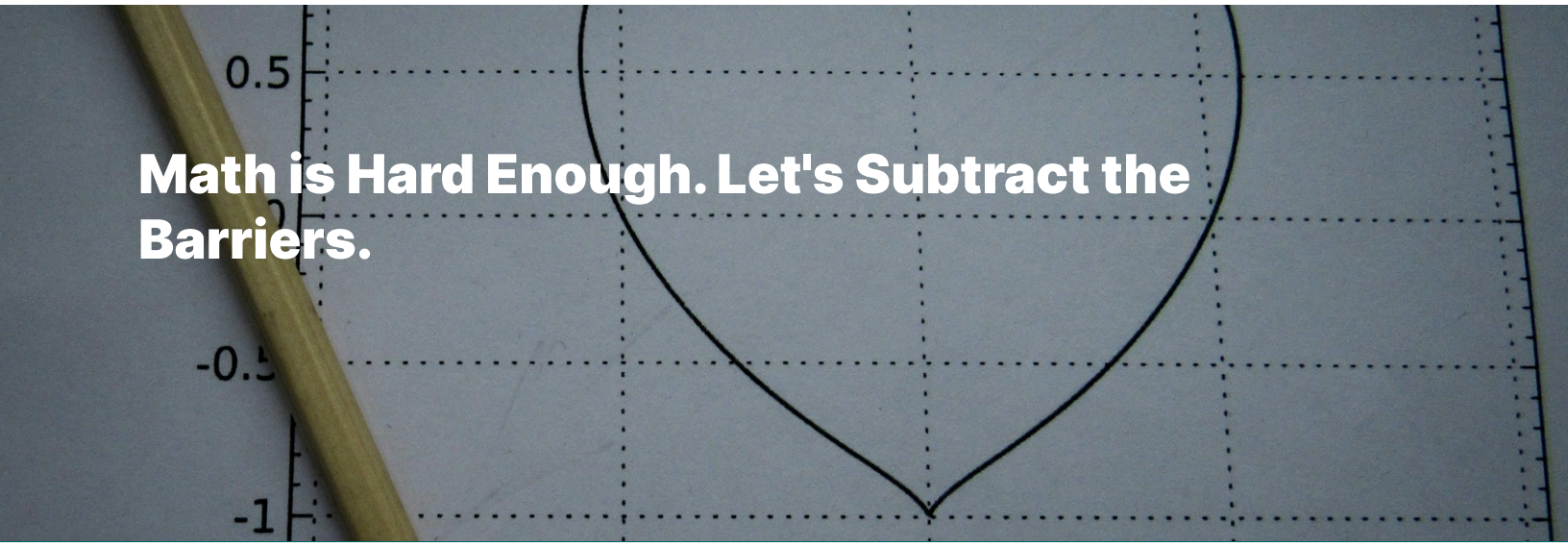


Math is Hard Enough. Let's Subtract the Barriers.

.

Math is Hard Enough. Let's Subtract the Barriers.

LaTeX & Alt Text Generator

Creating Accessible Math Graphics

Math Graphics Alt Text Generator

Geogebra Diagram Assistant

Lesson 1 of 5

Math is Hard Enough. Let's Subtract the Barriers.

Hi, I'm Greta Davis

Course Content Specialist

CONTINUE

WCAG and Legal Requirements

- State and local governments' web content and mobile apps need to meet WCAG 2.1, Level AA (with a few exceptions).
- Must meet requirements by ~~April 2026 or 2027~~ April 2027 or 2028
  (depending on their population)

CONTINUE

Perceivable

- Screen reader compatibility for equations and graphs
- Alt text for math visuals

P

Understandable

- Alt text that explains meaning (not just appearance)

