MATH, BEST QUOTES ON

Students never think it can be the teacher's fault and so I thought I was stupid. I was frustrated and would come home and cry because I couldn't do it. Then we got a new teacher who made math accessible. That made all the difference and I learned that it's how you present it that makes it scary or friendly.

—Danica McKellar

A good graph is worth a thousand words.

--Dennis Johnston

How to do math:

1. Write down the problem.
2. Cry.

—*T-Shirt Slogan*

Never try to walk across a river just because it has an average depth of four feet.

--Milton Friedman

What math education will be for one child for one year will depend on what the child's teacher believes, knows and does—and doesn't believe, doesn't know and doesn't do.

--Eric Muller

If you don't make mistakes, you're not working on hard enough problems. And that's a big mistake

--Frank Wilczek

Stand firm in your refusal to remain conscious during algebra. In real life, I assure you, there is no such thing as algebra.

--Fran Leibowitz

Concern for man and his fate must always form the chief interest of all technical endeavors. Never forget this in the midst of your diagrams and equations.

--Albert Einstein

Algebra is but written geometry, and geometry is but figured algebra.

--Sophie Germain

Bees...by virtue of a certain geometrical forethought...know that the hexagon is greater than the square and the triangle, and will hold more honey for the same expenditure of material.

--Pappus (A.D. 300)

Why are so many Asian kids good at math and achieve so much?….It's not genetic, it's not in the rice! It's about hard work.

--Amy Chua

There is no branch of mathematics, however abstract, which may not someday be applied to the phenomena of the real world.

--Nicolai Lobachevsky

It is unworthy of excellent men to lose hours like slaves in the labor of calculation which could safely be relegated to anyone else if machines were used.

--Gottfried Willhelm von Leibniz

Numbers constitute the only universal language.

--Nathanael West

The metric system did not really catch on in the States, unless you count the increasing popularity of the nine-millimeter bullet.

--Dave Barry

The idea of math phobia annoys me. There's no history phobia, no English phobia, no sociology phobia. Somehow mathematics phobia rolls right off the tongue with no problem. On behalf of all of those math-hating people, I personally apologize to them for their experience....Currently, if you look at all the people who think mathematics is dull, it's because of their experience. When we teach mathematics, we are not sensitive to the audience. Teachers are performers in front of an audience. Some teachers don't realize they have to reach their audience..

--Edward B. Burger

There is no more a math mind than there is a history or an English mind.

--Gloria Steinem

A mathematical theory is not to be considered complete until you have made it so clear that you can explain it to the first man whom you meet on the street.

--David Hilbert

Anyone who cannot cope with mathematics is not fully human. At best he is a tolerable subhuman who has learned to wear shoes, bathe, and not make messes in the house.

--Robert Heinlein

It has become almost a cliché to remark that nobody boasts of ignorance of literature, but it is socially acceptable to boast ignorance of science and proudly claim incompetence in mathematics.

--Richard Dawkins

Compound interest is the greatest mathematical discovery of all time.

--Albert Einstein

Writing about mathematics, such as describing how a problem was solved,...helps students clarify their thinking and develop deeper understanding.

--*National Council of Teachers of Mathematics* 1989

There are three kinds of people: Those who can count and those who can't.

--Unknown

'You won't have a calculator everywhere you go,' said your 8th grade math teacher. Yeah…about that.

—Ged Backland

Roman numerals are an ancient Roman system of organizing Super Bowls.

—*TL;DR Wikipedia*

Students who show an inclination toward math need additional math opportunities and a chance to be around other math enthusiasts in the same way that a kid adept with a soccer ball night eventually need to join a a traveling team. And earlier is better than later: The subject is relentlessly sequential and hierarchical.

—Peg Tyre

Only in math problems can you buy 60 cantaloupes and no one asks what the hell is wrong with you.

—Charles M. Schulz

I stopped understanding math when the alphabet decided to get involved.

—Ged Backland

I teach high school math. I sell a product to a market that doesn't want it, but is forced by law to buy it.

—Dan Meyer

I want to help middle school girls stay interested in math and be good at it, and see it as friendly and accessible and not this scary thing. Everyone else in society tells them it's not for them. It's for nerdy white guys with pocket protectors.

—Danica Mckellar

The roots of math failure can usually be traced back to second or third grade. In those grades instruction is provided by poorly trained teachers who are themselves uncomfortable with math.

—Inessa Rifkin

Nightingale [Florence]…analyzed army mortality rates. [She] uncovered a stunning fact: Most of the soldiers in the Crimean War hadn't died in combat. They'd died of 'preventable diseases'—precisely the sort caused by terrible hygiene. Clean up the hygiene and you'd save lives. Nightingale adroitly realized that tables of numbers and text would be too hard to parse. They needed, she said, a data visualization—'to affect thro' the eyes what we fail to convey to the public through their word-proof ears.' Her invention was the elegant 'polar area chart,' a new variant of the pie chart: Each slice of the pie showed deaths for one month of the war, growing larger if the deaths increased, and color-coded to show the causes of death. Fans called it the 'rose diagram,' because it looked like a flower.

—Clive Thompson

It still amazes me that we insist on teaching algebra to all students when only about 20 percent will ever use it and fail to teach anything about parenting when the vast majority of our students will become parents.

—Nel Noddings

There should be no such thing as boring mathematics.

—Edsger Dijkstra

Mathematics, even in its present and most abstract state, is not detached from life. It is just the ideal handling of the problems of life.

--Cassius Jackson Keyser

Mathematics is the science which uses easy words for hard ideas.

--Edward Kasner and
James R. Newman

I succeeded at math, at least by the usual evaluation criteria: grades. Yet while I might have earned top marks in geometry and algebra, I was merely following memorized rules, plugging in numbers and dutifully crunching out answers by rote, with no real grasp of the significance of what I was doing or its usefulness in solving real-world problems. Worse, I knew the depth of my own ignorance, and I lived in fear that my lack of comprehension would be discovered and I would be exposed as an academic fraud -- psychologists call this 'imposter syndrome.'

—Jennifer Ouellette

No doubt there are some who, when confronted with a line of mathematical symbols, however simply presented, can only see the face of a stern parent or teacher who tried to force into them a non-comprehending parrot-like apparent competence--a duty and a duty alone--and no hint of magic or beauty of the subject might be allowed to come through.

—Roger Penrose

I was performing at a New Jersey high school, and I asked a class of 2,000 students, 'How many of you love mathematics?' and only one hand went up. And that was the hand of the math teacher!

—Shakuntala Devi

Algebra is the new Greek that 'all educated persons' supposedly need….But we should be cautious about accepting its narrow view of the high school curriculum, especially its claim that advanced algebra should be a universal requirement….I have no doubt, for example, that most students who study Greek or astrophysics also end up in satisfying careers. Algebra is not the cause of adult success any more than Greek is. It is most likely the reverse: Those who take advanced courses are smart, motivated students who will succeed in any career they choose.

—Grant Wiggins

While reviewing math symbols with my second-grade pupils, I drew a greater-than (>) and a less-than (<) sign on the chalkboard and asked, 'Does anyone remember what these mean?' A few moments passed, and then a boy confidently raised his hand. 'One means fast-forward,' he exclaimed, 'and the other means rewind!'

--Teresa Donn

Completing advanced math courses in high school has a greater influence on whether students will graduate from college than any other factor—including family background. Students who take math beyond Algebra II double their chances of earning a bachelor's degree. Through 2016, professional occupations are expected to add more new jobs—at least 5 million—than any other sector; within that category, computer and mathematical occupations will grow the fastest. Simply taking advanced math has a direct impact on future earnings, apart from any other factors. Students who take advanced math have higher incomes 10 years after graduating—regardless of family background, grades, and college degrees.

—*Achieve* [A Group Created by Governors and CorporateLeaders]

We are on the verge of requiring every student in the United States to learn two years of algebra that they will likely never use, but no one is required to learn wellness or parenting. The current standards movement, for all its good intentions, is perilously narrowing our definition of education, to the great harm of not only students but also entire fields of study: the arts, the technical arts and trades, and the social sciences. Gone are excellent vocational programs….Threatened are visual arts, theater, music, and dance programs despite their obvious value. Indeed, there are more musicians in this country than mathematicians, but you would never know it from the work of standards committees.

—Grant Wiggins

It makes little sense to spend a month teaching decimal fractions to fourth-grade pupils when they can be taught in a week, and better understood and retained, by sixth-grade students. Child-centeredness does not mean lack of rigor or standards; it does mean finding the best match between curricula and children's developing interests and abilities.

--David Elkind

It is the duty of all teachers, and of teachers of mathematics in particular, to expose their students to problems much more than to facts.

—Paul Halmos

I abhor averages. I like the individual case. A man may have six meals one day and none the next, making an average of three meals per day, but that is not a good way to live.

—Louis D. Brandeis

Mathematics is the alphabet with which God has written the universe.

—Galileo

Unlike most math classes, where teachers struggle to impart knowledge to students—who must passively absorb it and then regurgitate it on a test—problem-solving classes demand that the pupils execute the cognitive bench press: investigating, conjecturing, predicting, analyzing, and finally verifying their own mathematical strategy. The point is not to accurately execute algorithms, although there is, of course, a right answer. Truly thinking the problem through—creatively applying what you know about math and puzzling out possible solutions—is more important. Sitting in a regular ninth-grade algebra class versus observing a middle-school problem-solving class is like watching kids get lectured on the basics of musical notation versus hearing them sing an aria from Tosca.

—Peg Tyre

Albert Einstein was a theoretical physicist who developed the mathematical equation cartoon characters write on a blackboard to show they're smart.

—TL;DR Wikipedia

The Pythagorean theorem is a mathematical formula used by all adults daily in a multitude of hypotenuse-determination related tasks.

—TL;DR Wikipedia

Get your facts first, and then you can distort them as much as you please. (Facts are stubborn, but statistics are more pliable.)

