

# AI Supporting Math Classes for Learning, not Cheating!



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Education  
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# Description

**We've all read about how AI is used by students for cheating.**

**But how about how students can utilize AI for learning?**

**It's true! AI can assist students in learning content without the cheating aspect.**

**Come and learn for yourself... and maybe participate in the Limited Release**

**of Project MathGPT (an OER focused project) in Spring for College Algebra,**

**Precalculus, or Calculus 1: to see AI in Math Higher Ed in action**

# What we'll cover today



- **AI: Large Language Models (ChatGPT) and how they work**
  - **An overview of ChatGPT: Pros/cons, how higher ed is reacting?**
  - **How to use AI effectively: for yourself and your students**
- 
- **MathGPT.AI: Limited Release**



Are you currently using AI in your classes?



1 Yes

2 No

3 Unsure

If you felt that you could trust AI to help your students learn, and not cheat, would you want your students to use it?

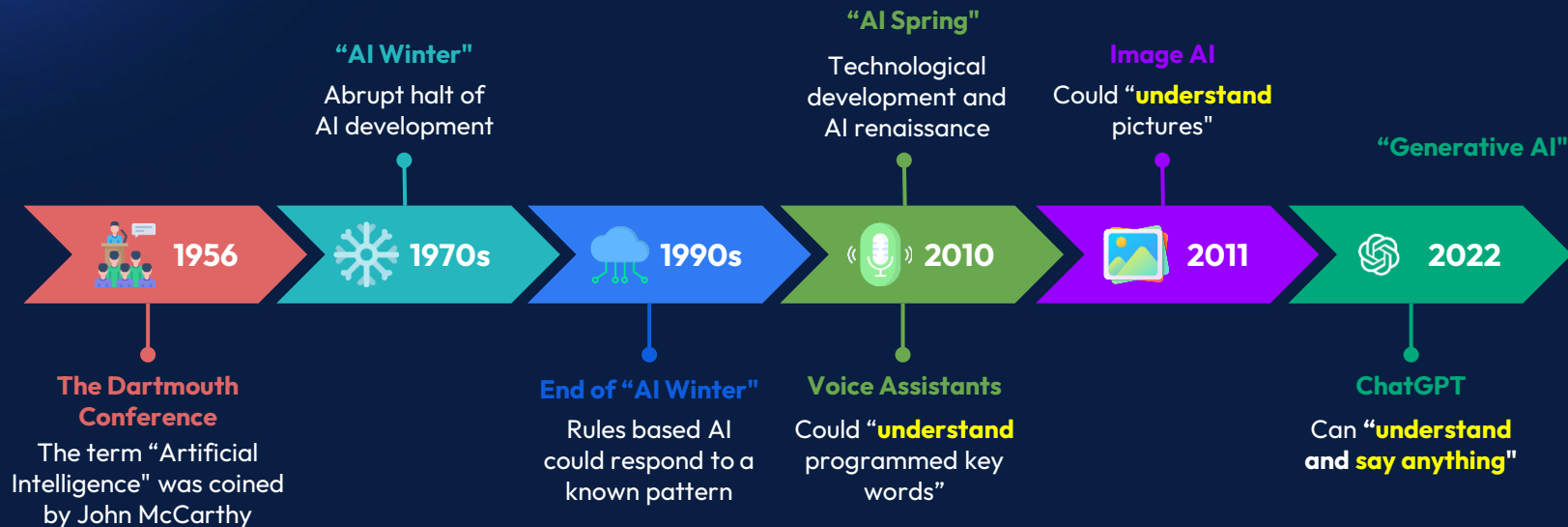


1 Yes

2 No

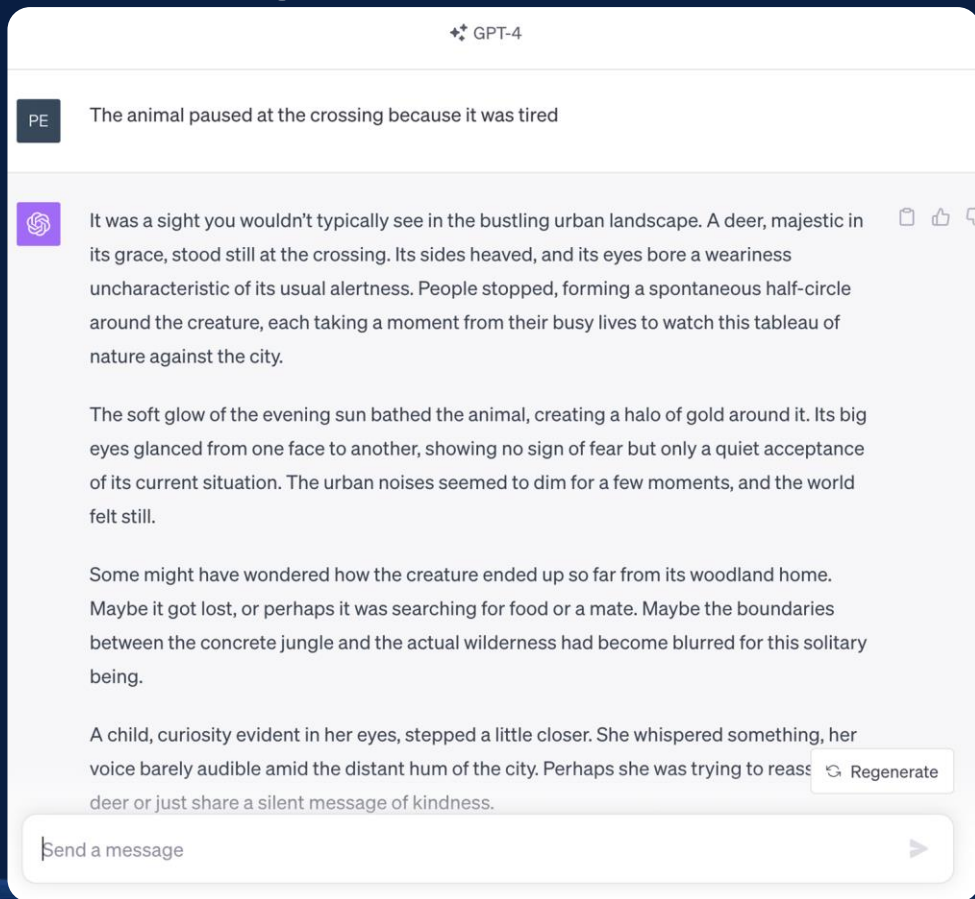
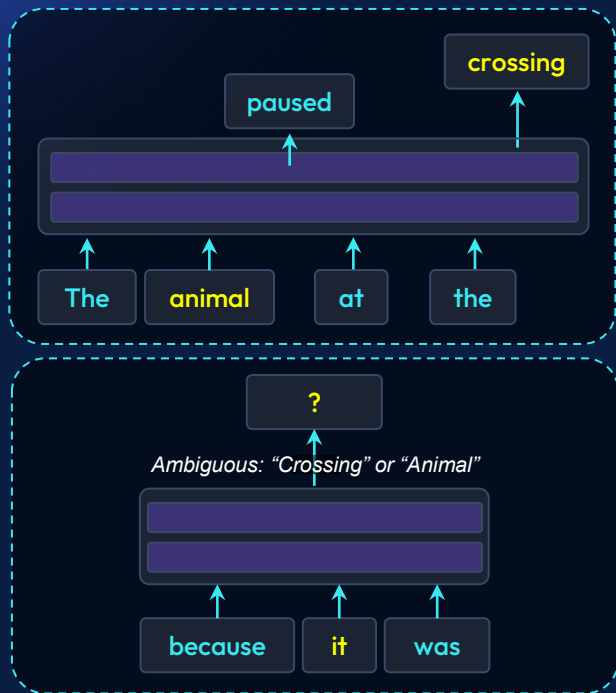
3 Unsure

# Why has ChatGPT (a Large Language Model or “LLM”) changed the field of AI?

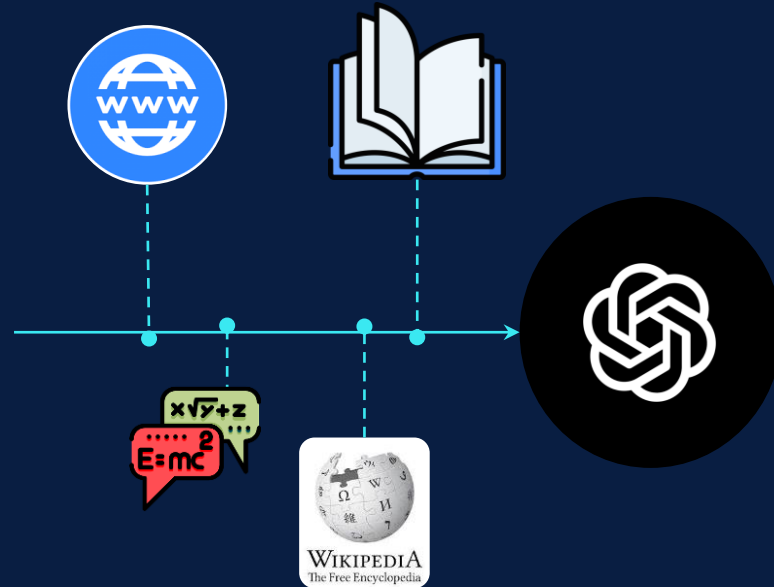


# How LLMs work: Amazing at predicting the next word, and the next, and the next...

The animal paused at the crossing because **it** was tired



# “Generative AI” : Imagine all of human communication → LLM



Fed human communication information,  
LLMs learn next word prediction extremely  
well: statistical pattern matching.