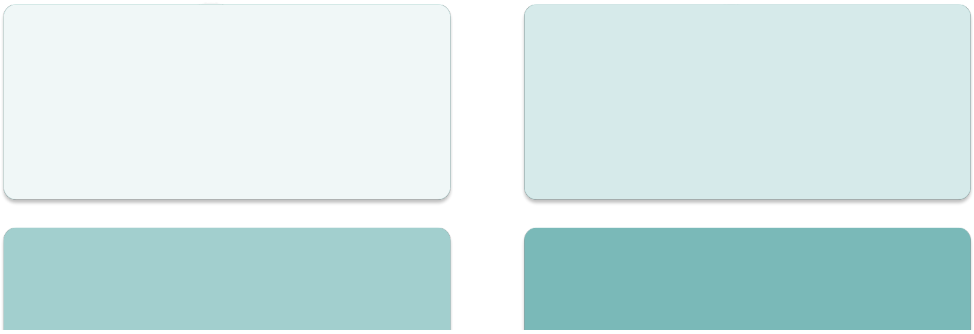
Operable

- Keyboard-only navigation
- Logical tab order through formulas

O

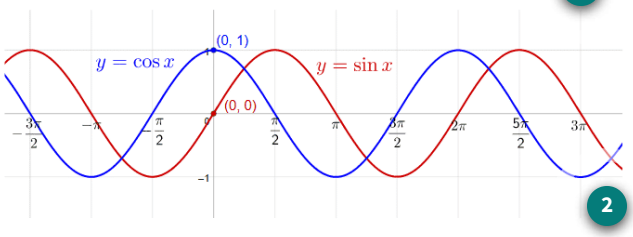
Robust

- Scalable SVGs instead of pixelated images



CONTINUE

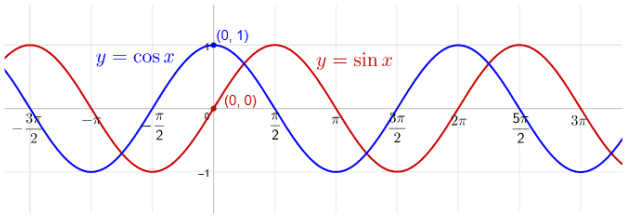
Math Content: A WCAG Challenge



The graphs of sine and cosine look similar because they have the same shape. However, they are not identical.

Compare their values at $x = 0$. The cosine graph has a maximum value at $x = 0$, while the sine graph has a value of zero at that same point.

In fact the cosine graph is the same as the sine function shifted $\frac{\pi}{2}$ units to the left.



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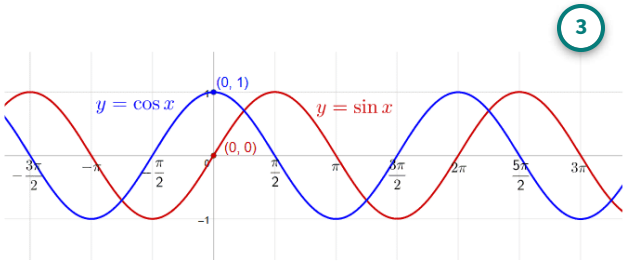
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1

Non-Linear Layout

e.g. fractions, matrices, integrals, etc.



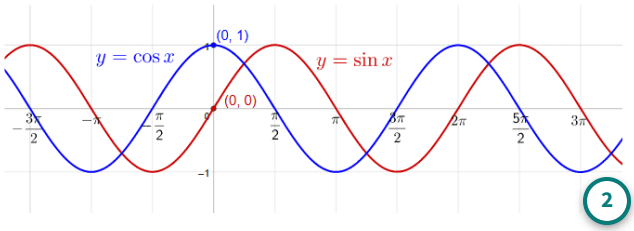
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Precise , accurate alt text

If its not precise and accurate, it is useless or even harmful.



2

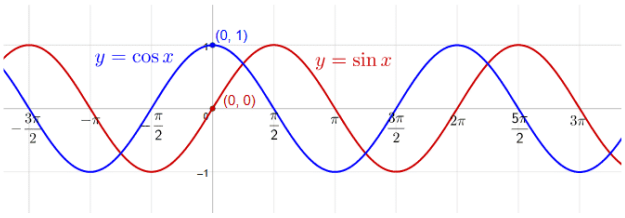
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Keeping alt text brief is hard.

Best practice is 2-3 sentences or 250 characters.
(Susi Miller, *Designing Accessible Learning Content).*



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4

Context is important!

The same image may require different alt text depending on where and how it is used.

CONTINUE

Using AI:

Custom GPT's to Streamline the Process.

1. Generating LaTeX Markup Language

2 Generating alt text for math expressions and graphics

3 Creating accessible graphics for math content

CONTINUE

Example of Math Expressions in Context

Solve the quadratic equation $x^2 + 7x + 3 = 0$ using the quadratic formula.

