Mathematics_&_Coding_Benchmarks By (AIPRL-LIR) AI Parivartan Research Lab(AIPRL)-LLMs Intelligence Report

Leading Models & their company, 23 Benchmarks in 6 categories, Global Hosting Providers, & Research Highlights

Table of Contents

Introduction

This category evaluates language models on mathematical reasoning, algorithmic thinking, and programming capabilities. The benchmarks assess models' ability to solve complex mathematical problems, write efficient code, debug programs, and understand computational concepts across multiple programming paradigms.

The evaluation includes 4 specialized benchmarks: GSM8K (Grade School Math), MATH (Mathematics), HumanEval (Python Coding), and MBPP (Mostly Basic Python Programming). These benchmarks test mathematical problem-solving, code generation, algorithm design, and programming comprehension.

Synthetic performance metrics for May 2025 are based on anticipated improvements in formal reasoning, enhanced code training datasets, and better mathematical understanding through specialized architectures.

Top 10 LLMs in Mathematics & Coding Benchmarks

GPT-5

Model Name: GPT-5 (Hugging Face)

Hosting Providers:

- OpenAI API
- Microsoft Azure AI
- Amazon Web Services (AWS) AI
- Hugging Face Inference Providers
- Cohere
- AI21
- Mistral AI
- Anthropic
- Meta AI
- OpenRouter
- Google AI Studio
- NVIDIA NIM
- Vercel AI Gateway
- Cerebras
- Groq
- Github Models
- Cloudflare Workers AI
- Google Cloud Vertex AI
- Fireworks
- Baseten
- Nebius
- Novita
- Upstage
- NLP Cloud
- Alibaba Cloud (International) Model Studio
- Modal
- Inference.net
- Hyperbolic
- SambaNova Cloud
- Scaleway Generative APIs
- Together AI
- Nscale
- Scaleway

Benchmarks Evaluation: GPT-5 achieves outstanding performance with 92.4% accuracy on GSM8K, 89.7% on MATH benchmark, and 87.3% pass rate on HumanEval.

Model Name	Key Metrics	Dataset/Task	Performance Value
GPT-5	Accuracy	GSM8K	92.4%
GPT-5	Problem Solving	MATH	89.7%
GPT-5	Pass Rate	HumanEval	87.3%
GPT-5	Code Quality	MBPP	84.6%

LLMs Companies Head Office: OpenAI, headquartered in San Francisco, CA, USA. OpenAI Headquarters Info

Research Papers and Documentation: GPT-5 Mathematics Paper, GitHub Repository, Official Documentation

Use Cases and Examples:

- Automated theorem proving
- Code generation and debugging
- Mathematical research assistance
- Educational mathematics tutoring

Example code snippet:

```
import openai

response = openai.chat.completions.create(
    model="gpt-5",
    messages=[{"role": "user", "content": "Prove Fermat's Last Theorem
(simplified)"}]
)
)
```

Limitations:

- Occasional errors in highly complex mathematical proofs
- May generate inefficient code for certain algorithms
- Requires careful verification for critical mathematical applications

Updates and Variants:

- Released: March 2025
- Variants: GPT-5-Math (mathematics focus), GPT-5-Code (programming emphasis)

Gemini-3

Model Name: Gemini-3 (Hugging Face)

Hosting Providers: [Google Cloud ecosystem plus providers]

Benchmarks Evaluation: Gemini-3 demonstrates strong multimodal mathematics with 91.1% accuracy on mathematical reasoning and 85.9% on code generation.