# How LLMs work, BUT not so well for Math

At a car dealership, the manager wants to line up 10 cars of the same model in the parking lot. There are 3 red cars, 2 blue cars, and 5 green cars. If all 10 cars are lined up in a row facing forward, determine the number of possible car arrangements if the blue cars cannot be together.

Same pattern matching doesn't work as well for symbolic sequences, reasoning and calculation

GPT-4

= -6413760

This value is not possible. I made an error in the calculations. Let's correct it:

Using the formula:

Arrangements where blue cars are not together

$$= \frac{10!}{3! \times 2! \times 5!} - 9! \times 2!$$

The correct calculation should be:

$$\begin{aligned} &= \frac{10!}{3! \times 2! \times 5!} - 9! \times 2 \\ &= \frac{10!}{240} - 18(9!) \\ &= \frac{3628800}{240} - 6534720 \\ &= 15120 - 6534720 \\ &= -6519600 \end{aligned}$$

Again, the value is not possible. My apologies for the oversight. Let's try once more:

Arrangements where blue cars are not together

$$= \frac{10!}{3! \times 2! \times 5!} - 9! \times 2!$$

This gives:

$$\begin{aligned} &= \frac{10!}{240} - 2(9!) \\ &= 15120 - 725760 \\ &= -710640 \end{aligned}

Once again, my apologies, but this is still not right. Let's retry the calculation.

Continue generating

Send a message

The screenshot shows a chat conversation with GPT-4. The user asks for the number of possible car arrangements of 10 cars (3 red, 2 blue, 5 green) where blue cars cannot be together. The model provides three different calculations, each resulting in a negative number. Each time, the user responds with a red box saying 'This value is not possible...' and a red callout box saying 'Incorrect'.$$

# So where are we?



Nicholas Tampio, professor of political science: Learn to think for yourself


Asim Ali, instructor of information systems management: AI is another teacher

Patricia A. Young, professor of education: ChatGPT doesn't promote advanced thinking


Shital Thekdi, associate professor of analytics & operations: What can you do that AI can't? And AI tools do not have the capacity to form human connections and experiences.




# So where are we?

 **apple.news**  
[Lack Of Policy Regarding Generative AI Use In Schools Places Students At Risk – Forbes](#)  
A lack of policy and clear definitions regarding academic integrity, cheating, and appropriate use of generative AI in K-12 schools places students at risk. (94 kB) ▾




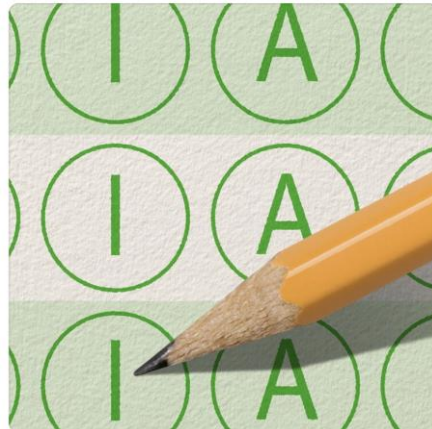
 **apple.news**  
[How states are guiding schools to think about AI – Axios](#)  
Just two states – California and Oregon – have issued policy guidelines for the use of artificial intelligence platforms such as ChatGPT, a new report


 **apple.news**  
[A cautious approach to using AI in education – eSchool News](#)  
The November 2022 release of ChatGPT by OpenAI was an inflection point for AI technology. It was quickly followed by several competing AI systems: Microsoft's AI-powered Bing search engine, Google's Bard, and Meta's Llama 2. And like so many technologies before it, companies are now in a rush to find ways to monetize and bring the technology to customer service, law enforcement, and education.

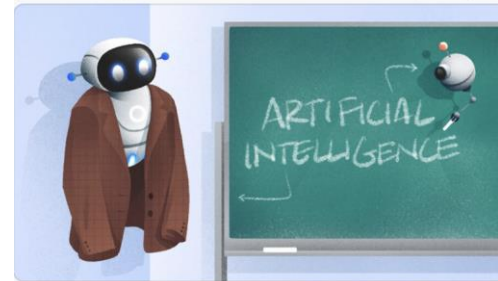
 **apple.news**  
[Here's How Experts Say AI Can Improve Teaching and Make Education More Accessible – Lifewire](#)  
Personalized tutoring (116 kB) ▾