Step 1: Identify a, b, and c

$x^2 + 7x + 3 = 0$

$a = 1$
$b = 7$
$c = 3$

Step 2: Substitute into the formula

$$x = \frac{-(7) \pm \sqrt{(7)^2 - 4(1)(3)}}{2(1)}$$

Step 3: Simplify the b terms and the denominator

$$x = \frac{-(7) \pm \sqrt{(7)^2 - 4(1)(3)}}{2(1)}$$

$$x = \frac{-7 \pm \sqrt{49 - 4(1)(3)}}{2}$$

Step 4: Simplify under the radical.

$$x = \frac{-7 \pm \sqrt{49 - 4(1)(3)}}{2}$$

$$x = \frac{-7 \pm \sqrt{49 - 12}}{2}$$

$$x = \frac{-7 \pm \sqrt{37}}{2}$$

Step 5: Simplify the square root (if necessary)

$$x = \frac{-7 \pm \sqrt{37}}{2}$$

$\sqrt{37}$ cannot be simplified. So, 2 real solutions are:

$x = \frac{-7 + \sqrt{37}}{2}$ and $x = \frac{-7 - \sqrt{37}}{2}$.

If you need decimal approximations, you can continue with a calculator.

Step 6: Use a calculator to approximate decimal values.

$x = \frac{-7 + \sqrt{37}}{2}$ and $x = \frac{-7 - \sqrt{37}}{2}$

$x \approx -0.46 \quad \text{and} \quad x \approx -6.54$

Custom GPT

Generates LaTeX and Alt Text

LaTeX and Alt Text Generator

Example #1 - Product Property of Logarithms (Continued)

Solve the equation: $\log_2 5 + \log_2 x = \log_2 15$

This problem could also have been done on a calculator using the **Change of Base Formula**:

$$\log_a x = \frac{\log x}{\log a}$$

$$\frac{\log 5}{\log 2} + \log_2 x = \frac{\log 15}{\log 2}$$

$$2.322 + \log_2 x = 3.907$$

$$2^{1.585} = x$$

$$3 = x$$

Which way is easier?

The Product Property of Logarithms made the problem much shorter than using the Change of Base Formula.

Practice Problem #3

Let $12y^3 + e^{xy} = 3x + 4y - 7$ find $\frac{dy}{dx}$.

$$D_x\left[12y^3\right] + D_x\left[e^{xy}\right] = D_x[3x] + D_x[4y] - D_x[7]$$

$$3\left(12y^2\right)\frac{dy}{dx} + e^{xy}\left(x\frac{dy}{dx} + y\right) = 3 + 4\frac{dy}{dx}$$

$$36y^2\frac{dy}{dx} + xe^{xy}\frac{dy}{dx} - 4\frac{dy}{dx} = 3 - ye^{xy}$$

$$\frac{dy}{dx}\left(36y^2 + xe^{xy} - 4\right) = 3 - ye^{xy}$$

$$\frac{dy}{dx} = \frac{3-ye^{xy}}{36y^2+xe^{xy}-4}$$

CONTINUE

Creating Accessible Math Graphics

- [ ] Zoomable
- [ ] High Color Contrast
- [ ] Consistent Look
- [ ] Mathematically Accurate
- [ ] OER

CONTINUE

High Quality Math Graphics:

From Geogebra to your Course

Step 1

Make the graph or diagram in Geogebra

(AI can help! More on this later)

Step 2

Download SVG

(Edit as needed)

