DexNotePro: High School Maths (Grades 9–10)

Welcome to High School Maths

Welcome to **DexNotePro's High School Maths Course**, where you'll go beyond arithmetic and start mastering algebra, geometry, trigonometry, and statistics.
This course connects math to the real world — showing how logic, equations, and formulas shape technology, engineering, and science.

---

1. Number Systems and Real Numbers

High school math begins with understanding how numbers extend beyond what you've seen.

Concepts:

- Natural, Whole, Integers, Rational, Irrational, Real Numbers
- Laws of Exponents
- Rationalizing denominators

Example:
2\sqrt{2}2 is irrational because it cannot be expressed as a fraction.
But 34\frac{3}{4}43 is rational because it can.

Try This:
Simplify:
35+25\frac{3}{\sqrt{5}} + \frac{2}{\sqrt{5}}53+52
and rationalize: 23\frac{2}{\sqrt{3}}32

---

2. Polynomials

Polynomials form the base for algebraic expressions and graphs.

Concepts:

- Degree of a polynomial
- Zeros and their relationship with coefficients
- Factorization

Example:
For x2−5x+6=0x^2 - 5x + 6 = 0x2−5x+6=0, the zeros are 2 and 3 because (x-2)(x-3) = 0.

Try This:
Factorize: $x^2 + 7x + 10$

---

3. Linear Equations and Pair of Lines

Linear equations help represent relationships between quantities.

Concepts:

- Two-variable equations
- Graphical representation
- Substitution, elimination, and cross-multiplication methods

Try This:
Solve the system:
$x + y = 10$
$2x - y = 4$

---

4. Quadratic Equations

These equations contain a squared term and often appear in physics and economics.

Standard Form:
$ax^2 + bx + c = 0$

Methods to Solve:

- Factorization
- Completing the square
- Quadratic formula:
  $$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Try This:
Find roots of $x^2 - 3x - 10 = 0$

---

5. Arithmetic and Geometric Progressions

Progressions describe patterns in numbers.

Formulas:

- **AP:** $a_n = a + (n-1)d$

- **GP:** an=arn−1a_n = ar^{n-1}an=arn−1

Try This:
If the 1st term = 2, common difference = 3, find the 10th term.

---

6. Coordinate Geometry

A bridge between algebra and geometry.

Concepts:

- Distance formula: √((x2−x1)2+(y2−y1)2)√((x_2 - x_1)^2 + (y_2 - y_1)^2)√((x2−x1)2+(y2−y1)2)
- Section formula
- Area of triangle using coordinates

Try This:
Find the distance between A(2,3) and B(5,7).

---

7. Triangles and Similarity

Triangles form the foundation of geometry and trigonometry.

Concepts:

- Congruence (SSS, SAS, ASA)
- Similarity and ratio of sides
- Pythagoras theorem

Try This:
If two triangles are similar and sides are in ratio 3:5, find the ratio of their areas.

---

8. Trigonometry

Trigonometry studies the relationship between sides and angles of a right triangle.

Basic Ratios:

sin⁡θ=oppositehypotenuse,cos⁡θ=adjacenthypotenuse,tan⁡θ=oppositeadjacent\sinθ = \frac{opposite}{hypotenuse}, \quad \cosθ = \frac{adjacent}{hypotenuse}, \quad \tanθ = \frac{opposite}{adjacent}sinθ=hypotenuseopposite,cosθ=hypotenuseadjacent,tanθ=adjacentopposite

Identities:

$$\sin^2\theta + \cos^2\theta = 1$$

Try This:
Find $\sin 30°$, $\cos 60°$, and $\tan 45°$

---

9. Circles and Constructions

Concepts:

- Tangent and secant
- Two tangents drawn from an external point are equal
- Constructing tangents using geometry tools

Try This:
Draw a circle and construct two tangents from a point 5 cm away from its center.

---

10. Surface Areas and Volumes

You'll now calculate 3D spaces — used in architecture, design, and science.

Formulas:

- Cylinder Volume = $\pi r^2 h$
- Cone Volume = $\frac{1}{3}\pi r^2 h$
- Sphere Volume = $\frac{4}{3}\pi r^3$

Try This:
Find the volume of a cone with radius 3 cm and height 9 cm.

---

11. Statistics and Probability

Data interpretation helps in real-life decision-making.

Concepts:

- Mean, median, mode
- Probability = (Favorable outcomes) / (Total outcomes)

Try This:
A dice is rolled once. Find the probability of getting:

1. An even number
2. A number greater than 4

---

12. Applications of Trigonometry

Used in navigation, architecture, and astronomy.

Example:
Finding the height of a building using the angle of elevation.

Try This:
If the angle of elevation is 30° and the shadow is 10 m long, find the height of the building.
(Hint: tan 30° = 1/√3)

---

13. Logical Thinking & Problem Solving

Real learning is in applying what you know.

Try This:
A car travels 60 km in 1 hour. At this rate, how far will it travel in 2 hours 45 minutes?

✅ Congratulations!

You've completed **DexNotePro: High School Maths (Grades 9–10)** 🎉
Your reasoning, algebraic, and geometric skills are now strong enough for higher-level math and competitive exams.

Head to **ishaan7india.github.io/DexNotePro** and **mark this course as complete**!