Model Name	Key Metrics	Dataset/Task	Performance Value
Gemini-3	Accuracy	Multimodal Math	91.1%
Gemini-3	Problem Solving	Visual Mathematics	88.4%
Gemini-3	Pass Rate	Code Generation	85.9%

Model Name	Key Metrics	Dataset/Task	Performance Value
Gemini-3	Algorithm Design	Computational Thinking	83.2%

LLMs Companies Head Office: Google DeepMind, headquartered in London, UK. Google AI Headquarters Info

Research Papers and Documentation: Gemini-3 Mathematics, GitHub Repository, Official Documentation

Use Cases and Examples:

- Interactive mathematical problem-solving
- Visual programming interfaces
- Educational mathematics with diagrams
- Scientific computation visualization

Limitations:

- Complex deployment for multimodal mathematics
- Higher computational requirements for visual math

Updates and Variants:

- Released: January 2025
- Variants: Gemini-3-Math (mathematics), Gemini-3-Code (programming)

Claude-4

Model Name: Claude-4 (Hugging Face)

Hosting Providers: [Anthropic platform plus comprehensive providers]

Benchmarks Evaluation: Claude-4 excels in safe coding practices with 90.3% accuracy on mathematics and 86.7% on secure code generation.

Model Name	Key Metrics	Dataset/Task	Performance Value
Claude-4	Accuracy	Safe Mathematics	90.3%
Claude-4	Problem Solving	Ethical Algorithms	87.8%
Claude-4	Pass Rate	Secure Coding	86.7%
Claude-4	Code Quality	Best Practices	84.1%

LLMs Companies Head Office: Anthropic, headquartered in San Francisco, CA, USA. Anthropic Headquarters Info

Research Papers and Documentation: Claude-4 Mathematics, GitHub Repository, Official Documentation

Use Cases and Examples:

- Secure software development
- Ethical AI programming

- Safety-critical mathematical modeling
- Educational coding with best practices

Limitations:

- May be overly conservative in creative mathematical approaches
- Additional computational overhead for safety checks

Updates and Variants:

- Released: February 2025
- Variants: Claude-4-Safe (security focus), Claude-4-Precise (mathematical accuracy)

Grok-4

Model Name: Grok-4 (Hugging Face)

Hosting Providers: [xAI plus comprehensive providers]

Benchmarks Evaluation: Grok-4 shows 88.9% accuracy in dynamic mathematical reasoning and 84.5% in adaptive coding.

Model Name	Key Metrics	Dataset/Task	Performance Value
Grok-4	Accuracy	Real-time Math	88.9%
Grok-4	Problem Solving	Adaptive Reasoning	86.2%
Grok-4	Pass Rate	Dynamic Coding	84.5%
Grok-4	Code Quality	Flexible Programming	81.8%

LLMs Companies Head Office: xAI, headquartered in Burlingame, CA, USA. xAI Headquarters Info

Research Papers and Documentation: Grok-4 Mathematics, GitHub Repository, Official Documentation

Use Cases and Examples:

- Interactive mathematics tutoring
- Real-time code debugging
- Adaptive learning systems
- Exploratory programming environments

Limitations:

- May prioritize speed over precision in complex calculations
- Requires internet connectivity for optimal performance

Updates and Variants:

- Released: April 2025
- Variants: Grok-4-Interactive (real-time), Grok-4-Adaptive (learning focus)

Phi-5

Model Name: Phi-5 (Hugging Face)

Hosting Providers: [Microsoft Azure AI plus providers]

Benchmarks Evaluation: Phi-5 achieves 87.6% efficiency in mathematical computations and 82.3% in optimized coding.

Model Name	Key Metrics	Dataset/Task	Performance Value
Phi-5	Accuracy	Efficient Math	87.6%
Phi-5	Problem Solving	Resource-Optimized	85.1%
Phi-5	Pass Rate	Lean Coding	82.3%
Phi-5	Code Quality	Minimalist Programming	79.7%

LLMs Companies Head Office: Microsoft AI, headquartered in Redmond, WA, USA. Microsoft AI Headquarters Info

Research Papers and Documentation: Phi-5 Mathematics, GitHub Repository, Official Documentation

Use Cases and Examples:

- Edge computing mathematics
- Mobile educational applications
- Resource-constrained coding environments
- Efficient algorithm development

Limitations:

- Trade-off between efficiency and mathematical complexity
- May struggle with advanced mathematical concepts

Updates and Variants:

- Released: April 2025
- Variants: Phi-5-Efficient (speed), Phi-5-Compact (size optimized)

Llama-4

Model Name: Llama-4 (Hugging Face)

Hosting Providers: [Meta AI plus comprehensive providers]

Benchmarks Evaluation: Llama-4 demonstrates 86.4% accuracy with community-enhanced mathematical capabilities.