Step 3

Upload to you course

Step 4

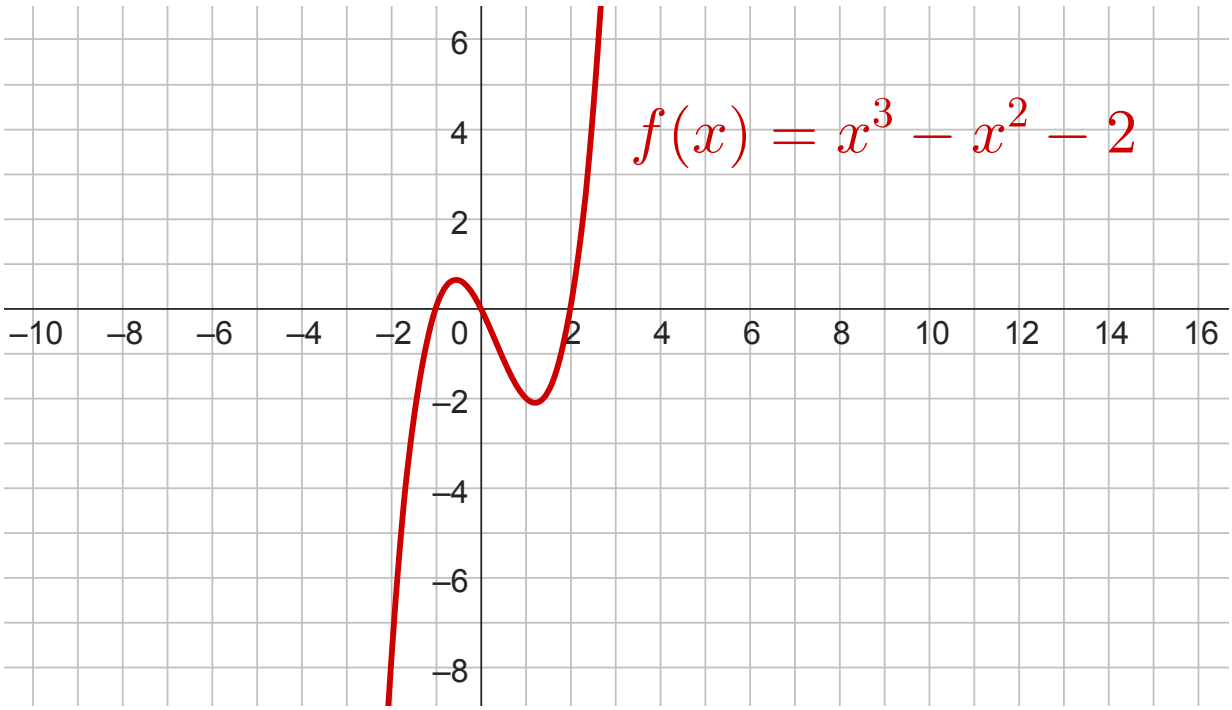
Generate Alt Text

With another custom GPT!

Geogebra graph

WebAim Contrast Checker

CONTINUE



- Zoomable

- High contrast
- Large text

CONTINUE

A GPT that Generates Alt Text for Math Graphics

How this GPT was trained (in short)

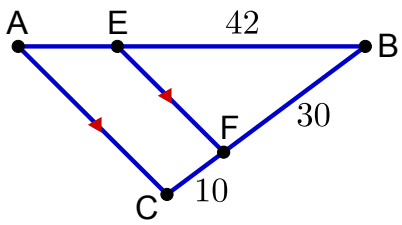
- Designed for alt text in high school math courses (Algebra, Geometry, Calculus, etc.)
- Generates accurate, readable alt text using clear math language at grade level
- Outputs one paragraph in plaintext (no formatting, no lists) - best for screen reader
- Special rules for math content such as geometric figures, coordinates, special symbols, Greek letters, statistics...
- Specific rules for graphs of polynomials, conic sections, trig functions...

CONTINUE

Lesson 4 of 5

Math Graphics Alt Text Generator

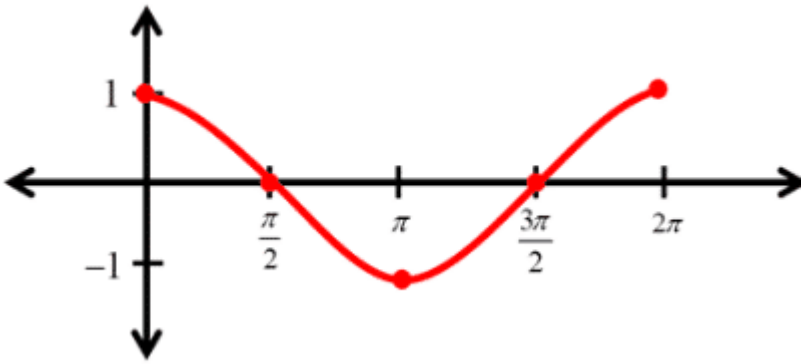
Math Graphics Alt Text GPT



CONTINUE

x	$f(x) = \cos(x)$
0	1
$\frac{\pi}{2}$	0

π	-1
$\frac{3\pi}{2}$	0
2π	1



CONTINUE

Lesson 5 of 5

Geogebra Diagram Assistant

What it does:

- Outputs valid GeoGebra commands to generate precise geometric diagrams
- Performs calculations based on parameters I provide with minimal input

ChatGPT vs NotebookLM

	ChatGPT	**NotebookLM**
Primary Purpose	General-purpose AI assistant	Research assistant focused on analyzing your documents
Information Source	Broad knowledge from training data and prompts	Only uses the sources you upload (documents, PDFs, etc.)

