

Introduction  
Robocompass  
Desmos  
GeoGebra  
Other Tools

## ICT Tools in Mathematics

Madhu B

Introduction

Robocompass

Desmos

GeoGebra

Other Tools

# ICT Tools in Mathematics

Madhu B

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## Introduction

Robocompass

Desmos

GeoGebra

Other Tools

## ICT Tools in Mathematics

Madhu B

### Introduction

Robocompass

Desmos

GeoGebra

Other Tools

As per NEP 2020, Education will play a critical role in transforming the entire nation into a digitally empowered society and knowledge economy.

Technology will play an important role in the improvement of educational processes and outcomes.

Thus, the relationship between technology and education at all levels is bidirectional.

## Introduction

Robocompass

Desmos

GeoGebra

Other Tools

## ICT Tools in Mathematics

Madhu B

### Introduction

Robocompass

Desmos

GeoGebra

Other Tools

- Interactive Learning
  - Enhanced Problem-Solving Skills
  - Collaboration and Communication

## Introduction

Robocompass

Desmos

GeoGebra

Other Tools

## ICT Tools in Mathematics

Madhu B

### Introduction

Robocompass

Desmos

GeoGebra

Other Tools

- Interactive Learning
- Enhanced Problem-Solving Skills
- Collaboration and Communication

## Introduction

Robocompass

Desmos

GeoGebra

Other Tools

## ICT Tools in Mathematics

Madhu B

### Introduction

Robocompass

Desmos

GeoGebra

Other Tools

- Interactive Learning
- Enhanced Problem-Solving Skills
- Collaboration and Communication

- 1 Adaptation problems
- 2 Distraction from learning concepts

Introduction  
Robocompass  
Desmos  
GeoGebra  
Other Tools

## ICT Tools in Mathematics

Madhu B

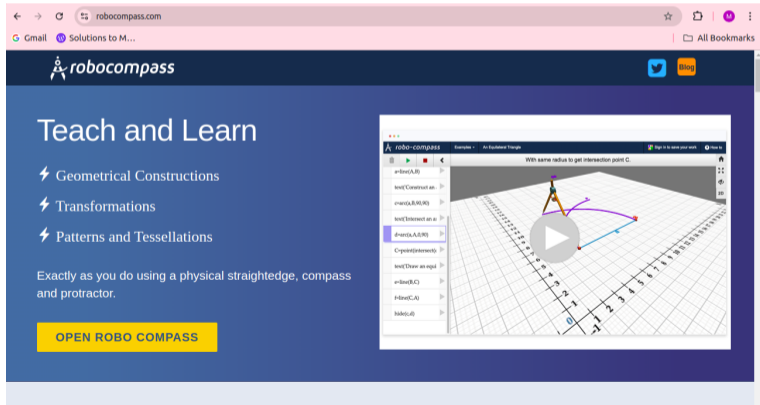
Introduction

Robocompass

Desmos

GeoGebra

Other Tools



The screenshot shows the Robocompass website interface. At the top, there is a navigation bar with the Robocompass logo and social media links for Twitter and Blog. Below this is a main header area with the text "Teach and Learn". Underneath, there is a list of topics: "Geometrical Constructions", "Transformations", and "Patterns and Tessellations". A paragraph below the list reads: "Exactly as you do using a physical straightedge, compass and protractor." At the bottom of this section is a yellow button labeled "OPEN ROBO COMPASS". To the right of the text is a video player showing a 3D geometric construction on a grid. The video player has a play button in the center and a list of commands on the left side, including "a=Line(A,B)", "line(Construct an...", "c=arc(A,B,R)", "line(Intersect an a...", "d=arc(A,A,R)", "C=point(intersect)", "line(Draw an equi...", "a=Line(B,C)", "H=Line(C,A)", and "M=Line(B,C)".