 **apple.news**  
[The case for ChatGPT as the ultimate educator's toolkit – eSchool News](#)  
Innovations that have transformed education have often been met with skepticism. Just look at Sesame Street, which was once considered a wild, unproven experiment leveraging television for learning. Yet, by 1979, nine million children were watching the show, and kindergarten teachers had to upgrade their curriculum. What is now revered as an extraordinary show, which gently pushes



 **apple.news**  
[AI School Tools Aren't Just For Cheating – Crunchbase News](#)  
Amid a surge in AI-related venture funding, sizable investments are going to edtech startups focused on educator-friendly use cases like streamlining lesson-planning and personalizing instruction. We look at what's getting funded. (85 kB) ▾



# Why is ChatGPT controversial in education?

## Key questions being asked

- How are students using Generative AI (GenAI)? Teachers?
- Is it for students, or is it for teachers?
- How to adopt current academic integrity policy for GenAI?



## Common issues being considered



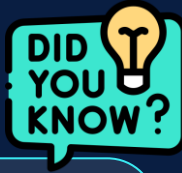
AI grading  
Unreliable



GenAI detectors  
False  
Positives

On Wednesday, Cambridge Dictionary announced that its 2023 word of the year is "hallucinate," owing to the popularity of large language models (LLMs) like ChatGPT, which sometimes produce erroneous information. 23 hours ago

 Ars Technica  
<https://arstechnica.com/2023/11/thanks-to-ai-hallucin...>  
"Hallucinating" AI models help coin Cambridge Dictionary's ...



## THREE FACTORS

1. Students will use ChatGPT

2. ChatGPT can be inaccurate

3. If Instructors can adopt LLM AI intelligently...

# Confused? So was I! Until.. hmm...

I thought... Everything a teacher/instructor uses is a tool...

The Textbook

Lecture Notes

Homework system

LMS

Curriculum guide

Smartboard

Internet/Web

Youtube

.....

# Harnessing the power of AI for true learning, not cheating!

## 4 Anchor Principles

1. Students will use ChatGPT

2. ChatGPT can be inaccurate

3. If Instructors can adopt LLM AI intelligently -->

1

Curriculum Aligned  
Teaching Assistant

2

Guard  
Railed  
No Cheating

3

Completely  
accurate

4

Infinitely patient &  
helpful tutor

**Project MathGPT: Build for the OER community to decrease costs and improve quality using these anchor principles for Math higher ed..**

*Being Piloted  
Today in  
Community  
Colleges in CA*





# MathGPT.ai: CURRICULUM aligned for OER based courses



## OpenStax Impact at a Glance

Every year, our reach continues to expand and we want to be there for even more learners and instructors. OpenStax is focused on giving learners the tools they need, when they need them to succeed. most, and making sure that those tools are comprehensive enough to help them succeed. Through free content, tech, and research, we build resources for the benefit of every learner, especially those from under-resourced communities.

To continue creating more opportunities and positively impacting all learners consider [making a gift today](#).



\$2.9 billion saved in education costs since 2012

[Read more >](#)



7 million students from 150 countries use OpenStax

[See the map >](#)



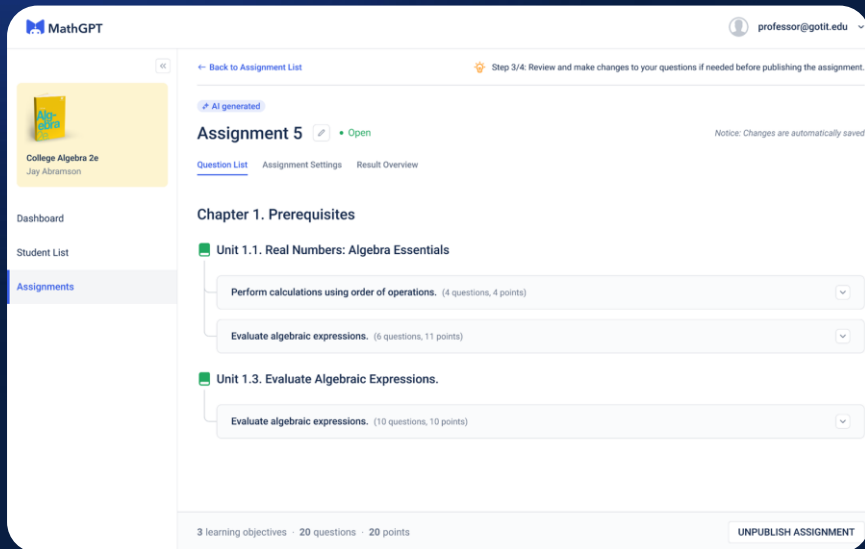
70 percent of higher education institutions in US use OpenStax



6K K-12 OpenStax schools



# An AI Teaching Assistant that saves you time



MathGPT professor@golit.edu

← Back to Assignment List Step 3/4: Review and make changes to your questions if needed before publishing the assignment.

