



math works

$$\cos^{-1} \theta \quad \sqrt{a^2 + b^2} \quad e^{i\theta}$$

$$\Delta y \quad \partial^2 \Omega \quad \sin^{-1} \theta$$

Math's Double Standard

Far too many students in the U.S. give up on math early because it does not come easy and they believe only students with innate ability can really be “good” at mathematics, a notion that is all too often reinforced by adults who believe the same thing. Yet, in most other countries students accept that mathematics—especially advanced math courses—can be challenging, but know that with enough motivation and perseverance, they can learn difficult material. The uniquely American attitude towards math—the perception that only people who are naturally gifted at math are good at it—leads to a dangerous corollary: that it is ok to be “bad at math.” This is a significant factor in the comparatively low math achievement of students in the U.S., which limits students’ education and career options and makes it harder for the U.S. to compete. Low levels of math attainment lead to fewer science, technology, engineering and math (STEM) workers, fewer degrees in STEM fields and ultimately threatens our innovation and technological preeminence.


Things you never hear about reading and writing (but often hear about math).

- “I’m just not that good at writing, so why bother?”
- “When will I actually use reading and writing in the real world?”
- “Only nerds like to read and write.”
- “I’m just not smart enough for writing.”
- “My parents can’t read, so why do I need to learn how to read?”
- “It’s just a fact that guys are better at reading than girls are.”
- “I’m not a writing person; it doesn’t come naturally to me, so why should I try?”

There is a serious gap between how Americans value math generally and how they value math for their own enrichment.

- Most American middle school students (84 percent) would rather clean their rooms, eat their vegetables, take out the garbage and go to the dentist than do their math homework. Yet these same students say they want to do better in math (67 percent) and that doing well in math is important to them (94 percent).¹

Reading through the comments to the left, they sound shocking and would undoubtedly be challenged by parents, teachers and students alike. Yet, if one switches out “reading” or “writing” for “math,” suddenly they become familiar and commonplace. In the U.S., people mistakenly believe that success in math courses is completely based on innate ability, rather than perseverance and hard work, a cultural double standard that facilitates American’s poor performance on international mathematics assessments—and ultimately hurts our ability to compete in the global marketplace.


$$[X_i - \bar{X}]^2 \partial^2 \Omega$$

- 62 percent of parents say it is crucial for most of today's students to learn high-level math, like advanced algebra and calculus. Only 32 percent of parents, however, say their child's school should teach more math and science.²

Students – and teachers – in other countries have a more positive perception of math

- When teachers were asked what factors may influence students' performance in mathematics, 41 percent of American teachers believed that innate intelligence was more important than studying hard, which was just the opposite of Chinese teachers.³
- One study found that fifth graders from the U.S. believe math is all about numbers, memorization and knowing the "rules," while fifth graders from Taiwan believe math is about knowing how to *use* the rules and develop flexible solutions. Taiwanese students also generally agree that math learned in school is useful in real life, more so than U.S. students.⁴
- Students' attitudes about mathematics can explain as much as 25-32 percent of the variance (or range) in mathematics achievement at the middle school level, with a positive attitude having a positive relationship with students' grades.⁵

ENDNOTES

- 1 Raytheon MathMovesU Survey, conducted by KRC Research, Nov 2005. <http://raytheon.mediaroom.com/index.php?s=43&item=307&page=template=release>
- 2 Kadlec, Alison & Will Friedman. (2007). *Important, But Not For Me: Parents and Students in Kansas and Missouri Talk About Math, Science, and Technology Education*. Public Agenda. www.publicagenda.org/reports/important-not-me
- 3 Stevenson, H.W., Chen, C., & Lee, S. (1993). *Mathematics Achievement of Chinese, Japanese, and American Children: Ten Years Later*. Science, Vol. 259, Issue 5091, p53-58.
- 4 Tsao, Yea-Ling (Sept 2004). *A Comparison of American and Taiwanese Students: Their Math Perception*. Journal of Instructional Psychology, Vol. 31 Issue 3, p206-213.
- 5 K. Sanchez, L. Zimmerman, and R. Ye, "Secondary students' attitudes toward mathematics," Academic Exchange Quarterly, vol. 8, no. 2, pp. 56-60, 2004.


$$\sqrt{b^2}$$
$$x - \mu$$