--Mark Twain

Mathematicians stand on each other's shoulders.

--Carl Friedrich Gauss

My daughter tells me she got a C on her math homework from the night before because she hadn't made an answer column. Her correct answers were there, at the end of each neatly written-out equation, yet they weren't segregated into a separate column on the right side of each page. I'm amazed that the pettiness of this doesn't seem to bother her. School is training her well for the inanities of adult life.

--Karl Taro Greenfeld

Civilization advances by extending the number of important operations which we can perform without thinking about them.

--Alfred North Whitehead

That's what math is—wondering, playing, amusing yourself with your imagination.

--Paul Lockhart

Mathematics is the gate and key of the sciences ... . Neglect of mathematics works injury to all knowledge, since he who is ignorant of it cannot know the other sciences or the things of this world. And what is worse, men who are thus ignorant are unable to perceive their own ignorance and so do not seek a remedy.

--Roger Bacon

Besides opening up a world of better-paying careers, doing math is excellent for building confidence and strengthening the mind. Math is a language, and we can talk about anything in the language of math; taxes, shoe sales and even the chemical formula in your favorite lip gloss.

--Danica McKellar

Conclusions that are wrong or just incomprehensible are often the result of plain old-fashioned blunders. Rates and percentages are the most common cause of crooked arithmetic. Sometimes the matter can be straightened out by some numerical detective work.

--David S. Moore

It is remarkable to what extent Indian mathematics enters into the science of our time. Both the form and the spirit of the arithmetic and algebra of modern times are essentially Indian and not Grecian.

--Florian Cajori

Minus times minus is plus,
The reason for this we need to discuss.

--W. H. Auden

Beauty in mathematics is seeing the truth without effort.

--George Polya

7/5ths of all people do not understand fractions.

--Unknown

Actually, most mathematics courses do not teach reasoning of any kind. Students are so baffled by the material that they are obliged to memorize in order to pass examinations.

--Morris Kline

[Mathematics] is an independent world created out of pure intelligence.

--William Wordsworth

A mathematician is a device for turning coffee into theorems.

--Paul Erdös

Too often we give children answers to remember rather than problems to solve.

--Roger Lewin

You cannot solve the problem with the same kind of thinking that created the problem.

--Albert Einstein

On the basis of my historical experience, I fully believe that mathematics of the twenty-fifth century will be as different from that of today as the latter is from that of the sixteenth century.

--George Sarton

Never say of a branch of mathematics, 'There's something I don't need to know.' It always comes back to haunt you.

--Charles Rickart

Mathematics is the cheapest science. Unlike physics or chemistry, it does not require any expensive equipment. All one needs for mathematics is a pencil and paper.

--George Polya

In many schools, sports are so entrenched that no one—not even the people in charge—realizes their actual cost. When Marguerite Roza, the author of Educational Economics, analyzed the finances of one public high school in the Pacific Northwest, she and her colleagues found that the school was spending $328 a student for math instruction and more than four times that much for cheerleading—$1,348 a cheerleader. 'And it is not even a school in a district that prioritizes cheerleading' Roza wrote. 'In fact, this district's strategic plan has for the past three years claimed that math was the primary focus.'

--Amanda Ripley

When you can measure what you are talking about and express it in numbers, you know something about it.

--Lord Kelvin

Measure what is measurable, and make measurable what is not so.

--Galileo Galilei

People who don't count won't count.

--Anatole France

Every new body of discovery is mathematical in form, because there is no other guidance we can have.

--Charles Darwin

I suppose you are two fathoms deep in mathematics, and if you are, then God help you, for so am I, only with this difference, I stick fast in the mud at the bottom and there I shall remain.

--Charles Darwin

Mathematics seems to endow one with something like a new sense.

--Charles Darwin

Mathematics is the supreme arbiter. From its decisions there is no appeal.

--Tobias Dantzig

As for everything else, so for a mathematical theory: beauty can be perceived but not explained.

--Arthur Cayley

In mathematics the art of proposing a question must be held of higher value than solving it.

--Georg Cantor

The things of this world cannot be made known without a knowledge of mathematics.

--Roger Bacon

As are the crests on the heads of peacocks, as are the gems on the hoods of cobras, so is mathematics at the top of all sciences.

--*The Yajurveda*,
c. 600 B.C.

Arithmetic is numbers you squeeze from your head to your hand to your pencil to your paper till you get the answer.

--Carl Sandburg

Averages...seduce us away from minute observation.

--Florence Nightingale

Spurious moral grandeur is generally attached to any formulation computed to a large number of decimal places.

--David Berlinski

Mathematics is what the world is when we subtract our own perceptions.

--Don DeLillo

It is easier to square the circle than to get round a mathematician.

--Augustus De Morgan

A statistician is someone who is good with figures but who doesn't have the personality to become an accountant.

--Bruce White

When you have mastered numbers, you will in fact no longer be reading numbers, any more than you read words when reading books. You will be reading meanings.

--Harold Geneen

We only trust what we can measure.

--Unknown

Accuracy, being able to figure out the correct answer consistently, is...more important than speed.

--Mary Baratta-Lorton

The arithmetic of 1900 differed materially from the arithmetic we now include in the elementary curriculum....Two of its characteristics stand out prominently: (a) it was hard, and (b) it was little related to practical living....Teachers, relying pretty much upon what was in the textbook, showed pupils what to do and then relied upon abundant practice to produce mastery. Homework assignments were heavy, and many parents were called upon to revive, temporarily at least, skills that they had forgotten. The children who survived this demanding regimen, aided often by two one-hour periods in arithmetic a day, were capable of arithmetical feats far beyond the capabilities of eighth-graders today, whether or not they ever put them to effective use.

--William A. Brownell

Mathematics contains much that will neither hurt one if one does not know it nor help one if one does know it.

--Johann Burkhard Mencke

Mathematics possesses not only truth, but supreme beauty—a beauty cold and austere, like that of a sculpture.

--Bertrand Russell

The study of the mathematics is like climbing up a steep and craggy mountain; when once you reach the top, it fully recompenses your trouble, by opening a fine, clear, and extensive prospect.

—Tryon Edwards

The mathematician has reached the highest rung on the ladder of human thought.

--Havelock Ellis

Numerical precision is the very soul of science.

--Sir D'Arcy Wentworth Thompson

When you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meager and unsatisfactory kind: it may be the beginning of knowledge, but you have scarcely, in your thoughts, advanced to the stage of science.

--William Thomson

If in other sciences we should arrive at certainty without doubt and truth without error, it behooves us to place the foundations of knowledge in mathematics.

--Roger Bacon

There is no royal road to geometry.

--Euclid

That arithmetic is the basest of all mental activities is proved by the fact that it is the only one that can be accomplished by a machine.

--Arthur Schopenhauer

Mathematics is the bell-boy of all sciences.

--Unknown

Mathematics, rightly viewed, possesses...supreme beauty—a beauty cold and austere, like that of sculpture, without appeal to any of our weaker nature, without the gorgeous trappings of paint or music, yet sublimely pure and capable of a stern perfection such as only the greatest art can show. The true spirit of delight, the exaltations, the sense of being more than man, which is the touchstone of excellence, is to be found in mathematics as surely as in poetry. Real life is to most men a long second-best, a perpetual compromise between the ideal and the possible; but the world of our reason knows no compromise, no practical limitations, no barrier to creative activity.

--Bertrand Russell

You may prove anything by figures.

--Thomas Carlyle

Round numbers are always false.

--Samuel Johnson

Numbers are intellectual witnesses that belong only to mankind, and by whose means we can achieve an understanding of words.

--Honoré de Balzac

It has been said that figures rule the world; maybe. I am quite sure that it is figures which show us whether it is being ruled well or badly.

--J. W. van Goethe

Many students are flunking geometry. They just don't know the angles.

--Unknown

I have hardly ever known a mathematician who was capable of reasoning.

--Plato

Philosophy is written in this grand book—I mean the universe—which stands continually open to our gaze, but it cannot be understood unless one first learns to comprehend the language and interpret the characters in which it is written. It is written in the language of mathematics, and its characters are triangles, circles, and other geometrical figures, without which it is humanly impossible to understand a single word of it; without these, one is wandering about in a dark labyrinth.

--Galileo Galilei

Mechanics is the paradise of the mathematical sciences because by means of it one comes to the fruits of mathematics.

--Leonardo da Vinci

The geometrical mind is not so closely bound to geometry that it cannot be drawn aside and transferred to other departments of knowledge. A work of morality, politics, criticism, perhaps even eloquence will be more elegant, other things being equal, if it is shaped by the hand of geometry.

--Bernard Le Bovier de Fontenelle

Nature has...some sort of arithmetical-geometrical coordinate system, because nature has all kinds of models. What we experience of nature is in models, and all of nature's models are so beautiful. It struck me that nature's system must be a real beauty, because in chemistry we find that the associations are always in beautiful whole numbers—there are no fractions.

--Richard Buckminster Fuller

The theory of probabilities is at bottom nothing but common sense reduced to calculus.

--Pierre Simon de Laplace

It may be true that people who are merely mathematicians have certain specific shortcomings; however, that is not the fault of mathematics, but is true of every exclusive occupation.

--Carl Friedrich Gauss

Mathematics is the science which draws necessary conclusions.

--Benjamin Pierce

All the mathematical sciences are founded on relations between physical laws and laws of numbers, so that the aim of exact science is to reduce the problems of nature to the determination of quantities by operations with numbers.

--James Clerk Maxwell

Civilization advances by extending the number of important operations which we can perform without thinking about them.

--Alfred North Whitehead

The harmony of the world is made manifest in Form and Number, and the heart and soul and all the poetry of Natural Philosophy are embodied in the concept of mathematical beauty.

--Sir D'Arcy Wentworth Thompson

The perfection of mathematical beauty is such...that whatsoever is most beautiful and regular is also found to be most useful and excellent.