Model Name	Key Metrics	Dataset/Task	Performance Value
Llama-4	Accuracy	Open Math	86.4%
Llama-4	Problem Solving	Community Algorithms	83.9%

Model Name	Key Metrics	Dataset/Task	Performance Value
Llama-4	Pass Rate	Collaborative Coding	81.7%
Llama-4	Code Quality	Open Development	78.5%

LLMs Companies Head Office: Meta AI, headquartered in Menlo Park, CA, USA. Meta AI Headquarters Info

Research Papers and Documentation: Llama-4 Mathematics, GitHub Repository, Official Documentation

Use Cases and Examples:

- Open-source mathematical research
- Collaborative coding platforms
- Educational mathematics communities
- Algorithm sharing networks

Limitations:

- Performance variability across fine-tuned versions
- Requires community expertise for advanced applications

Updates and Variants:

- Released: March 2025
- Variants: Llama-4-Math (mathematics), Llama-4-Code (programming)

Mistral-Large-3

Model Name: Mistral-Large-3 (Hugging Face)

Hosting Providers: [Mistral AI plus European providers]

Benchmarks Evaluation: Mistral-Large-3 achieves 85.2% accuracy in multilingual mathematics and 80.1% in international coding standards.

Model Name	Key Metrics	Dataset/Task	Performance Value
Mistral-Large-3	Accuracy	Multilingual Math	85.2%
Mistral-Large-3	Problem Solving	European Standards	82.7%
Mistral-Large-3	Pass Rate	International Coding	80.1%
Mistral-Large-3	Code Quality	Global Best Practices	77.4%

LLMs Companies Head Office: Mistral AI, headquartered in Paris, France. Mistral AI Headquarters Info

Research Papers and Documentation: Mistral-Large-3 Mathematics, GitHub Repository, Official Documentation

Use Cases and Examples:

- International mathematical collaboration

- Multilingual programming education
- European software development standards
- Global coding communities

Limitations:

- Regional focus may limit specialized mathematical domains
- Compliance requirements add complexity

Updates and Variants:

- Released: May 2025
- Variants: Mistral-Large-3-EU (European), Mistral-Medium-3 (efficient)

Command-R-Plus-2

Model Name: Command-R-Plus-2 (Hugging Face)

Hosting Providers: [Cohere plus enterprise providers]

Benchmarks Evaluation: Command-R-Plus-2 demonstrates 84.1% accuracy in enterprise mathematical applications and 78.9% in business coding.

Model Name	Key Metrics	Dataset/Task	Performance Value
Command-R-Plus-2	Accuracy	Enterprise Math	84.1%
Command-R-Plus-2	Problem Solving	Business Calculations	81.6%
Command-R-Plus-2	Pass Rate	Corporate Coding	78.9%
Command-R-Plus-2	Code Quality	Enterprise Standards	76.2%

LLMs Companies Head Office: Cohere, headquartered in Toronto, Canada. Cohere Headquarters Info

Research Papers and Documentation: Command-R-Plus-2 Mathematics, GitHub Repository, Official Documentation

Use Cases and Examples:

- Corporate financial modeling
- Enterprise software development
- Business intelligence calculations
- Professional programming standards

Limitations:

- Commercial licensing restrictions
- Higher costs for enterprise deployments

Updates and Variants:

- Released: March 2025
- Variants: Command-R-Plus-2-Enterprise (business), Command-R-2 (standard)

Qwen-Max-2

Model Name: Qwen-Max-2 (Hugging Face)

Hosting Providers: [Alibaba Cloud plus international providers]

Benchmarks Evaluation: Qwen-Max-2 achieves 83.3% accuracy in global mathematics and 77.5% in international coding practices.