Introduction  
Robocompass  
Desmos  
GeoGebra  
Other Tools

## ICT Tools in Mathematics

Madhu B

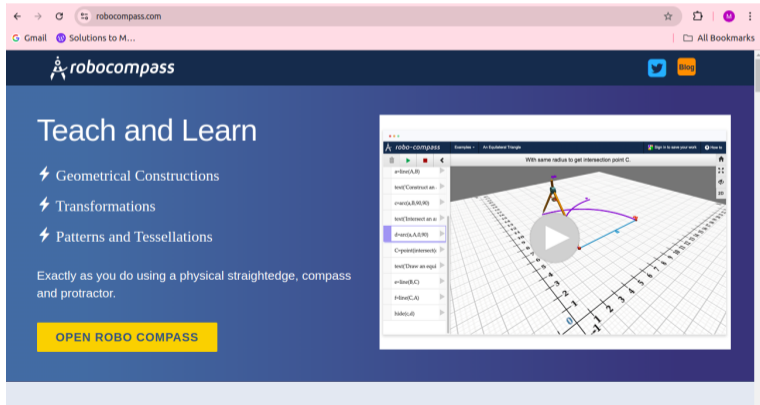
Introduction

Robocompass

Desmos

GeoGebra

Other Tools



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Here we will discuss about

- 1 Interface of Robocompass.
- 2 Demonstration of an activity from the Ganita Prakash using Robocompass.
- 3 List of basic tools in Robocompass.

Let us explore Robocompass

## Ganita Prakash-Grade 6, NCERT

Construct a rectangle in which one of the diagonals divides the opposite angles into  $60^\circ$  and  $30^\circ$ .

- Hide Grid
- Mark  $A = \text{point}(0,0)$
- $B = \text{point}(4,0)$
- $a = \text{line}(A,B)$
- $c = \text{perp}(a,B,20)$
- $\text{line}(A,\text{angle}(A,B,60,0),4)$

- $C = \text{point}(\text{intersect}(c, e))$
- $f = \text{perp}(c, C, 10)$
- $D = \text{point}(\text{intersect}(f, d))$
- $\text{hide}(a, c, f, d, e)$
- $\text{polygon}(A, B, C, D)$
- $\text{dash}(A, C)$

Let us see the construction

Introduction  
Robocompass  
**Desmos**  
GeoGebra  
Other Tools

## ICT Tools in Mathematics

Madhu B

Introduction

Robocompass

**Desmos**

GeoGebra

Other Tools

The screenshot shows the Desmos website homepage in a browser window. The browser's address bar displays "desmos.com". The page features a dark blue background with the text "Beautiful free math." and "At Desmos Studio, we want to help everyone learn math, love math, and grow with math." Below this text is a white button labeled "Open Graphing Calculator". To the right, there is a graphing calculator interface showing a coordinate plane with a grid. A blue curve is plotted, and a point on the curve is highlighted with a blue dot. An arrow points to this dot with the text "Drag a point". The browser's navigation bar includes "Math Tools" and "Resources" dropdown menus, and the user's name "Madhu" is visible in the top right corner.

Explore all of our math tools!

Introduction  
Robocompass  
**Desmos**  
GeoGebra  
Other Tools

## ICT Tools in Mathematics

Madhu B

Introduction

Robocompass

**Desmos**

GeoGebra

Other Tools

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Explore all of our math tools!

Desmos is a powerful, free online graphing calculator and math tool designed to help students and teachers visualize and explore mathematical concepts interactively.

- 1 **Graphing Calculator:** Desmos is known for its graphing capabilities, where users can plot multiple functions, adjust parameters, and explore behavior in real time.
- 2 **Accessible and Free:** Desmos is available for free as a web tool and as a mobile app, making it widely accessible for students, educators, and learners.



- 1 Open Graphing Calculator
- 2 Type  $x+1$  in input bar and enter.
- 3 Type  $y = mx + d$
- 4 Add sliders  $m, d$  (or all)
- 5 Type  $y = ax^2 + bx + c$ , add all sliders.