For this Notebook LM tool I provide:

1. Official Geogebra Manual

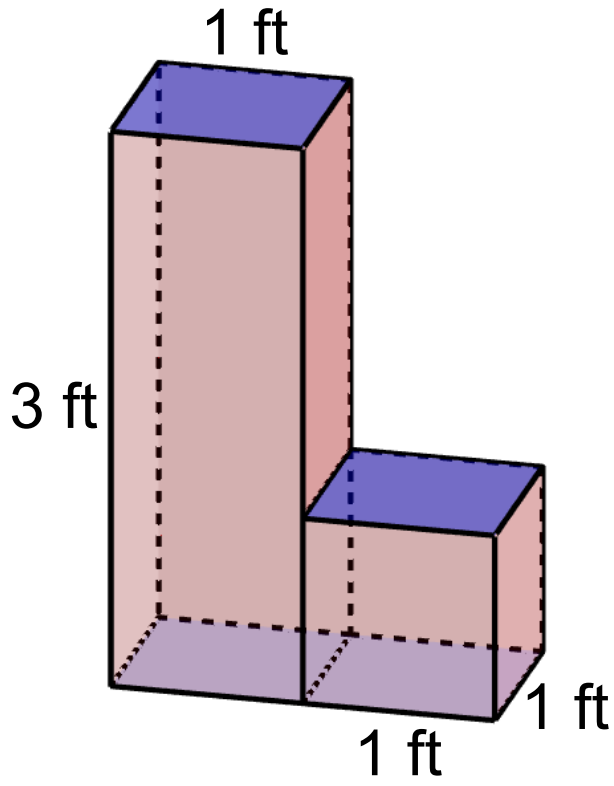
2. A set of general instructions

3. Special instructions for specific types of diagrams

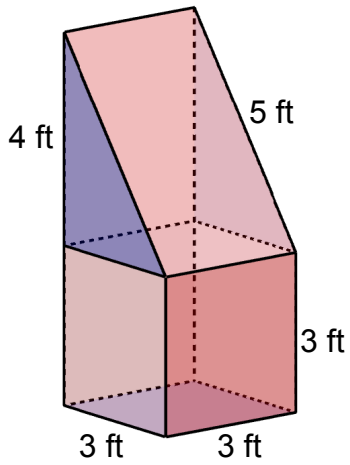
GeoGebra Diagram Assistant

CONTINUE

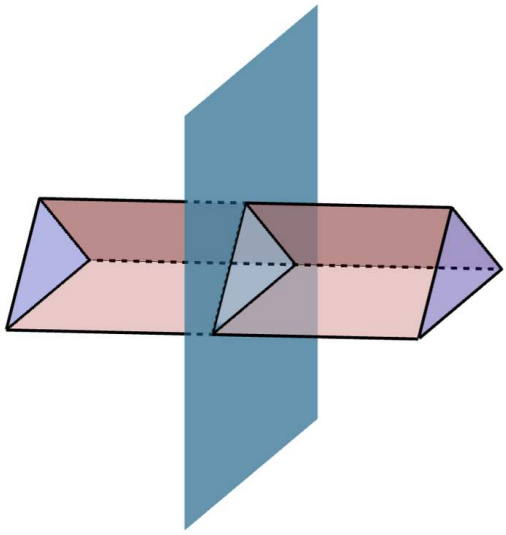
a 1 1 1 cube and a 1 1 3 rectangular prism attached at one face to form an 'L' shape


1 ft
3 ft
1 ft
1 ft

composite 3D figure: a 3 3 3 cube with a trianglar prism on top of the cube. the prism base is 3 4 5. the height is 3. the 3 x 3 surfaces of the cube and the prism are in contact



triangular prism base 2 1 5 h 4 on its side cross section parallel to base



CONTINUE

Thank You!

Questions?

Greta Davis

Course Content Specialist

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205-348-6043

CONTINUE