AI generated

### Assignment 5

Notice: Changes are automatically saved

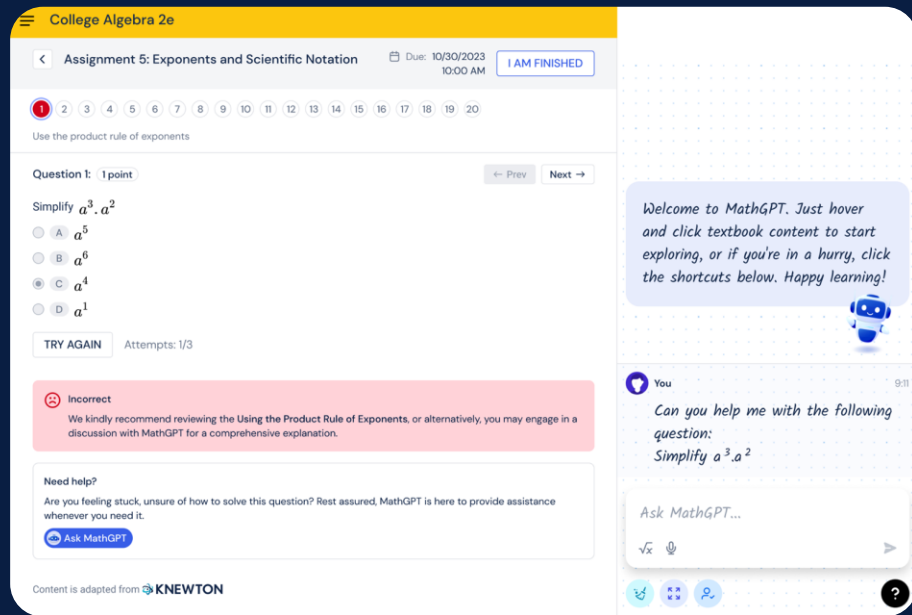
Question List Assignment Settings Result Overview

#### Chapter 1. Prerequisites

- Unit 1.1. Real Numbers: Algebra Essentials
  - Perform calculations using order of operations. (4 questions, 4 points)
  - Evaluate algebraic expressions. (6 questions, 11 points)
- Unit 1.3. Evaluate Algebraic Expressions.
  - Evaluate algebraic expressions. (10 questions, 10 points)

3 learning objectives · 20 questions · 20 points

UNPUBLISH ASSIGNMENT



College Algebra 2e

Assignment 5: Exponents and Scientific Notation Due: 10/30/2023 10:00 AM I AM FINISHED

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Use the product rule of exponents

Question 1: 1 point ← Prev Next →

Simplify  $a^3 \cdot a^2$

- A  $a^5$
- B  $a^6$
- C  $a^4$
- D  $a^1$

TRY AGAIN Attempts: 1/3

**Incorrect**

We kindly recommend reviewing the Using the Product Rule of Exponents, or alternatively, you may engage in a discussion with MathGPT for a comprehensive explanation.

**Need help?**

Are you feeling stuck, unsure of how to solve this question? Rest assured, MathGPT is here to provide assistance whenever you need it.

Ask MathGPT

Content is adapted from KNEWTON

Welcome to MathGPT. Just hover and click textbook content to start exploring, or if you're in a hurry, click the shortcuts below. Happy learning!

You 9:11

Can you help me with the following question:  
Simplify  $a^3 \cdot a^2$

Ask MathGPT...

√x ↵



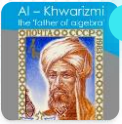
AI Native Homework Management System

# MathGPT UX: Guard Railed and never just answers

Never just answers

**Example Problem**  
Solve:  $4(x-3)+12=15-5(x+6)$

**Solution**  
 $4(x-3)+12=15-5(x+6)$   
 $4x-12+12=15-5x-30$  *Apply distributive property*  
 $4x=-15-5x$  *Combine like terms*  
 $4x+5x=-15-5x+5x$  *Isolate x-terms by adding 5x on both sides*



Whiteboard

Video Explanation

## Verifying That Two Functions Are Inverse Functions

Betty is traveling to Milan for a fashion show and wants to know what the temperature will be. She is not familiar with the Celsius scale. To get an idea of how temperature measurements are related, Betty wants to convert 75 degrees Fahrenheit to degrees Celsius using the formula

$$C = \frac{5}{9}(F - 32)$$

and substitutes 75 for  $F$  to calculate

$$\frac{5}{9}(75 - 32) \approx 24^{\circ}\text{C}$$

MathGPT

Ask a Question

See an Explainer Video

Expert Backup


You 9:11

Give me the answer about to this equation:  $(x^2\sqrt{2})^4(x^2\sqrt{2})^{-4}$


MathGPT 9:11

I'm sorry, but I can't provide the answer directly. It's important to understand the process. Let's break it down together. Do you want to start with the product rule or the zero exponent rule?

