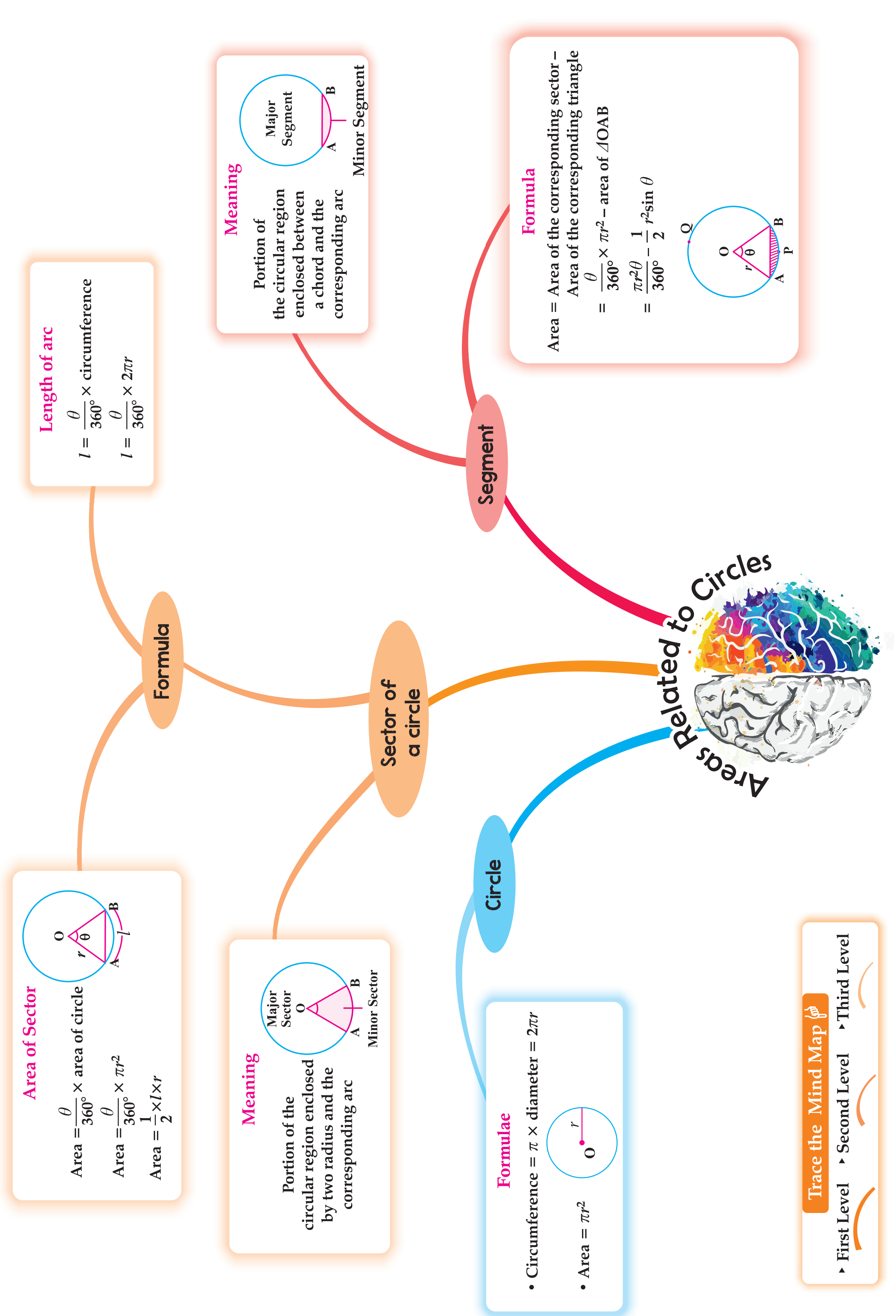
In ΔABC, ∠B = 90°, ∠C = 60°

Here, $\tan 60° = \frac{AB}{BC}$

$\sqrt{3} = \frac{AB}{15}$

i.e., AB = $15\sqrt{3}$ m

Trace the Mind Map
- First Level
- Second Level
- Third Level


Areas Related to Circles
Circle
Formulae
• Circumference = π × diameter = $2\pi r$
• Area = πr^2
O
r
Sector of a circle
Meaning
Portion of the circular region enclosed by two radius and the corresponding arc
Major Sector
O
A
B
Minor Sector
Formula
Area of Sector
Area = $\frac{\theta}{360^\circ}$ × area of circle
Area = $\frac{\theta}{360^\circ} \times \pi r^2$
Area = $\frac{1}{2} \times l \times r$
O
r
θ
A
B
l
Length of arc
$l = \frac{\theta}{360^\circ}$ × circumference
$l = \frac{\theta}{360^\circ} \times 2\pi r$
Segment
Meaning
Portion of the circular region enclosed between a chord and the corresponding arc
Major Segment
A
B
Minor Segment
Formula
Area = Area of the corresponding sector – Area of the corresponding triangle
= $\frac{\theta}{360^\circ} \times \pi r^2$ – area of ΔOAB
= $\frac{\pi r^2 \theta}{360^\circ} - \frac{1}{2} r^2 \sin\theta$
O
r
θ
A
P
B
Q
Trace the Mind Map
• First Level
• Second Level
• Third Level