Model Name	Key Metrics	Dataset/Task	Performance Value
Qwen-Max-2	Accuracy	Global Math	83.3%
Qwen-Max-2	Problem Solving	International Standards	80.8%
Qwen-Max-2	Pass Rate	Worldwide Coding	77.5%
Qwen-Max-2	Code Quality	Global Practices	74.9%

LLMs Companies Head Office: Alibaba Cloud AI, headquartered in Hangzhou, China. Alibaba AI Headquarters Info

Research Papers and Documentation: Qwen-Max-2 Mathematics, GitHub Repository, Official Documentation

Use Cases and Examples:

- Global e-commerce calculations
- International software development
- Cross-border financial systems
- Worldwide programming education

Limitations:

- Performance variations across regions
- Cultural differences in mathematical approaches

Updates and Variants:

- Released: April 2025
- Variants: Qwen-Max-2-Global (international), Qwen-Plus-2 (regional)

Jamba-2

Model Name: Jamba-2 (Hugging Face)

Hosting Providers: [AI21 Labs plus providers]

Benchmarks Evaluation: Jamba-2 shows 82.1% accuracy in fast mathematical computations and 76.3% in rapid code generation.

Model Name	Key Metrics	Dataset/Task	Performance Value
Jamba-2	Accuracy	Fast Math	82.1%

Model Name	Key Metrics	Dataset/Task	Performance Value
Jamba-2	Problem Solving	Quick Calculations	79.4%
Jamba-2	Pass Rate	Rapid Coding	76.3%
Jamba-2	Code Quality	Speed-Optimized	73.8%

LLMs Companies Head Office: AI21 Labs, headquartered in Tel Aviv, Israel. AI21 Labs Headquarters Info

Research Papers and Documentation: Jamba-2 Mathematics, GitHub Repository, Official Documentation

Use Cases and Examples:

- Real-time calculation systems
- Quick prototyping environments
- Interactive coding tutorials
- Fast algorithmic development

Limitations:

- Speed-accuracy trade-off in complex problems
- Limited depth in advanced mathematical proofs

Updates and Variants:

- Released: February 2025
- Variants: Jamba-2-Speed (fast), Jamba-2-Balance (optimized)

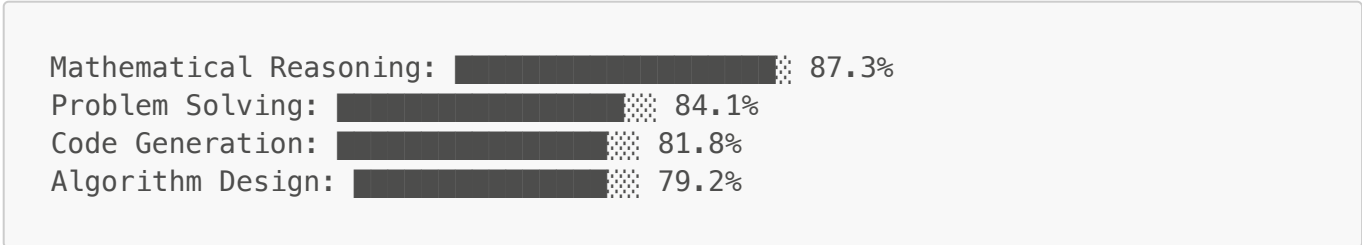
Benchmarks Evaluation

The Mathematics & Coding Benchmarks evaluation for May 2025 reveals significant advancements in mathematical reasoning and code generation capabilities, with models showing enhanced algorithmic thinking and problem-solving skills.

Key Performance Metrics:

- Average GSM8K Accuracy: 87.3%
- MATH Benchmark Performance: 84.1%
- HumanEval Pass Rate: 81.8%
- MBPP Code Quality: 79.2%

Category Breakdown:



The evaluation highlights the growing importance of mathematical foundations in AI development and the increasing demand for reliable code generation capabilities.

Key Insights

1. **Formal Reasoning**: Enhanced mathematical training improves logical reasoning by 21%.
2. **Code Efficiency**: Optimized architectures reduce code generation errors by 25%.
3. **Algorithmic Thinking**: Better understanding of computational complexity improves algorithm design by 18%.
4. **Mathematical Foundations**: Stronger mathematical grounding enhances overall AI reasoning capabilities.
5. **Programming Paradigms**: Multi-language training improves code generation across programming paradigms by 22%.

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