

Harold's Math Etiquette

Cheat Sheet

13 March 2025

Purpose

Mathematicians, professors, and strict high school teachers expect students to follow these rules or risk losing points.

Bad Math Etiquette

Function	Improper Form	Proper Form
$\frac{1}{\sqrt[n]{x}}$	Radicals in the denominator $\frac{1}{\sqrt{x}}$	Radicals in the numerator $\frac{\sqrt{x}}{x}$
x^{-n}	Negative exponents x^{-n}	Positive exponents $\frac{1}{x^n}$
$\frac{1}{i}$	Complex/Imaginary numbers in the denominator $\frac{1}{a + bi}$	Complex/Imaginary numbers in the numerator $\frac{a - bi}{a^2 + b^2}$ (multiply by the conjugate)
Sets { }	Unsorted set elements $A = \{5, 2, 7, 1, -3\}$	Sorted set elements $A = \{-3, 1, 2, 5, 7\}$
Unsimplified Answers	Common terms not combined $x^2 + 3x - x + 1$	Common terms combined $x^2 + 2x + 1$
	Common terms not factored $Ax + Bx + Cx$	Common terms factored $x(A + B + C)$
Ignoring Precision	Saying "it's close enough" when precision is required.	Follow the exact rules for rounding, significant figures, or proofs.
Unchecked Exceptions	Assuming a rule always applies without checking exceptions.	Test cases and understand when rules apply.
Misusing Infinity	Writing $\frac{1}{0} = \infty$ without understanding that division by zero is undefined.	Use proper limit notation when dealing with infinity. $\lim_{x \rightarrow \infty} f(x), \quad \lim_{h \rightarrow 0} \frac{f(x)}{h}$
Academic Dishonesty	Copying homework or exam answers without learning the material.	Struggle through problems first and seek help if needed.
Improper Attribution	Plagiarism.	Acknowledging Internet sources, including the use of AI Chatbots.
Take Home Tests	Open book during a closed-book exam. Unusually high scores often indicate cheating.	Closed book. Be fair to your classmates when taking a makeup exam unattended after being sick.

Illegal Math Operations

Function	Undefined	Defined
Algebra		
$\frac{1}{x}$	Division by zero (0) (vertical asymptote)	$x \neq 0$
$f(x) \frac{(x-c)}{(x-c)}$	Division by zero (0): special case (hole at $x = c$)	$x \neq c$
\sqrt{x}	Negative square roots	$x \geq 0$
$\sqrt[n]{x} = x^{\frac{1}{2n}}$	Negative even-powered roots	$x \geq 0$
$\log_n x$ $\ln x$	Negative logarithms or bases Complex bases	$x > 0$ $n > 0$
$n!$	Negative factorials $(-n)!$	$n \geq 1$
Trigonometry		
$\tan x$ $\sec x$	Trig functions with division by zero when $\cos x = 0$	$x \neq \frac{\pi}{2} \pm n\pi$
$\cot x$ $\csc x$	Trig functions with division by zero when $\sin x = 0$	$x \neq \pm n\pi$
$\sin^{-1} x$ $\cos^{-1} x$	Inverse trig functions where $ x > 1$	$ x \leq 1$
$\sec^{-1} x$ $\csc^{-1} x$	Inverse trig functions where $ x < 1$	$ x \geq 1$
Zero/Infinity		
Zero (0)	$\frac{0}{0}, 0^0, \infty^0, 0 \cdot \infty$	$\frac{0}{\infty} \rightarrow 0, \frac{\infty}{0} \rightarrow \infty$
Infinity (∞)	$\frac{\infty}{\infty}, \infty - \infty, a - \infty, 1^\infty, x^\infty$	$0^\infty \rightarrow 0, \infty^\infty \rightarrow \infty$
Mod	Modulo by zero $a \bmod 0$	$a \bmod b$ where $b > 0$
Linear Algebra		
Matrix Division	A/B	$A/B = AB^{-1}$ If B is invertible

Polishing a Math Assignment

Category	Rule	Clarification
1. Accuracy	1.1 Double-check calculations	Rework problems to verify correctness.
	1.2 Check the formulas	Ensure the correct formulas, theorems, or techniques are used.
	1.3 Validate units and notation	If dealing with measurements, ensure correct units are used, properly converted, and shown with answers.
	1.4 Check equation balancing	For algebraic equations, confirm both sides are equal. For chemistry equations, confirm the conservation of both mass and charge on both sides.
	1.5 Ensure correct sign usage	Pay attention to negative (-) signs, exponents, and coefficients.
2. Mistakes	2.1 Look for arithmetic mistakes	Simple errors can impact the entire solution.
	2.2 Look for algebraic mistakes	Incorrect factoring, distributing, or sign errors.
	2.3 Verify logical consistency	Ensure no contradiction in your steps.
3. Logical	3.1 Neatly organize steps	Show logical progression in solving problems.
	3.2 One step per line	Avoid cramming multiple steps into one line.
	3.3 Don't skip steps unless trivial	Makes it easier for readers to follow.
	3.4 Justify steps when necessary	If a step isn't obvious, provide a brief explanation.
4. Neatness	4.1 Use legible handwriting	If handwritten, write clearly and consistently.
	4.2 Align equal signs	Keep equations lined up for readability.
	4.3 Box or highlight final answers	Make answers stand out for easy grading.
5. Formatting	5.1 Use proper symbols	Ensure symbols (e.g., \sum , \int , π , Δ , \neq) are correctly used.
	5.2 Use consistent font and size	Stick to a standard, readable format.
	5.3 Label graphs and diagrams	Axes, units, and labels must be included.
	5.4 Use margins for notes	If submitting a physical paper, keep space for comments or corrections.
	5.5 Format fractions properly	Avoid ambiguities like $1/2x$ vs. $(1/2)x$.
6. Readability	6.1 Avoid cluttered work	Keep work spaced out for easy reading.
	6.2 Don't jump around	Show your steps from Left \rightarrow Right, Top \rightarrow Bottom, or vice versa.
	6.3 Maintain proper spacing	Don't clutter solutions, leave space between problems.
	6.4 Avoid unnecessary abbreviations	Write abbreviations in full upon first use.
7. Completeness	7.1 Answer all parts of the question	If a problem has multiple parts, don't leave any out.
	7.2 Double-check word problems	Ensure answers make sense in context.

	7.3 Write full sentences for explanations	If required, provide clear justifications.
8. Justification	8.1 Use proper mathematical reasoning	Avoid skipping essential explanations.
	8.2 Include definitions or assumptions	If necessary, state assumptions made.
9. Spelling & Grammar	9.1 Use proper mathematical vocabulary	Distinguish between terms like "factor" and "multiple."
	9.2 Write concise explanations	Keep answers direct and to the point.
	9.3 Check the spelling of technical terms	Misspellings can confuse the reader.
	9.4 Use a spelling and grammar checker	Most editors include a spell checker.
10. Proofreading	10.1 Check for typos	Ensure numbers, symbols, and variables are correct.
	10.2 Ensure proper alignment	Especially for equations in multi-step solutions.
	10.3 Review instructions	Make sure all questions are fully answered.
11. Professional	11.1 Number each question clearly	Corresponding to the assignment format.
	11.2 Use a consistent structure	Uniformly solve similar types of problems.
	11.3 Check for completeness	Ensure all required problems are included.

Sources

- ChatGPT 4o (12 March 2025), Open AI:
 - “Rules for polishing a math assignment”
 - “more rules for Rules for polishing a math assignment”
 - “what is considered bad math etiquette?”