Let us explore Sliders in Desmos

Let us explore Three Dimensional Geometry in Desmos

Let us explore Sliders in Desmos

Let us explore Three Dimensional Geometry in Desmos

Introduction  
Robocompass  
Desmos  
**GeoGebra**  
Other Tools

## ICT Tools in Mathematics

Madhu B

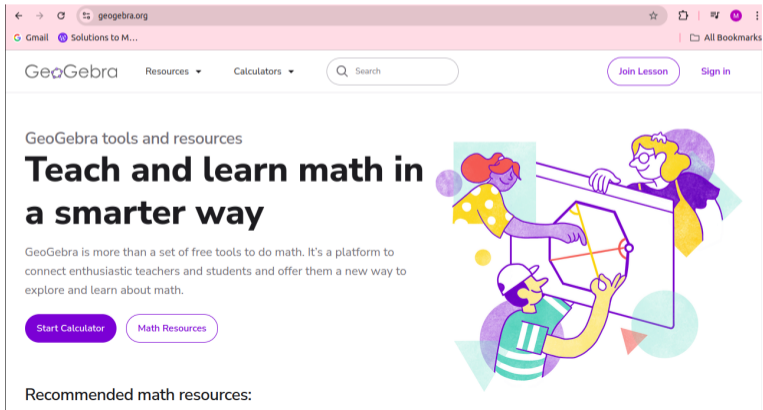
Introduction

Robocompass

Desmos

**GeoGebra**

Other Tools



The screenshot shows the GeoGebra website homepage in a browser. The browser's address bar displays "geogebra.org". The website header includes the GeoGebra logo, navigation menus for "Resources" and "Calculators", a search bar, and buttons for "Join Lesson" and "Sign in". The main content area features the heading "GeoGebra tools and resources" followed by the large text "Teach and learn math in a smarter way". Below this is a paragraph: "GeoGebra is more than a set of free tools to do math. It's a platform to connect enthusiastic teachers and students and offer them a new way to explore and learn about math." At the bottom of this section are two buttons: "Start Calculator" and "Math Resources". To the right of the text is an illustration of three people (two women and one man) interacting with a large digital screen displaying a geometric diagram of a hexagon with internal lines. The background of the illustration is decorated with colorful geometric shapes like circles and triangles.

← → ↻ geogebra.org ☆ 🗄️ 🔊 🔒 ⋮

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GeoGebra tools and resources

# Teach and learn math in a smarter way

GeoGebra is more than a set of free tools to do math. It's a platform to connect enthusiastic teachers and students and offer them a new way to explore and learn about math.

Start Calculator Math Resources

Recommended math resources:

GeoGebra is a free, open-source software that helps students learn and teachers teach math and science

- **Dynamic and Interactive Learning**
- Multi-Disciplinary Tool
- Free and Open-Source
- Visualization of Concepts
- Supports Inquiry-Based Learning

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Let us explore GeoGebra

Resource for comparing multiplication

Resource for Drawing Angles Using a Protractor

Resource for comparing multiplication

Resource for Drawing Angles Using a Protractor

Now let us construct a GeoGebra applet to show that area of a circle through polygons.

- Draw circle with centre A(0,0) and radius 1
- Mark a point B(1,0)
- Define an integer slider n (3,100)
- Mark angle at BAB' with angle  $\frac{2\pi}{n}$
- Regular Polygon(BB',n)

Now let us construct a GeoGebra applet to show that area of a circle through polygons.

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Introduction  
Robocompass  
Desmos  
**GeoGebra**  
Other Tools

ICT Tools in Mathematics

Madhu B

Introduction

Robocompass

Desmos

**GeoGebra**

Other Tools

Circle Through Polygon



# Free/Open Source ICT Tools for Mathematics

## ICT Tools in Mathematics

Madhu B

Introduction

Robocompass

Desmos

GeoGebra

Other Tools

- 1 SageMath (Open Source): Covers algebra, calculus and more.
- 2 Maxima (Open Source): A computer algebra system used for symbolic computations, including algebra, calculus, matrix operations, and more.
- 3 Octave (free and open source): A high-level programming language, primarily used for numerical computations, data visualization, and solving linear and nonlinear problems in mathematics.
- 4 TuxMath (Free and open source): A math education arcade game designed for kids.
- 5 Gnuplot (Free and open source): A portable command-line driven

Introduction  
Robocompass  
Desmos  
GeoGebra  
**Other Tools**

ICT Tools in Mathematics

Madhu B

Introduction

Robocompass

Desmos

GeoGebra

**Other Tools**

# THANK YOU

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