--Sir D'Arcy Wentworth Thompson

The study of mathematics is apt to commence in disappointment....We are told that by its aid the stars are weighed and the billions of molecules in a drop of water are counted. Yet, like the ghost of Hamlet's father, this great science eludes the efforts of our mental weapons to grasp it.

--Alfred North Whitehead

Mathematics takes us still further from what is human, into the region of absolute necessity, to which not only the actual world, but every possible world, must conform.

--Bertrand Russell

All the pictures which science now draws of nature and which alone seem capable of according with observational fact are mathematical pictures....From the intrinsic evidence of his creation, the Great Architect of the Universe now begins to appear as a pure mathematician.

--Sir James Hopwood Jeans

Multiplication is vexation,
Division is as bad;
The Rule of Three doth puzzle me,
And practice drives me mad.

--John Napier

Pure mathematics do remedy and cure many defects in the wit and faculties of individuals; for if the wit be dull, they sharpen it; if too wandering they fix it; if too inherent in the sense, they abstract it.

--Francis Bacon

The study of mathematics cultivates the reason; that of the languages, at the same time, the reason and the taste. The former gives grasp and power to the mind; the latter both power and flexibility. The former, by itself, would prepare us for a state of certainties, which nowhere exists; the latter, for a state of probabilities, which is that of common life. Each, by itself, does but an imperfect work: in the union of both, is the best discipline for the mind, and the best mental training for the world as it is.

--Tryon Edwards

Algebra is the metaphysics of arithmetic.

--Laurence Sterne

Euclid was hired to tutor King Ptolemy I on the subject of mathematics. The king, frustrated with the complexity of the theorems, asked Euclid if there was an easier way to approach the problems. Euclid admonished the king, 'Sire, there is no royal road to learning.'

--*Personal Selling Power*

If all the arts aspire to the condition of music, all the sciences aspire to the condition of mathematics.

--George Santayana

Mathematics is the only science where one never knows what one is talking about, nor whether what is said is true.

--Bertrand Russell

A widespread misconception about mathematics is that it is completely hierarchical—first arithmetic, then algebra, then calculus, then more abstraction, then whatever....This belief in the totem pole nature of mathematics isn't true, but it prevents many people who did poorly in seventh-grade, high school, or even college mathematics from picking up a popular book on the subject. Often very 'advanced' mathematical ideas are more intuitive and comprehensible than are certain areas of elementary algebra.

--John Allen Paulos

Mathematics is the embodiment of the harmony of the universe.

--Followers of the
Pythagories

As far as the laws of mathematics refer to reality, they are not certain, and as far as they are certain, they do not refer to reality.

--Albert Einstein

I never did very well in math—I could never seem to persuade the teacher that I hadn't meant my answers literally.

--Calvin Trilling

I like mathematics because it is not human and has nothing particular to do with this planet or with the whole accidental universe—because, like Spinoza's God, it won't love us in return.

--Bertrand Russell

It is hard to convince a high-school student that he will encounter a lot of problems more difficult than those of algebra and geometry.

--Edgar W. Howe

When we reach the sphere of mathematics we are among processes which seem to some the most inhuman of all human activities and the most remote from poetry. Yet it is there that the artist has fullest scope for his imagination.

--Havelock Ellis

The only way I can distinguish
proper from improper fractions
Is by their actions.

--Ogden Nash

One has to be able to count if only so that, at fifty, one doesn't marry a girl of twenty.

--Maxim Gorky

Statistics: the mathematical theory of ignorance.

--Morris Kline

There are three kinds of lies: lies, damned lies and statistics.

--Benjamin Disraeli

He uses statistics as a drunken man uses lampposts—for support rather than illumination.

--Andrew Lang

1950, the old math:
A logger sells a truckload of lumber for $100. His cost of production is four-fifths of the price. What is his profit?

1960, the old math wanes:
A logger sells a truckload of lumber for $100. His cost of production is four-fifths of the price, or $80. What is his profit?

1970, the new math:
A logger exchanges a set L of lumber for a set M of money. The cardinality of set M is 100, and each element is worth $1. Make 100 dots representing the elements of the set M. The set C of the costs of production contains 20 fewer points than set M. Represent the set C as a subset of M, and answer the following question: What is the cardinality of the set P of points?

1980, leveling the playing field:
A logger sells a truckload of lumber for $100. His cost of production is $80, and his profit is $20. Your assignment: Underline the number 20.

1990, outcomes-based education:
By cutting down beautiful forest trees, a logger makes $20. What do you think of this way of making a living? (Topic for class discussion: How did the forest birds and squirrels feel?)

1997, profit-driven education:
By laying off 40 percent of its loggers, a company improves its stock price from $80 to $100. How much capital gain per share does the CEO make by exercising his stock options at $80?

--Jessica L. Sandham and
Erik Fatemi

Algebra and money are essentially levelers; the first intellectually, the second effectively.

--Simone Weil

There exists a passion for comprehension, just as there exists a passion for music. That passion is rather common in children, but gets lost in most people later on. Without this passion there would be neither mathematics nor natural science.

--Albert Einstein

It is now proved beyond doubt that cigarettes are the biggest single cause of statistics.

--Unknown

A statistician is a person who draws a mathematically precise line from an unwarranted assumption to a foregone conclusion.

--Unknown

If you are truly serious about preparing your child for the future, don't teach him to subtract—teach him to deduct.

--Fran Lebowitz

You propound a complicated mathematical problem: give me a slate and half an hour's time, and I can produce a wrong answer.

--Bernard Shaw

One of the chiefest triumphs of modern mathematics consists in having discovered what mathematics really is.

--Bertrand Russell

Statistics prove that you can prove anything by statistics.

--Unknown

A statistician carefully assembles facts and figures for others who carefully misinterpret them.

--Unknown

Don't put too much stock in figures: a man can drown in a stream that averages only two feet in depth.

--Unknown

If all the statisticians were placed end to end, they would reach endless conclusions.

--Unknown

To a statistician, fractions speak louder than words.

--Unknown

The nearest thing to nothing that anything can be and still be something is zero.

--Unknown

Mathematics is the language of size.

--Lancelot Hogben

Mathematics goes along behind physics, making respectable what the physicists find sensible.

--G. S. Watson

Who can really feel comfortable in this culture now except maybe a few guys who are good at mathematics?

--Thomas Hart Benton

Statistics are like alienists—they will testify for either side.

--Fiorello H. La Guardia

Statistics: The most exact of false sciences.

--Jean Cau

Statistics: It does not follow that because something can be counted it therefore should be counted.

--Harold L. Enarson

We've taken disturbances and fluctuations and averaged them together to give us comfortable statistics. Our training has been to look for big numbers, important trends, major variances. Yet it is the slight variations—soft-spoken, even whispered at first—that we need to encourage.

--Margaret J. Wheatley

Arithmetic is where numbers fly like pigeons in and out of your head.

--Carl Sandburg

The structures with which mathematics deals are more like lace, the leaves of trees and the play of light and shadow on a human face than they are like buildings and machines, the least of their representatives.

—Scott Buchanan

Mathematics is a linguistic activity; its ultimate area is preciseness of communication.

--William L. Schaaf

God made the integers, all else is the work of man.

—Leopold Kronecker

Math and me don't get along too well. I figure that's because my head is round and math is very square and logical. So all that square math just bounces off my round head and never gets in there.

--Robert Kimmel Smith

IF THERE WERE NO SQUARES

A logical question though it does seem quite rare,
Is what would there be, if there was not a square?

Several items we'd lose would cost us a high price,
Checkers, Chess, Scrabble; all games that use dice.

In stadiums all over you'd see many sad faces,
There'd be home runs to hit, but no running the bases.

Many road signs would vanish; driving would not be fun,
All of civilization would be back to square one!

The stamp would be changed, along with devices,
Like toasters designed to toast new-shaped bread slices.

The Einstein equation would just cease to be.
Because the squared would be gone from E = mc.

On the long list of things Earth would have to reissue...
Napkins, picture frames, white toilet tissue.

Telephone keys, card tables, linoleum floors,
Keyboards, ceiling tiles, windows on doors.

Without squares it'd be tricky; the options are thin,
How would calendars work? What would CDs come in?

So value your post-it notes, crackers and cheese,
And say thank you to four sides...and ninety degrees.

--David Peabody

Let no one ignorant of mathematics enter here.

--Plato

There cannot be a language more universal and more simple, more free from errors and obscurities...more worthy to express the invariable relations of natural things (than mathematics). It interprets (all phenomena) by the same language, as if to attest the unity and simplicity of the plan of the universe, and to make still more evident that unchangeable order which presides over all natural causes.

--Joseph Fourier

The mathematical sciences particularly exhibit order, symmetry, and limitation; and these are the greatest forms of the beautiful.

--Aristotle

How happy is the lot of the mathematician. He is judged solely by his peers, and the standard is so high that no colleague or rival can ever win a reputation he does not deserve.

--W. H. Auden

So if man's wit be wandering, let him study the mathematics: for in demonstrations, if his wit be called away ever so little, he must begin again.

--Sir Francis Bacon

In mathematics I can report no deficiency, except it be that men do not sufficiently understand the excellent use of Pure Mathematics.

--Roger Bacon

Mathematics is the gate and key to the sciences.

--Roger Bacon

Creative mathematicians now, as in the past, are inspired by the art of mathematics rather than by any prospect of ultimate usefulness.

--Eric Temple Bell

'Obvious' is the most dangerous word in mathematics.

--Eric Temple Bell

Mathematics is the handwriting on the human consciousness of the very Spirit of Life itself.

--Claude Bragdon

To appreciate the living spirit rather than the dry bones of mathematics, it is necessary to inspect the work of a master at first hand. Textbooks and treatises are an unavoidable evil... The very crudities of the first attack on a significant problem by a master are more illuminating than all the pretty elegance of the standard texts which has been won at the cost of perhaps centuries of finicky polishing.