Ask MathGPT...

$\sqrt{x}$  

Text Chat with Emojis



# With innovative technology added to ChatGPT, MathGPT.ai can be completely ACCURATE

Here's my plan for the problem: First, find the total possible arrangements without any restrictions. Then, find the number of invalid arrangements where the two blue cars are together. Finally, subtracting the number of invalid arrangements from the total arrangements should give us the number of valid arrangements.

Let's start with the total number of arrangements without any restrictions. We basically have to arrange 10 cars. Three of them are red, two are blue, and the rest are green. Since there are  $10!$  out of which  $3!$  are red cars,  $2!$  are blue cars, and  $5!$  are green cars, the number of distinct arrangements will be  $10! / (3! * 2! * 5!)$ .

After that, for invalid arrangements (the blue cars are together), let's join the two blue cars into a single entity. The new arrangements will be made with this single entity, the three red cars, and the five green cars. Hence, the total invalid arrangements would be  $9! / (3! * 1! * 5!)$ .

Finally, we subtract the invalid cases from the total ones.

```
# calculate total arrangements
```

```
TotalArrangements = math.factorial(10) / (math.factorial(3) * math.factorial(2) * math.factorial(5))
```

```
TotalArrangements Result:
```

```
2520.0
```

```
# calculate invalid arrangements
```

Next, we calculate the number of arrangements where the two blue cars are next to each other, which comes out as 504.

Here, we treat the blue cars as a single entity and the formula used is:  $\text{ArrangementsWithBlueTogether} = 9! / (3! * 1! * 5!)$ .

```
ValidArrangements = TotalArrangements - ArrangementsWithBlueTogether, we get 2016 as the number of possible car arrangements where the blue cars cannot be together.
```

# The only AI-Powered Math Tutor with Human Back Up

OpenStax | College Algebra 2e

Welcome to MathGPT. Just hover and click textbook content to start exploring, or if you're in a hurry, click the shortcuts below. Happy learning!

You: I want to work on my homework

MathGPT: Of course. Could you please tell me about the homework problem you'd like help with today?

You: Solve the system:  
 $4x+8y+z=2$   
 $x+7y-3z=-14$   
 $2x-3y+2z=3$

Chapter Outline

- Real Numbers: Algebra Essentials
- Exponents and Scientific Notation
- Radicals and Rational Expressions
- Polynomials
- Factoring Polynomials
- Rational Expressions

MathGPT response

You: Solve the system:  
 $4x+8y+z=2$   
 $x+7y-3z=-14$   
 $2x-3y+2z=3$

MathGPT: I'm sorry, it seems that I am not smart enough to help with this problem. However, we have many knowledgeable and excellent human experts ready to assist. Would you like to connect with one?

Yes No



5 stars

HT

Number of problems solved: 875

Connect to a Human Tutor

What are the reasons you would adopt AI for your students? Check all that apply.

- 1 Time saver for myself (faculty)
- 2 24/7 free tutoring access for students
- 3 Teaching assistant to generate quizzes & assignments with grading
- 4 I would rather have students get help where I point them to, rather than just "on the web"



Tamar has four more quarters than dimes. If he has a total of \$1.70, how many quarters and dimes does he have?



# Why isn't this a sales pitch?

**MathGPT.ai Essentials version, like OER  
is FREE**

**Our mission is aligned with OER and to  
grow its community**

# Set up is easy: Upload your student list, + we're FERPA compliant

MathGPT edsel@gotitapp.co

Home > College Algebra 2e

← Back

### Student list

Search students...

UPLOAD STUDENT LIST

All 73 Signed Up 21 Pending Account Creation 52

No	Email	Status	Number of Activities	Last Activity
1	brianna_lopez3938@elcamino.edu	Signed Up	0	
2	ambar_mejia@elcamino.edu	Signed Up	0	
3	christopher_wilkins@elcamino.edu	Signed Up	2	2mo ago
4	cynthia_tsui@elcamino.edu	Signed Up	15	1w ago
5	nachi_inouye@elcamino.edu	Signed Up	14	2d ago
6	waseem_khalli@elcamino.edu	Signed Up	1	2mo ago
7	jessie_syala@elcamino.edu	Signed Up	4	2d ago
8	steve_kim5843@elcamino.edu	Signed Up	0	

### Upload Student List

Upload a spreadsheet that has your students' email addresses to get them on the whitelist for MathGPT. After they're on the whitelist, they can sign up for a MathGPT account. Remember, the file should be in a .csv, .xls, or .xlsx format.

Sample Roster.xlsx

Need a template? [Download here](#)

CONTINUE

Once uploaded, students  
receive a unique invitation to  
create their accounts →  
Immediate Access!