Surface Areas and Volumes

Formulas

Name of solid	Volume	Total surface Area	Lateral surface Area
Cube	$V = a^3$	TSA = $6a^2$	LSA = $4a^2$
Cuboid	$V = l \times b \times h$	TSA = $2(lb + bh + hl)$	LSA = $2h(l + b)$
Cylinder	$V = \pi r^2 h$	TSA = $2\pi r(h + r)$	CSA = $2\pi rh$
Hollow cylinder ($R > r$)	$V = \pi(R^2 - r^2)h$	TSA = $2\pi(R + r)(h + R - r)$	$2\pi(R+r)h$
Cone	$V = \frac{1}{3}\pi r^2 h$	TSA = $\pi r(l + r)$	CSA = πrl
Sphere	$V = \frac{4}{3}\pi r^3$	TSA = $4\pi r^2$	CSA = $4\pi r^2$
Hemisphere	$V = \frac{2}{3}\pi r^3$	TSA = $3\pi r^2$	CSA = $2\pi r^2$

Surface Area

Sum of surface areas of the faces of solid

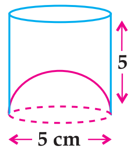
Volume

Quantity of 3-D space enclosed by a hollow/closed solid

Combination of Solids

Example

Given: Inner diameter of the Cylindrical glass = 5 cm
Height = 5 cm



Find: Actual capacity of cylindrical glass.

Solution : Apparent capacity of the glass = $\pi r^2 h$
$= 3.14 \times 2.5 \times 2.5 \times 5 \text{ cm}^3$
$= 98.125 \text{ cm}^3$

Volume of hemisphere $= \frac{2}{3}\pi r^3$, if $r = 2.5$ cm
$= \frac{2}{3} \times 3.14 \times (2.5)^3 \text{ cm}^3 = 32.71 \text{ cm}^3$

Actual capacity = Apparent capacity – Volume of hemisphere
$= 98.125 - 32.71$
$= 65.42 \text{ cm}^3$

Trace the Mind Map
- First Level
- Second Level
- Third Level

Statistics

Definition

A collection, analysis, interpretation of quantitative data

Cumulative Frequency

Frequency obtained by adding the frequencies of all the classes preceding the class

Class Mark

$$\left[\frac{\text{Upper class limit} + \text{Lower class limit}}{2}\right]$$

Median (For Ungrouped Data)

If n is odd,

Median $= \left(\frac{n+1}{2}\right)^{th}$ term

Where n = Sum of frequencies

If n is even,

Median $= \dfrac{\left(\frac{n}{2}\right)^{th} \text{term} + \left(\frac{n}{2}+1\right)^{th} \text{term}}{2}$

Where n = Sum of frequencies

Grouped Data

Mode $= l + \left(\dfrac{f_1 - f_0}{2f_1 - f_0 - f_2}\right) \times h$

l = lower limit of modal class
f_1 = frequency of modal class
f_0 = frequency of class preceding to modal class
f_2 = frequency of class succeeding to modal class
h = width of class interval

Median $= l + \left(\dfrac{\frac{n}{2} - c.f.}{f}\right) \times h$

Where, l = lower Limit of median class
n = Sum of frequencies
h = with of class interval
f = frequency of median class
$c.f.$ = Cumulative frequency of preceding to median class