--Eric Temple Bell

The essence of mathematics resides in its freedom.

--Georg Cantor

It is a mathematical fact that the casting of this pebble from my hand alters the centre of gravity of the universe.

--Thomas Carlyle

The charm [of mathematics] lies chiefly in the absolute certainty of its results; for that is what, beyond all mental treasures, the human intellect craves for. Let us be sure of something! More light, more light!

----Lewis Carroll

It may well be doubted whether, in all the range of science, there is any field so fascinating to the explorer – so rich in hidden treasures – so fruitful in delightful surprises – as Pure Mathematics.

--Lewis Carroll

Everything in nature adheres to the cone, the cylinder and the cube.

--Paul Cezanne

I had a feeling once about Mathematics – that I saw it all. Depth beyond depth was revealed to me – the Byss and Abyss. But it was after dinner and I let it go.

--Winston Churchill

From the time of Kepler to that of Newton, and from Newton to Hartley, not only all things in external nature, but the subtlest mysteries of life and organization, and even of the intellect and moral being, were conjured within the magic circle of mathematical formulae.

--Samuel Taylor
Coleridge

In mathematics we find the primitive source of rationality; and to mathematics must the biologists resort for means to carry out their researches.

--Auguste Comte

Algebra is generous; she often gives more than is asked of her.

--Jean D'Alembert

Thus metaphysics and mathematics are, among all the sciences that belong to reason, those in which imagination has the greatest role.

--Jean D'Alembert

The mathematician may be compared to a designer of garments, who is utterly oblivious of the creatures whom his garments may fit. To be sure, his art originated in the necessity for clothing such creatures, but this was long ago; to this day a shape will occasionally appear which will fit into the garment as if the garment had been made for it. Then there is no end of surprise and delight!

--Tobias Dantzig

A mathematician is a blind man in a dark room looking for a black cat which isn't there.

--Charles Darwin

Mechanics is the paradise of the mathematical sciences, because by means of it one comes to the fruits of mathematics.

--Leonardo da Vinci

Whoever despises the high wisdom of mathematics nourishes himself on delusion.

--Leonardo da Vinci

The popular image of mathematics as a collection of precise facts, linked together by well-defined logical paths is revealed to be false. There is randomness and hence uncertainty in mathematics, just as there is in physics.

--Paul Davis

One of the endlessly alluring aspects of mathematics is that its thorniest paradoxes have a way of blooming into beautiful theories.

--Philip Davis

Numbers are the free creation of the human mind.

--Richard Dedekind

Each problem that I solved became a rule which served afterwards to solve other problems.

--Rene Descartes

Mathematics is the tool specially suited for dealing with abstract concepts of any kind and there is no limit to its power in this field.

--Paul Dirac

A man should be learned in several sciences, and should have a reasonable, philosophical and in some measure a mathematical head, to be a complete and excellent poet.

--John Dryden

How can it be that mathematics, being after all a product of human thought independent of experience, is so admirably adapted to the objects of reality?

--Albert Einstein

Pure mathematics is, in its way, the poetry of logical ideas.

--Albert Einstein

If a man is at once acquainted with the geometric foundation of things and with their festal splendor, his poetry is exact and his arithmetic musical.

--Ralph Waldo Emerson

The laws of mathematics are not merely human inventions or creations. They simply 'are;' they exist quite independently of the human intellect. The most that any(one) ... can do is to find that they are there and to take cognizance of them.

--Escher Maurits Cornelis

Mighty is geometry; joined with art, resistless.

-- Euripides

Since you are now studying geometry and trigonometry, I will give you a problem. A ship sails the ocean. It left Boston with a cargo of wool. It grosses 200 tons. It is bound for Le Havre. The main mast is broken, the cabin boy is on deck, there are 12 passengers aboard, the wind is blowing east-north-east, the clock points to a quarter past three in the afternoon. It is the month of May. How old is the captain?

--Gustave Flaubert

Mathematical Analysis is as extensive as nature herself.

--Joseph Fourier

The profound study of nature is the most fertile source of mathematical discoveries.

--Joseph Fourier

What science can there be more noble, more excellent, more useful for men, more admirably high and demonstrative than mathematics.

--Benjamin Franklin

Every good mathematician is at least half a philosopher, and every good philosopher is at least half a mathematician.

--Gottlob Frege

Mathematics is the queen of the sciences, and number theory the queen of mathematics.

--Carl Friedrich Gauss

Mathematics has the completely false reputation of yielding infallible conclusions.

--Johann Wolfgang Goethe

A diller, A dollar, A witless trig scholar
On a ladder against a wall.
If length over height
Gives an angle too slight,
The cosecant may prove his downfall.

--L. A. Grahm

The essence of mathematics is not to make simple things complicated, but to make complicated things simple.

--Stan Gudder

Mathematics is not a deductive science – that's a cliché. When you try to prove a theorem, you don't just list the hypotheses, and then start to reason. What you do is trial and error, experimentation, guess-work.

--Paul Richard Halmos

In most sciences one generation tears down what another has built and what one has established another undoes. In mathematics alone each generation adds a new story to the old structure.

--Hermann Hankle

I am interested in mathematics only as a creative art.

--Godfrey Harold Hardy

I believe that mathematical reality lies outside of us, and that our function is to discover, or observe it, and that the theorems which we prove, and which we describe grandiloquently as our 'creations' are simply notes on our observations.

--Godfrey Harold Hardy

The mathematician's patterns, like the painter's or the poet's must be beautiful; the ideas, like the colours or the words, must fit together in a harmonious way. Beauty is the first test: there is no permanent place in the world for ugly mathematics.

--Godfrey Harold Hardy

I think that modern physics has definitely decided in favor of Plato. In fact the smallest units of matter are not physical objects in the ordinary sense; they are forms, ideas which can be expressed unambiguously only in mathematical language.

--Werner Heisenberg

The value of a problem is not so much coming up with the answer as in the ideas and attempted ideas it forces on the would be solver.

--Israel Nathan Herstein

Very often in mathematics the crucial problem is to recognize and discover what are the relevant concepts; once this is accomplished the job may be more than half done.

--Israel Nathan Herstein

Mathematics knows no races or geographic boundaries; for mathematics, the cultural world is one country.

--David Hilbert

The infinite! No other question has ever moved so profoundly the spirit of man.

--David Hilbert

One's intellectual and aesthetic life cannot be complete unless it includes an appreciation of the power and the beauty of mathematics. Simply put, aesthetic and intellectual fullfillment requires that you know about mathematics.

-- J. P. King

Everyone knows what a curve is, until he has studied enough mathematics to become confused through the countless number of possible exceptions.

--Felix Klein

Thus, in a sense, mathematics has been most advanced by those who distinguished themselves by intuition rather than by rigorous proofs.

--Felix Klein

The tantalizing and compelling pursuit of mathematical problems offers mental absorption, peace of mind amid endless challenges, repose in activity, battle without conflict, refuge from the goading urgency of contingent happenings, and the sort of beauty changeless mountains present to senses tried by the present-day kaleidoscope of events.

--Morris Kline

It is impossible to be a mathematician without being a poet in soul.

--Sophia Kovalevskaya

Many who have had an opportunity of knowing any more about mathematics confuse it with arithmetic, and consider it an arid science. In reality, however, it is a science which requires a great amount of imagination.

--Sonya Kovalevsky

Number theorists are like lotus-eaters—having once tasted of this food they can never give it up.

--Leopold Kronecker

It is India that gave us the ingenious method of expressing all numbers by means of ten symbols, each symbol receiving a value of position as well as an absolute value; a profound and important idea which appears so simple to us now that we ignore its true merit.

--Pierre-Simon Laplace

Ask a philosopher 'What is philosophy?' or a historian 'What is history?', and they will have no difficulty in giving an answer. Neither of them, in fact, can pursue his own discipline without knowing what he is searching for. But ask a mathematician 'What is mathematics?' and he may justifiably reply that he does not know the answer but that this does not stop him from doing mathematics.

--Francois Lasserre

Taking mathematics from the beginning of the world to the time of Newton, what he has done is much the better half.

--Gottfried Willhelm von Leibniz

Mountains are not cones, clouds are not spheres, trees are not cylinders, neither does lightening travel in a straight line. Almost everything around us is non-Euclidean.

--Benoit Mandelbrot

In a time when much of the world's geography has been explored, and space exploration is restricted to astronauts, mathematics offers fertile ground for exploring the unknown.

--Walter Meyer

The mathematical rules of the universe are visible to men in the form of beauty.

--John Michel

The moving power of mathematical invention is not reasoning but imagination.

--Augustus de Morgan

There is nothing so troublesome to mathematical practice ... than multiplications, divisions, square and cubical extractions of great numbers ... I began therefore to consider ... how I might remove those hindrances.

--John Napier

The advancement and perfection of mathematics are intimately connected with the prosperity of the State.

--Napoleon Bonaparte

The latest authors, like the most ancient, strove to subordinate the phenomena of nature to the laws of mathematics.

--Sir Isaac Newton

The calculus is the greatest aid we have to the appreciation of physical truth in the broadest sense of the word.

--William F. Osgood

I love mathematics ... principally because it is beautiful, because man has breathed his spirit of play into it, and because it has given him his greatest game – the encompassing of the infinite.

--Rozso Peter

Give me a place to stand and a lever long enough and I will move the world.

—Archimedes

To most outsiders, modern mathematics is unknown territory. Its borders are protected by dense thickets of technical terms; its landscapes are a mass of indecipherable equations and incomprehensible concepts. Few realize that the world of modern mathematics is rich with vivid images and provocative ideas.

--Ivars Peterson

Students must learn that mathematics is the most human of endeavors. Flesh and blood representatives of their own species engaged in a centuries long creative struggle to uncover and to erect this magnificent edifice. And the struggle goes on today. On the very campuses where mathematics is presented and received as an inhuman discipline, cold and dead, new mathematics is created. As sure as the tides.