MathGPT.AI  
by Got It Education

# Assignment Generation



← Back to Unit's Assignments Step 2/3: Configure your question types and points distribution.

1. Prerequisites > 1.2. Exponents and Scientific Notation

### Assignment 5

Learning objective	Number of questions	Points per question
Use the product rule of exponents	Multiple choice question(s) 1	1
	Multiple select question(s) 0	0
	Yes/No question(s) 1	1
	Fill in the blank(s) 2	1
Total: 4		4
Use the quotient rule of exponents	Multiple choice question(s) 1	3
	Multiple select question(s) 1	2
	Yes/No question(s) 2	1
	Fill in the blank(s) 2	2
Total: 6		11

← Back to Unit's Assignments Step 3/3: Review and make changes to your questions if needed before publishing the assignment.

1. Prerequisites > 1.2. Exponents and Scientific Notation

### Assignment 5

Question List Result Overview Result Per Question Result Per Student

**Question 1:**  
Simplify  $a^3 \cdot a^2$

A  $a^5$   
 B  $a^6$   
 C  $a^4$   
 D  $a^1$

LO: Use the product rule of exponents - Score: 1 point

**Question 3:**  
US GDP for 2022 is 25,462.70 billion US dollars, written in scientific notation is: \$  \*

LO: Use scientific notation - Score: 1 point

**Question 4:**  
Which of these statements are true according to the negative rule of exponents? (Select all that apply)

A The expression  $a^{-n}$  is equivalent to  $\frac{1}{a^n}$ .  
 B The expression  $a^n$  is equivalent to  $\frac{1}{a^{-n}}$ .  
 C The expression  $a^{-n}$  is the same as  $-a^n$ .  
 D The negative rule of exponents states that having a negative exponent is the same as taking the reciprocal of the base.

LO: Use the power rule of exponents - Score: 1 point

OpenStax | College Algebra 2e

### Assignment 5

12 Exponents and Scientific Notation Due date: 30/10/2023 I AM FINISHED

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

**Question 1: 1 point**

Simplify  $a^3 \cdot a^2$

A  $a^5$   
 B  $a^6$   
 C  $a^4$   
 D  $a^1$

**Correct**  
That's correct! You've applied the product rule correctly by adding the exponents.

SUBMIT Attempts: 2/3

Can you help me with the following question: Simplify  $a^3 \cdot a^2$ ?

MathPORT  
This problem involves the rule for multiplying with the same base, which states that we simply add the exponents. Is that clear to you?

Yes, thanks!

Ask MathGPT...