Mean

Direct Method $\bar{x} = \dfrac{\sum_{i=1}^{n} f_i x_i}{\sum_{i=1}^{n} f_i}$

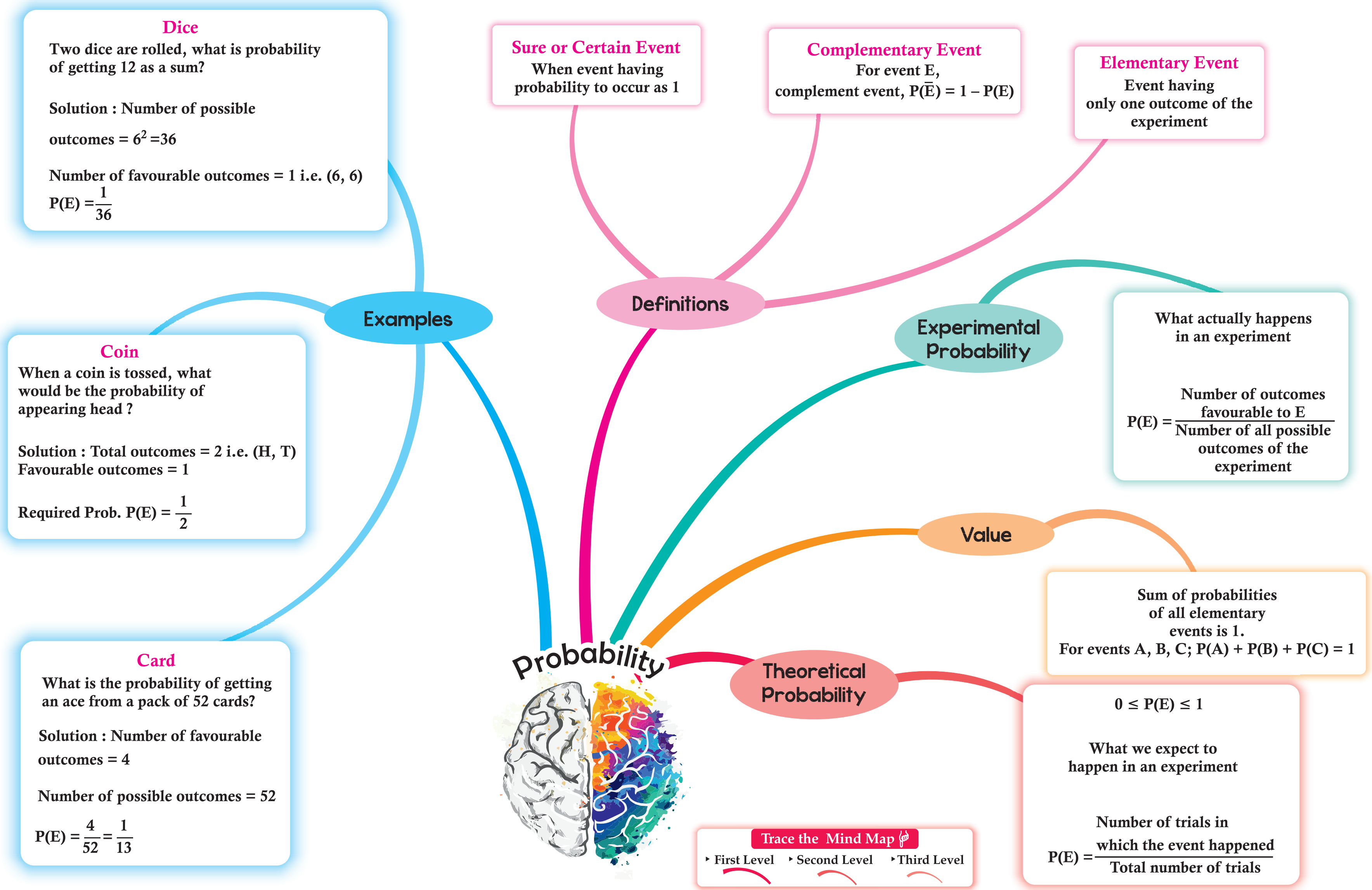
Where x_i = class marks.
f_i = frequencies

Assumed Mean Method $\bar{x} = a + \dfrac{\sum_{i=1}^{n} f_i d_i}{\sum_{i=1}^{n} f_i}$

Here, $d_i = x_i - a$
f_i = frequencies
x_i = class marks

Trace the Mind Map

- First Level
- Second Level
- Third Level


Probability
Examples
Dice
Two dice are rolled, what is probability of getting 12 as a sum?
Solution : Number of possible outcomes = $6^2 = 36$
Number of favourable outcomes = 1 i.e. (6, 6)
$P(E) = \frac{1}{36}$
Coin
When a coin is tossed, what would be the probability of appearing head ?
Solution : Total outcomes = 2 i.e. (H, T)
Favourable outcomes = 1
Required Prob. $P(E) = \frac{1}{2}$
Card
What is the probability of getting an ace from a pack of 52 cards?
Solution : Number of favourable outcomes = 4
Number of possible outcomes = 52
$P(E) = \frac{4}{52} = \frac{1}{13}$
Definitions
Sure or Certain Event
When event having probability to occur as 1
Complementary Event
For event E, complement event, $P(\bar{E}) = 1 - P(E)$
Elementary Event
Event having only one outcome of the experiment
Experimental Probability
What actually happens in an experiment
$P(E) = \frac{\text{Number of outcomes favourable to E}}{\text{Number of all possible outcomes of the experiment}}$
Value
Sum of probabilities of all elementary events is 1.
For events A, B, C; $P(A) + P(B) + P(C) = 1$
Theoretical Probability
$0 \le P(E) \le 1$
What we expect to happen in an experiment
$P(E) = \frac{\text{Number of trials in which the event happened}}{\text{Total number of trials}}$
Trace the Mind Map
First Level
Second Level
Third Level