--J. Phillips

Geometry existed before the creation.

--Plato

Numbers are the highest degree of knowledge. It is knowledge itself.

--Plato

A scientist worthy of the name, above all a mathematician, experiences in his work the same impression as an artist; his pleasure is as great and of the same nature.

--Henri Poincaré

This therefore is Mathematics:
She reminds you of the invisible forms of the soul;
She gives life to her own discoveries;
She awakens the mind and purifies the intellect;
She brings light to our intrinsic ideas;
She abolishes oblivion and ignorance which are ours by birth.

--Proclus Diadochus

Wherever there is number, there is beauty.

--Proclus Diadochus

The study of infinity is much more than a dry academic game. The intellectual pursuit of the absolute infinity is, as Georg Cantor realized, a form of the soul's quest for God. Whether or not the goal is ever reached, an awareness of the process brings enlightenment.

--Rudy Rucker

It can be shown that a mathematical web of some kind can be woven about any universe containing several objects. The fact that our universe lends itself to mathematical treatment is not a fact of any great philosophical significance.

--Bertrand Russell

Mathematics takes us still further from what is human into the region of absolute necessity, to which not only the actual world, but every possible world, must conform.

--Bertrand Russell

What is best in mathematics deserves not merely to be learned as a task but to be assimilated as a part of daily thought, and brought again and again before the mind with ever-renewed encouragement.

--Bertrand Russell

If all art aspires to the condition of music, all the sciences aspire to the condition of mathematics.

--George Santayana

Mathematics is often defined as the science of space and number ... it was not until the recent resonance of computers and mathematics that a more apt definition became fully evident: mathematics is the science of patterns.

--Lynn Arthur Steen

The most distinct and beautiful statement of any truth must take at last the mathematical form.

--Henry David Thoreau

Perhaps the most surprising thing about mathematics is that it is so surprising. The rules which we make up at the beginning seem ordinary and inevitable, but it is impossible to forsee their consequences. These have only been found out by long study, extending over many centuries. Much of our knowledge is due to a comparatively few great mathematicians such as Newton, Euler, Gauss, or Tiemann; few careers can have been more satisfying than theirs. They have contributed something to human thought even more lasting than great literature, since it is independent of language.

--Edward Charles Titchmarsh

Statistical thinking will one day be as necessary for efficient citizenship as the ability to read and write.

--Herbert George Wells

Not everything that counts can be counted, and not everything that can be counted counts.

--Albert Einstein

Besides language and music, [mathematics] is one of the primary manifestations of the free creative powers of the human mind, and it is the universal organ for world-understanding through theoretical construction. Mathematics must therefore remain an essential element of the knowledge and abilities which we have to teach, of the culture we have to transmit, to the next generation.

--Hermann Weyl

Logic is the hygiene the mathematician practices to keep his ideas healthy and strong.

--Hermann Weyl

Algebra is the intellectual instrument which has been created for rendering clear the quantitative aspects of the world.

--Alfred North Whitehead

The science of Pure Mathematics, in its modern developments, may claim to be the most original creation of the human spirit.

--Alfred North Whitehead

There is no more common error than to assume that, because prolonged and accurate mathematical calculations have been made, the application of the result to some fact of nature is absolutely certain.

--Alfred North Whitehead

When you are dissatisfied and would like to go back to youth, think of Algebra.

--Will Rogers

'Reeling and writhing, of course to begin with,' Mock Turtle replied, 'and the different branches of arithmetic—Ambition, Distraction, Uglification, and Derision.'

--Lewis Caroll

She doesn't understand the concept of Roman numerals. She thought we just fought in world war eleven.

--Joan Rivers

Math is a language that needs to be spoken, a music that needs to be heard, and an art that needs to be seen.

--Rachel McAnallen

And once I had a teacher who understood. He brought with him the beauty of mathematics. He made me create it for myself. He gave me nothing, and it was more than any other teacher has ever dared to give me.

—Lex Cochran

The mathematicians may well nod their heads in a friendly and interested manner—I still am a tinkerer to them. and the 'artistic' ones are primarily irritated. Still, maybe I'm on the right track if I experience more joy from my own little images than from the most beautiful camera in the the world.

--M. C. Escher

In mathematics you don't understand things. You just get used to them.

--Johann von Neumann

In mathematics as in other fields, to find one self lost in wonder at some manifestation is frequently the half of a new discovery.

--P.G. L. Dirichlet

ST. IVES PUZZLE

As I was going to St. Ives I met a man with seven wives;
Every wife had seven sacks; every sack had seven cats; every cat had seven kits.
Kits, cats, sacks, and wives, how many were going to St. Ives?

--Old English Rhyme

Give me a place to stand and I shall move the earth.

--Archimedes

As the sun eclipses the stars by his brilliancy, so the man of knowledge will eclipse the fame of others in assemblies of the people if he proposes algebraic problems, and still more if he solves them.

--Brahmagupta

Diophantus' youth lasted 1/6 of his life.
He grew a beard after 1/12 more of his life.
After 1/7 more of his life, Diophantus married.
Five years later he had a son.
The son lived exactly 1/2 as long as his father:
Diophantus died just four years after his son's death.
All of this totals the years Diophantus lived.

--Admirer of Diophantus

As long as a branch of science offers an abundance of problems, so long it is alive; a lack of problems foreshadows extinction or the cessation of independent development.

--David Hilbert

The invention of logarithms came on the world as a bolt from the blue. No previous work had led up to it, nothing had foreshadowed it or heralded its arrival. It stands isolated, breaking in upon human thought abruptly without borrowing from the work of other intellects or following known lines of mathematics thought.

--*Napier Tercentenary Memorial Volume*

It is a truth very certain that, when it is not in our power to determine what is true, we ought to follow what is most probable.

--René Descartes

The (theory of probability)...enters into the regulation of some of the most important practical concerns of modern life.

--George Chrystal

There is no smallest among the small and no largest among the large; but always something still smaller and something still larger.

--Anaxagoras

We admit, in geometry; not only infinite magnitudes, that is to say, magnitudes greater than any assignable magnitude, but infinite magnitudes infinitely greater, the one than the other. This astonishes our dimensions of brains, which is only about six inches long, five broad, and six in depth, in the largest heads.

--François Voltaire

The comparison of mathematics and music is often particularly apt. The most attractive music is spoiled by a bad performance. So it is that many an admirable mathematical thought languishes amid the colorless rigor of a formal exposition.

--Ross Honsberger

I think there certainly is a link (between mathematics and music), for various reasons. One is that they are both creative arts. When you're sitting with a bit of paper creating mathematics, it is very like sitting with a sheet of music paper creating music.

--Robin Wilson

These examples (taken from the geometry of the circle) indicate what a countless number of other such harmonic relations obtain in the properties of space, many of which are manifested in the relations of the various classes of curves in higher geometry, all of which, besides exercising the understanding through intellectual insight, affect the emotion in a similar or even greater degree than the occasional beauties of nature.

--Immanuel Kant

There has not been any science so much esteemed and honored as this of mathematics, nor with so much industry and vigilance become the care of great (people), and labored in by the potentates of the world.

--Benjamin Franklin

The investigation of mathematical truths accustoms the mind to method and correctness in reasoning, and is an employment peculiarly worthy of rational beings....From the high ground of mathematical and philosophical demonstration, we are insensibly led to far nobler speculations and sublime mediations.

--George Washington

The nineteenth century which prides itself upon the invention of steam and evolution, might have derived a more legitimate title to fame from the discovery of pure mathematics.

--Bertrand Russell

Mathematical science is in my opinion an indivisible whole, an organism whose vitality is conditioned upon the connection of its parts. For with all the variety of mathematical knowledge, we are still clearly conscious of the similarity of the logical devices, the relationship of the ideas in mathematics as a whole and the numerous analogies in its different departments.

--David Hilbert

The advancement and perfection of mathematics are intimately connected with the prosperity of the state.

--Napoleon Bonaparte

Much of the best mathematical inspiration comes from experience. It is hardly possible to believe in the existence of an absolute immutable concept of mathematical rigor dissociated from all human experience.

--Jon von Neumann

It is now proved beyond a shadow of a doubt that smoking is one of the leading causes of statistics.

--Fletcher Knebel

Each of us is a statistical impossibility around which hover a million other lives that were never destined to be born.

--Leslie Eiseley

Our goal is to make people comfortable with mathematics. Math should be something that people aren't afraid of. After all, math is everywhere around us if we know how to recognize it.

--Theoni Pappas

Number was born in superstition and reared in mystery...numbers were once made the foundations of religion and philosophy, and the tricks of figures have had a marvelous effect on credulous people.

--F. W. Parker

I have not been in the country very long, but I do know this. For a 16-year-old, low-income Hispanic kid growing up in East Los Angeles, there are a lot of things that are dangerous. Calculus is not one of them.

--Jaime Escalante

Clouds are not spheres, mountains are not cones, coastlines are not circles, and bark is not smooth, nor does lightning travel in a straight line....many patterns of Nature are so irregular and fragmented....The existence of these patterns challenge us to study those forms that Euclid leaves aside as being 'formless,' to investigate the morphology of the 'amorphous.'

--Benoit Mandelbrot

Politics is for the present, but an equation is for eternity.

--Albert Einstein

Girls are brought up to believe that they aren't supposed to be good in math, so they get it in their heads that they don't belong in math or sciences. As math gets more challenging in junior high, girls become more aware of those stereotypes and fear math.

--Danica McKellar

Statistics are like bikinis. What they reveal is suggestive, but what they conceal is vital.

--Aaron Levenstein

It would be better for the true physics if there were no mathematicians on earth.

—Daniel Bernoulli

Do not worry about your difficulties in mathematics: I can assure you that mine are still greater.