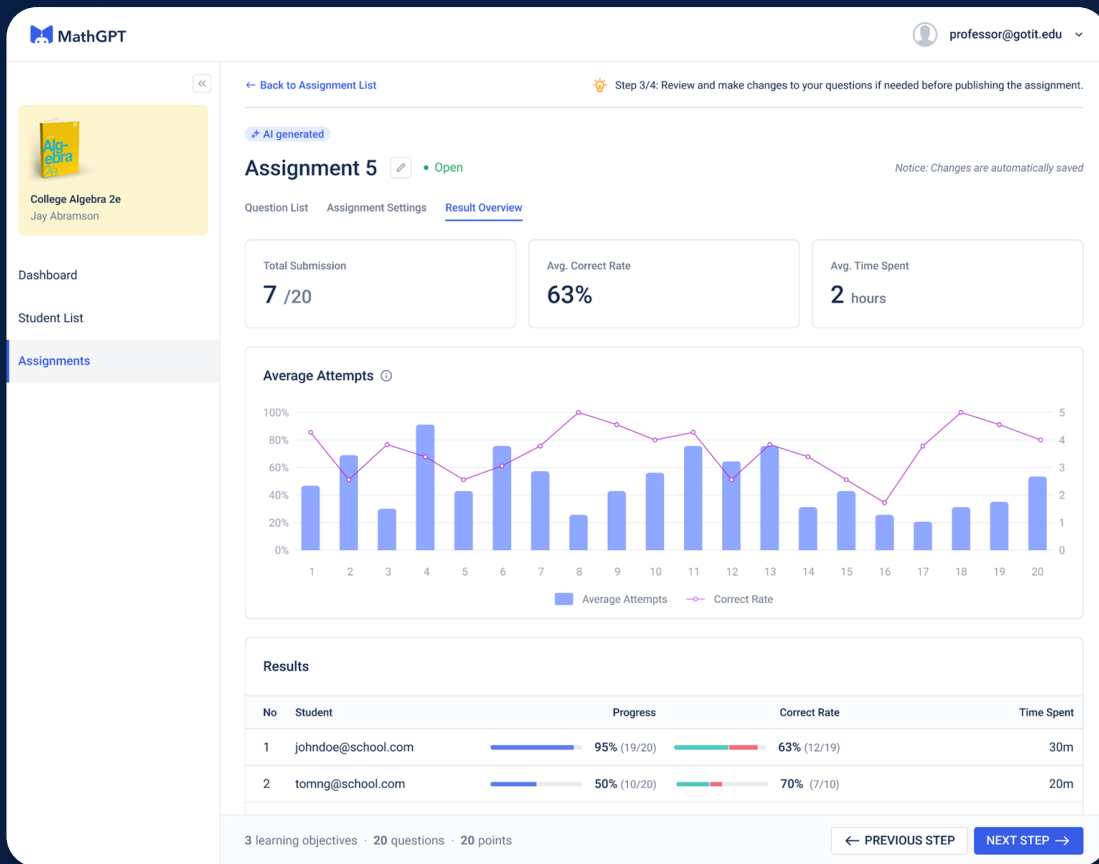
Professor

Students



# Data & Analytics

Discover real-time insights on student progress



# Our 2024 Limited Release is coming up! First come first serve!

Interested? Sign up now!  
Limited number of slots for the Spring 2024 semester.

*\* For instructors teaching OpenStax Math College Algebra, Pre-Calculus, Statistics*

Visit:



[www.mathgpt.ai](http://www.mathgpt.ai)

Name\*

Enter your name

Business Email\*

Enter your best contact email

Organisation Name\*

Where do you teach?

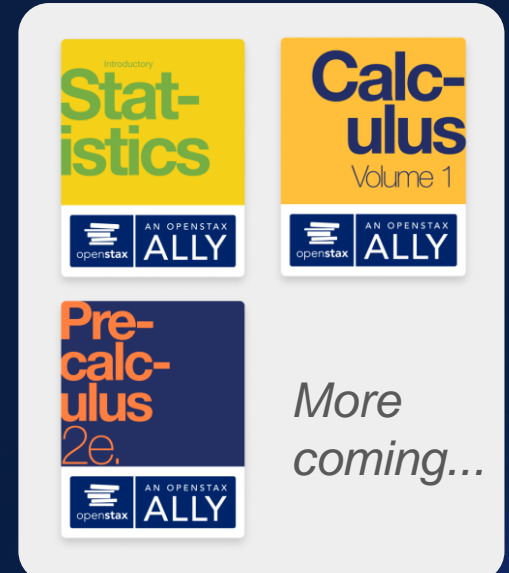
Reason for Contacting

What OpenStax based Math courses are you teaching in Spring 2024 semester? Enter all.

SIGN ME UP!

# Limited Release Overview (Essentials Version & Advanced Version)

- 1 Dec-Jan 1:1 Onboarding Calls:  
MathGPT.AI LR access
- 2 Community Launch
- 3 **Jan. - Limited Release Launch when Classes start**



## Supported Textbooks

(If you don't see yours, let us know!)

+

**AI Native HW Management System**

# Essentials Version: If you cannot use our Homework Management System

**Limited Release of Essentials version will still give you FREE access to everything you and your students need**

- Course Management Feature
- **Textbook content tutoring** for all Learning Objectives, Concepts, Examples, and Try-Its w/ AI Tutoring (with limits on number of tutoring sessions for the class: it does cost us)
- Data and Analytics for Student Usage

We DO require that you at least TRY OUT our HW Management System by creating:

**at least one quiz during the quarter for extra credit.**

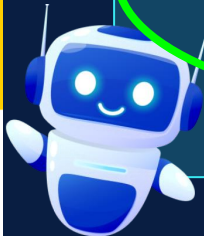
Quiz feature in the Homework Management System will be enabled.



Advanced Version

Switch to AI Native HW Management

→ Get Algebra 2e enabled with MathGPT for no extra charge



**\$25** per student

- AI Powered Homework Platform **with Tutoring on HW problems**
- AI Homework Help for selected Exercises for every Learning Objective
- Quiz generation with feedback
- **+ BONUS** - full MathGPT.ai support for Intermediate Algebra 2e for student remediation and practice **with Tutoring!**

# In Either Case: A True Partnership!

## As a Limited Release Participant, you agree to:

- Provide access to all students in the course
- Integrate MathGPT.AI into your course via extra credit quiz, reading assignments, etc.
- Provide us with feedback, ideas to improve
- Actively participate in our online community
- Spread the word - tell colleagues!

## Our Promise to You:

- Responsive technical and product support
- Proactive partnership to integrate MathGPT.AI into your courses
- Ongoing product development based on your feedback
- Regular touch-points, communication + active pilot user community



**MathGPT.AI**  
by Got It Education

# Thank you!

We would love to hear from you!



**Contact Us**

**Peter Relan**

**[peter@youwebinc.com](mailto:peter@youwebinc.com)**