—Albert Einstein

All the mathematical sciences are founded on relations between physical laws and laws of numbers, so that the aim of exact science is to reduce the problems of nature to the determination of quantities by operations with numbers.

--James C. Maxwell

There are two kinds of statistics, the kind you look up and the kind you make up.

--Rex Stout

Mathematicians are like Frenchmen: whatever you say to them they translate into their own language, and forthwith it is something entirely different.

--Johann Wolfgang von Goethe

My mathematical education was rather independent and idiosyncratic, where for a number of years I learned things on my own, developing personal mental models for how to think about mathematics. This has often been a big advantage for me in thinking about mathematics, because it's easy to pick up later the standard mental models shared by groups of mathematicians.

--Bill Thurston

A pure mathematical series would be one in which each term is derived from the preceding term by a rule.

—George Oppen

All science requires mathematics. The knowledge of mathematical things is almost innate in us. This is the easiest of sciences, a fact which is obvious in that no one's brain rejects it; for laymen and people who are utterly illiterate know how to count and reckon.

—Roger Bacon

Definition of a Statistician: A man who believes figures don't lie, but admits that under analysis some of them won't stand up either.

—Evan Esar

Say you were standing with one foot in the oven and one foot in an ice bucket. According to the percentage people, you would be perfectly comfortable.

—Bobby Bragan

Alcohol and calculus don't mix, so don't drink and derive.

—Unknown

Computations are everywhere, once you begin to look at things in a certain way.

—Rudy Rucker

Mathematics is as much a method of reasoning as it is a body of conclusions.

—Hollis R. Cooley

My favorite number is 6. I can't escape the magic of hexagons. They explain the shape of honeycombs and are an efficient way of connecting objects in a network, like circuit board designs.

—Marc Chamberland

People have an innate ability to see patterns. Some animals, like monkeys and dolphins, are also capable of basic arithmetic.

—Marc Chamberland

The mathematician, carried along on his flood of symbols, dealing apparently with purely formal truths, may still reach results of endless importance for our description of the physical universe.

—Karl Pearson

Dear Algebra,
Please stop asking us to find your X. She's never coming back and don't ask Y.

—Unknown

One would have to have completely forgotten the history of science so as to not remember that the desire to know nature has had the most constant and the happiest influence on the development of mathematics.

—Jules H. Poincare

Well, another day has passed and I haven't used algebra once.

—Ged Backland

Mathematics is the music of reason.

—Joseph Sylvester

For a subject that has been around almost as long as civilization itself, there remains a surprising degree of contention among experts about how best to teach math. Fiery battles have been waged for decades over what gets taught, in what order, why, and how. Broadly speaking, there have been two opposing camps. On one side are those who favor conceptual knowledge—understanding how math relates to the world—over rote memorization and what they call 'drill and kill.' (Some well-respected math-instruction gurus say that memorizing anything in math is counterproductive and stifles the love of learning.) On the other side are those who say memorization of multiplication tables and the like is necessary for efficient computation. They say teaching students the rules and procedures that govern math forms the bedrock of good instruction and sophisticated mathematical thinking. They bristle at the phrase 'drill and kill' and prefer to call it simply 'practice.'

—Peg Tyre

The ratio of rich math whizzes to poor ones is 3 to 1 in south Korea and 3.7 to 1 in Canada, to take two representative developed countries. In the U.S., it is 8 to 1. And while the proportion of American students scoring at advanced levels in math is rising, those gains are almost entirely limited to the children of the highly educated, and largely exclude the children of the poor. By the end of high school, the percentage of low-income advanced-math learners rounds to zero.

—Peg Tyre

We know that math ability is universal, and interest in math is spread pretty much equally through the population, and we see there are almost no low-income, high-performing math students. So we know that there are many, many students who have the potential for high achievement in math but who have not had opportunity to develop their math minds, simply because they were born to the wrong parents or in the wrong zip code.

—Daniel Zaharopol

Considering also that of all those who have hitherto sought for the truth in the sciences, it is been the mathematicians alone who have been able to succeed in… producing reasons which are evident and certain.

—René Descartes

Mathematicians do it continuously and discretely.

—Unknown

Metric Conversions (For the rest of us)

- 1 millionth of a mouthwash: 1 microscope
- Time between slipping on a peel and hitting the pavement: 1 bananosecond
- Weight an evangelist carries with God: 1 billigram
- 1,000 aches: 1 megahurtz
- Time it takes to sail 220 yards at 1 nautical mph: 1 knot-furlong
- Basic unit of laryngitis: 1 hoarsepower
- 1,000 grams of wet socks: 1 literhosen
- 10 rations: 1 decoration

—Ed Thompson

Data should speak to the eyes because they are the best judge of proportion, being able to estimate it with more quickness and accuracy than any other of our organs. A really good data visualization produces form and shape to a number of separate ideas, which are otherwise abstract and unconnected.

—William Playfair

As a child she [Florence Nightingale] was so bewitched by math that she organized information about her gardening in tables. Statistics, she said, were a tool to know 'the thought of God': when weary, a glance at a table of numbers was 'perfectly reviving.'

—Clive Thompson

You know, of course, that in the real world there's no such thing as algebra.

--Steve Thayer

The ability to ask the right question is more than half the battle of finding the answer.

—Thomas John Watson, Sr.

So here we have pi squared, which an engineer would call 10.

—Frank King

No doubt many people feel that the inclusion of mathematics among the arts is unwarranted. The strongest objection is that mathematics has no emotional import.

—Morris Kline

What would life be without arithmetic, but a scene of horrors?

--Sydney Smith
Fuller

Mathematics has beauties of its own—a symmetry and proportion in its results, a lack of superfluity, an exact adaptation of means to ends, which is exceedingly remarkable and to be found only in the works of the greatest beauty. When this subject is properly…presented, the mental emotion should be that of enjoyment of beauty, not that of repulsion from the ugly and the unpleasant.

—J. W. A. Young

The only way to learn mathematics is to do mathematics.

—Paul Halmos

Go down deep enough into anything and you will find mathematics.

Dean Schlicler

Mathematics for me touches on all the joys of the human mind. It has rules, patterns, and structure, yet leaves so much room for creativity and invention.

—Rebecca Goldin

You could be active in mathematics. You could get inside a good problem and enjoy the discovery of unexpected connections with familiar things. Sometimes, as a result, you had the pleasure of seeing everything anew.

—William McGowen
Priestley

Mathematics is the art and science of abstraction; it is the systematic study of quantity, structure, space, and change. To paraphrase Newton, it is the language in which the universe is written. The study of mathematics provides the abilities to analyze data, discover patterns, and reason logically.

—from *Adelphi's*
University Math /
CS Department
Webpage)

Arithmetic is where the answer is right and everything is nice and you can look out of the window and see the blue sky—or the answer is wrong and you have to start all over and try again and see how it comes out this time.

--Carl Sandburg

The human mind has never invented a labor-saving machine equal to algebra.

—Unknown

I see you have graph paper. You must be plotting something.

—Unknown

In today's technological world, math is no longer just for students who go to college. *ACT* compared the skills needed to succeed as a freshman in college and those needed for job-training programs. They found that students need to be educated to a comparable level in algebra, geometry, data analysis, and statistics for success in either situation.

—*ACT*, 2006

Math is like love; a simple idea, but it can get complicated.

—R. Drabek

The real significance of Euclidean geometry lies in the superb training it gives for logical thinking.

—Petr Beckmann

The [Golden] ratio (1.618033...) was used by architects and artists throughout history to produce objects of great beauty.

— M. Bourne

Good writing is a reflection of clear thinking, and clear thinking rather than memorization is the knob to success in mathematics.

—Dr. Melvin Henrickson

The ability to comprehend, develop, and utilize mathematical concepts is invaluable throughout life. All people need some fluency in this area in order to contribute to and to fare well in our contemporary world.

—from the *St. John's Prep* Website

A recent study from *CareerCast.com*, a new job site, evaluates 200 professions to determine the best and worst according to five criteria inherent to every job: income, employment outlook, physical demands, and stress. Mathematicians fared best with a median income of $94,160, strong growth potential, favorable working conditions and excellent job prospects. Most of the positions in the top ten also utilize applied math and statistics skills in their work: actuary, statistician, biologist, software engineer, computer-systems analyst, historian, sociologist, industrial engineer and accountant.

—*CareerCast.com*

Mathematics is a more powerful instrument of knowledge than any other that has been bequeathed to us by human agency.

—Rene Descartes

How can it be that mathematics, being after all a product of human thought independent of experience, is so admirably adapted to the objects of reality?

—Albert Einstein

To many outsiders, mathematicians appear to think like computers, grimly grinding away with a strict formal logic and moving methodically--even algorithmically--from one black-and-white deduction to another. Yet mathematicians often describe their most important breakthroughs as creative, intuitive responses to ambiguity, contradiction, and paradox.

—William Byers

Mathematics is not a spectator sport! Athletes do not train for sports by watching games on TV -- they must exercise and practice. Similarly, you can not learn mathematics by only listening to the lecture; you must actively and consistently participate in the learning process, both in and out of the classroom.

—Prof. Stemkoski

The one thing that helped students do well in all college science was having taken an advanced high school math class. That undermines a commonly held belief that math training is not particularly important or helpful for the study of biology.

—Rick Weiss

Geometry is beautifully logical, and it teaches you how to think and prove that things are so, step by step by step. Proofs are excellent lessons in reasoning. Without logic and reasoning, you are dependent on jumping to conclusions or - worse - having empty opinions.

—Marilyn Vos Savant

At Heathrow Airport today, an individual later discovered to be a public school teacher was arrested trying to board a flight while in possession of a compass, a protractor, and a graphical calculator. Authorities believe he is a member of the notorious al-Gebra movement. He is being charged with carrying weapons of math instruction.

—Unknown

Do not worry about your difficulties in mathematics, I assure you that mine are greater. —Albert Einstein

Historically, mathematics was first applied with great success in astronomy and mechanics. Then it developed into a main tool for physics, other physical sciences and engineering. It is now becoming important in the biological, geological, economics, business, etc. With the coming of age of the computer, applied mathematics transcended its traditional style, and now assumes an even greater importance and a new vitality.

—From the website:
http://www.ap.columbia.edu/apam/AM/AMintro.htm)

The right angle from which to approach any problem is the try angle.

—Unknown

Within the decade, it will either become the norm to teach this course (high school Algebra I) in middle school or we'll have finally woken up to the fact that there's no reason to give algebra weight over statistics and IT in high school for non-math majors (and they will have all taken it in middle school anyway).

—Shelley Blake-Plock

In Cornell's math Ph.D. program there's a particular course during which the going inevitably gets tough. Male students typically recognize the hurdle for what it is, and respond to their lower grades by saying, 'Wow, this is a tough class.' That's what's known as external attribution, and in a situation like this, it's usually a healthy sign of resilience. Women tend to respond differently. When the course gets hard, their reaction is more likely to be 'You see, I knew I wasn't good enough.' That's internal attribution, and it can be debilitating.

--Katty Kay and Claire Shipman

Computers are better than we are at arithmetic, not because computers are so good at it, but because we are so bad at it.

—Isaac Asimov

The one thing that helped students do well in all college science was having taken an advanced high school math class. That undermines a commonly held belief that math training is not particularly important or helpful for the study of biology.

—Rick Weiss

[Math] curriculum is obsessed with jargon and nomenclature seemingly for no other purpose than to provide teachers with something to test the students on.

—Paul Lockhart

You cannot try to fix the quality of education without asking the basic question: 'What do you mean by an educated youngster?' Just to get a kid into a math course is good. But it's better if we can define what an effective math course it.

--Bill Honig

In the early grades, children learn mathematics best when they can manipulate physical objects in their lessons. Although very young children tend to think in concrete terms, a University of Chicago project shows that teachers can also introduce abstract math concepts into the early grades by using everyday phenomena. (For example, decimals can be introduced to first graders by talking about units of money, and negative numbers can be introduced to kindergarten students by use of an outdoor thermometer.)

—William J. Bennett

If the purpose of secondary education is to improve all students' ability to be successful as adults why is Algebra II required but not child-rearing or financial literacy or ethics?

—Grant Wiggins

Mathematicians have exact minds, provided all things are explained to them by means of definitions and axioms; otherwise they are inaccurate and insufferable, for they are only right when the principles are quite clear.

—Pascal

Only about 5 percent of the population actually need Algebra II in their work

—M. J. Handel

75% of freshmen entering a two-year college required remedial work in English, math, or both. 60% of freshmen in less selective four-year colleges required some remediation work.

—*National Center for Public Policy and Higher Education*

Successful workers communicate effectively, orally and in writing, and have social and behavioral skills that make them responsible and good at teamwork. They are creative and techno-savvy, have a good command of fractions and basic statistics, and can apply relatively simple math to real-world problems such as those concerning financial or health literacy. Employers never mention polynomial factoring.

—R. I. Lerman and A. Packer

Dear Math,
I'm not a therapist. Solve your own Problems.

—Internet Meme

When general relativity was first put forward in 1915, the math was very unfamiliar to most physicists. Now we teach general relativity to advanced high school students.

—Brian Greene

I tell students that even if they don't like math right now, they can use math as a brain-sharpening tool—a tool that not only builds the foundation for a great career, but that also builds self-confidence, no matter what they choose to do with their lives.

—Danica McKellar

Albert Einstein was good at math, but it took ages for him to understand the sort of tensor calculus that all engineering students today acquire.

—David Bodanis

Students never think it can be the teacher's fault and so I thought I was stupid. I was frustrated and would come home and cry because I couldn't do it. Then we got a new teacher who made math accessible. That made all the difference and I learned that it's how you present it that makes it scary or friendly.

—Danica McKellar

Four key beliefs that, when embraced by students, seem to contribute most significantly to their tendency to persevere in the classroom:

1. I belong in this academic community.

2. My ability and competence grow with my effort.

3. I can succeed at this.

4. This work has value for me.

If students hold these beliefs in mind as they are sitting in math class, Farrington [Camille] concludes, they are more likely to persevere through the challenges and failures they encounter there. And if they don't, they are more likely to give up at the first sign of trouble.

—Paul Tough

When we first arrived at the school we received an extended introduction detailing what a wonderful place it was and how lucky we were to be there. But no one explained exactly why we were to be there. Yes, we understood the general objective was to accumulate knowledge, although learning Shakespeare and algebra did not strike us as particularly helpful to our future lives. I've yet to meet a single person who found a use for algebra in later life. The excuse proffered was that it developed intelligence. It struck me as extremely unintelligent not to give us the opportunity to study subjects that would be of practical use as well as develop our intelligence. I learned Boyle's law and Ohm's law parrot fashion without having a clue as to their meaning, yet left the school five years later incapable of changing a fuse or wiring a three-pin plug. Understandably, we formed the general impression that we were there for the same reason we were sent to Sunday school – to keep us out of mischief until we were old enough to work.

—Allen Carr

Equations are just the boring part of mathematics. I attempt to see things in terms of geometry.

—Stephen Hawking

I don't mind being an actor. It's a lot easier than arithmetic.

—Tommy Kelly [12-Year-Old Tom Sawyer, 1937]

The humanities are the flower that blossoms on top of the 'stem.' (Science, Technology, Engineering, Math.)

--John Lithgow

Computations are everywhere, once you begin to look at things in a certain way.

—Rudy Rucker

We humans are prisoners of our limbs and minds. We see galaxies but cannot reach them. We can conceive of nuclear fusion, yet we have trouble doing sums in our heads. The computer is the tool that can set us free.

--Jean-Louis Gassee

When you learn to use computers, I hope you also learn to add and subtract in your head.

—Paul Harvey

[My favourite fellow of the Royal Society is the Reverend Thomas Bayes, an obscure 18th-century Kent clergyman and a brilliant mathematician who] devised a complex equation known as the Bayes theorem, which can be used to work out probability distributions. It had no practical application in his lifetime, but today, thanks to computers, is routinely used in the modelling of climate change, astrophysics and stock-market analysis.

—Bill Bryson

Mathematics is an essential component of the scientific method (data collection and observation and hypotheses are sustained by relevant mathematical models) and mathematics is the language in which the Natural Physical World is written (as Galileo once said). Can anyone imagine physics without numbers, or without derivatives, integrals, equations, tensors , geometrical figures, etc.? Physics would be a barren field of study based on verbal statements with no precision. All the exact sciences are important, but they all need and use mathematics.

—Emad Noujeim

'Applied Mathematics!'...There is, strictly speaking, no such thing. Applied Mathematics is mathematics or it is not mathematics at all....And I suppose we are fated yet to hear of applied glory, applied holiness, applied poetry... applied joy, applied ontology, yea of applied inapplicability itself?

--Cassius Jackson Keyser

Mathematics is a body of knowledge, but it contains no truths.

--Morris Kline

The humanization of mathematical teaching, the bringing of the matter and the spirit mathematics to bear not merely upon certain fragmentary faculties of the mind, but upon the whole mind, that this is the greatest desideratum is, I assume, beyond dispute.

--Cassius Jackson Keyser

One cannot escape the feeling that these mathematical formulas have an independent existence and an intelligence of their own, that they are wiser than we are, wiser even than their discoverers, that we get more out of them than was originally put into them.

--Heinrich Hertz

The Great Architect of the Universe now appears as a pure mathematician.

--James H. Jeans

Mathematics may be defined as the subject in which we never know what we are talking about, nor whether what we are saying is true.

--Bertrand Russell

Arithmetic is where numbers fly like pigeons in
and out of your head.
Arithmetic tells you how many you lose or win if
you know how many you had before you lost
or won.
Arithmetic is seven eleven all good children go to heaven—
or five six bundle of sticks.
Arithmetic is numbers you squeeze from your
head to your hand to your pencil to your
paper till you get the answer.
Arithmetic is where the answer is right and
everything is nice and you look out of the window
and see the blue sky—or the answer is
wrong and you have to start all over and try
again and see how it comes out this time.
If you take a number and double it and double it again and
then double it a few more times, the number gets bigger
and bigger and goes higher and higher and only
arithmetic can tell you what the number is when
you decide to quit doubling.
Arithmetic is where you have to multiply—and carry the multiplication

table in your head and hope you won't lose it.
If you have two animal crackers, one good and one bad, and
you eat one and a striped zebra with streaks all over
him eats the other, how many animal crackers will
you have if somebody offers you five six seven and you
say No no no and you say Nay nay nay and you say
Nix nix nix?
If you ask your mother for one fried egg for
breakfast and she gives you two fried eggs,
and you eat both of them, who is better in
arithmetic, you or your mother?

--Carl Sandburg

In the new math approach,..the important thing is to understand what you are doing, rather than to get the right answer.

--Tom Lehrer

The birth of a True Equilateral Triangle from Isosceles parents is the subject of rejoicing in our country from many furlongs around.

--Edwin Abbott

Don't panic. Base 8 is just like Base 10 really. If you're missing two fingers.

--Tom Lehrer

I think that I shall never c
A # lovelier than 3;
For 3 < 6 or 4,
And than 1 it's slightly more.

All things in nature come in 3's,
Like . . , trios, Q.E.D.'s;
While $s gain more dignity
If augmented 3 X 3...

--John Atherton

In one word he told me the secret of success in mathematics—PLAGIARIZE!

--Tom Lehrer

A mathematician who is not somewhat of a poet will never be a perfect mathematician.

--Karl Weierstrass

Mathematics is a linguistic activity; its ultimate area is preciseness of communication.

--William L. Schaaf

May not Music be described as the Mathematics of sense, Mathematics as Music of the Reason? The musician feels Mathematics, the mathematician thinks Music—Music the dream, Mathematics the working life.

--Joseph J. Sylvester

Architecture, it has been said, is frozen music. Be it so.
Geometry is frozen architecture,

--Cassius Jackson Keyser

The union of the mathematician with the poet, fervor with measure, passion with correctness, this it surely the ideal.

--William James

Mathematicians are like lovers...Grant a mathematician the least principle, and he will draw from it a consequence which you must grant him also, and from this consequence another.

--Fontenelle

What is the Muse of Life in the World of Ideas? An amateur goddess, high, pure, serene, cold towards human frailty, demanding perfect precision of ideas, perfect clarity of expression, and perfect allegiance to the eternal laws of thought. In mathematics the name of this muse is familiar—it is Rigor—Logical Rigor, which signifies a mind of silent music, the still harmony of ideas, the intellect, the dream of logical perfection.

--Cassius Jackson Keyser

Mathematics is on the artistic side a creation of new rhythms, orders, designs, harmonies, and on the knowledge side, is a systematic study of various rhythms, orders, designs and harmonies.

--William L. Schaaf

Mathematics—the Subtle Fine Art.

--Jamie Byrnie Shaw

A mathematician, like a poet or painter, is a maker of patterns. If his patterns are more permanent than theirs it is because they are made with ideas....A mathematician...has no material to work with but ideas, and so his patterns are likely to last longer.

--Godfrey Harold Hardy

The tantalizing and compelling pursuit of mathematical problems offers mental absorption, peace of mind amid endless challenges, repose in activity, battle without conflict...and the sort of beauty changeless mountains present to senses tried by the present-day kaleidoscope of events.

--Morris Kline

No doubt many people feel that the inclusion of mathematics among the arts is unwarranted. The strongest objection is that mathematics has no emotional import.

--Morris Kline

In the presence of so many beautiful creations of his thought the mathematician lives long and lives young; he rejoices in the grandeur of the height to which his controlled imagination attains.

--Robert D. Carmichael

The merit of painting lies in the exactness of reproduction. Painting is a science and all sciences are based on mathematics. No human inquiry can be a science unless it pursues its path through mathematical exposition and demonstration.

--Leonardo da Vinci

If a man's wit be wandering, let him study the mathematics.

--Francis Bacon

Here, where we reach the sphere of mathematics, we are among processes which seem to some the most inhuman of all human activities and the most remote from poetry. Yet it is here that the artist has the fullest scope of his imagination.

--Havelock Ellis

Mathematicians who are only mathematicians have exact minds, provided all things are explained to them by means of definitions and axioms; otherwise they are inaccurate and insufferable, for they are only right when the principles are quite clear.

--Pascal

Mathematics is thought moving in the sphere of complete abstraction from any particular instance of what it is talking about.

--Alfred North Whitehead

A pizza's shape is round. It's delivered in a box. And you cut it into triangles.

—Unknown

The Golden Gate Bridge is a giant moving math problem.

—John van der Zee

I regard it in fact as the great advantage of the mathematical technique that it allows us to describe, by means of algebraic equations, the general character of a pattern even where we are ignorant of the numerical values which will determine its particular manifestation.

—Friedrich August von Hayek

At the fourth grade level, girls at the same percentages of boys say they're interested in careers in engineering or math or astrophysics, but by eighth grade that has dropped precipitously.

—Chelsea Clinton

Those who study geometry use visible figures and reason about them. But they are not thinking of these, but of the ideals which they resemble. They are thinking of a perfect square or a perfect line, and so on, and not of the imperfect figures they draw.…The visible figures they draw are merely replicas and what they are seeking is to understand the ideals which can be known only by the mind.

—Plato

Less than 5% of girls, on average, contemplate pursuing a STEM career….
And in their professional lives, women often face obstacles such as harassment.

—Ximena Rojo

No one every got a word of sense out of any schoolmaster. You may, at a pinch, take their word about equilateral hexagons, but life, life's a closed book to them.

--John Mortimer

Don't judge a book by its cover. My math textbook had a picture of someone enjoying themselves on it.

—Internet Meme

The most painful thing about mathematics is how far away you are from being able to use it after you have learned it.

—James Newman

I've used the letter x more in math than I ever have in English.

—*theChive*

A 2015 study published in Science confirmed that computer science and certain other fields, including physics, math, and philosophy, fetishize 'brilliance,' cultivating the idea that potential is inborn. The report concluded that these fields tend to be problematic for women, owing to a stubborn assumption that genius is a male trait.

—Liza Munday

In early adolescence girls' IQ scores drop and their math and science scores plummet…..girls lose their resiliency and optimism, become less curious, and are less inclined to take risks in early adolescence. They become more differential, self-critical, and depressed….the great unhappiness many girls feel about their bodies, noting that women have been increasingly sexualized and objectified, their bodies 'marketed to sell tractors and toothpaste.'…the pressures girls have always faced are intensified….There is more divorce, chemical addiction, casual sex, and violence against women….girls can be themselves and grow into healthy adults….Girls can be saved by a good school, a good teacher, or a meaningful activity.

—Mary Pipher

The individual source of the statistics may easily be the weakest link. Harold Cox tells a story of his life as a young man in India. He quoted some statistics to a Judge, an Englishman, and a very good fellow. His friend said, 'Cox, when you are a bit older, you will not quote Indian statistics with that assurance. The Government are very keen on amassing statistics—they collect them, add them, raise them to the nth power, take the cube root and prepare wonderful diagrams. But what you must never forget is that every one of those figures comes in the first instance from the chowty dar [chowkidar] (village watchman), who just puts down what he damn pleases.'

--Josiah Stamp

A report released by the *Partnership for a New American Economy* and the *Partnership for New York City* predicts that by 2018, there will be 800,000 science, technology, engineering, and mathematics (STEM) jobs in the United States that require a master's degree or higher—and only around 550,000 American-graduates with this training.

—Marvin Ammori

We know that to compete for the jobs of the 21st century and thrive in a global economy, we need a growing, skilled and educated workforce, particularly in the areas of science, technology, engineering and math. Americans with bachelor's degrees have half the unemployment rate of those with a high school degree.

—Mark Pocan

By 2018 there will be more than two million open jobs in STEM (science, technology, engineering, math) professions, but only 19 percent of current college degrees are in STEM fields. Even worse, 75 percent of students that do well in science and math decide to not pursue STEM in college. If we want to remain a global leader, we have to develop more interest in these topics. One way to do that is to show students that coding ties into nearly everything we do. And to do that, we need to incorporate programming into the curriculum.

—Ellen Ullman

It is mathematics that offers the exact natural sciences a certain measure of security which, without mathematics, they could not attain.

—Albert Einstein

You can have data without information, but you cannot have information without data.

—Daniel K. Moran

Statistics show that of those who contract the habit of eating, very few survive.

—George Bernard Shaw

Most of all, a friend should be mathematical;
They should multiply the joy,
Divide the sorrow,
Subtract the past, and
Add to tomorrow.
Calculate the need deep in your heart,
And always be bigger than the sum of all their parts.

—Unknown

As far as I know, only a small minority of mathematicians, even of those with Platonist views, accept the idea that there may be mathematical facts which are true but unknowable.

—Abraham Robinson

By the late 19th century, this surge in mathematical reasoning and measurement technology made map making explode. In France, the Cassini family crisscrossed the country to calculate its dimensions with precision never before seen. Their trick? Using 'triangulation'– a bit of trigonometry— to let them stitch together thousands of measurements taken by peering through the new, high tech 'theodolite.' Breakthroughs in binocular lenses allowed surveyors to measure scores of miles at a glance. World maps became increasingly accurate.

—Clive Thompson

There are men who can write poetry, and there are men who can read balance sheets. The men who can read balance sheets cannot write.

—Henry R. Luce

I've seen farmers who can't read and farmers who can't write, but I've never seen a farmer who can't figure.

--Forrest Hill

No one ever made a decision because of a number. They need a story.

—Daniel Kahneman

Students have to learn content, including geography, dates, and political contexts. But books can put a human face on historical events. That [ability] is the greatest power of integrating literature with social studies, science, math, and history.

—Joan Ruddiman

Years later—long after I had failed, in high school, to master the math courses that would have allowed me to go on to study calculus—my father would occasionally remark that it was too bad, because it's impossible to see the world clearly if you don't know calculus…Years after all this, whenever my father made this comment… I'd invariably reply by saying that you couldn't really see the world clearly without having read the Aeneid in Latin, either. And then he'd make that little grimace that we all knew, half a smile, half a frown, twisting his face, and we'd laugh a sour little laugh, and retreat to our corners.

—Daniel Mendelsohn

A twelve-year-old girl fell into the habit of dropping in on the professor [Albert Einstein] every day on her way home from school. Her parents were gratified, but somewhat mystified too. One evening the mother found an opportunity to ask the professor, 'What do you two talk about every day?' 'Oh,' laughed the professor, 'she brings me cookies and I do her arithmetic for her.'

—Bennett Cerf

Math makes me feel calm, like, 'OK, there's an answer to something.'

—Sumaiya Sabnam, 11th Grader

I've told my grandchildren, 'First you learn how to work the problem, and then you can go use the computer.' I never liked that they could use a computer to find the answer.

—Katherine Johnson, *NASA* Mathematician

Any impatient student of mathematics or science or engineering who is irked by having algebraic symbolism thrust upon him should try to get along without it for a week.

—Eric Temple Bell

I don't know why I should have to learn Algebra... I'm never likely to go there.

—Billy Connolly

Every odd number that exists has the letter 'e' in it.

—Auston Pugh

The desire to economize time and mental effort in arithmetical computations, and to eliminate human liability to error is probably as old as the science of arithmetic itself.

—Howard Aiken

The Mayan Indians of Central America used their number system to create a calendar that was more accurate than that of the ancient Egyptians, Greeks or Romans.

—Roger Matile

Mathematicians do not study objects, but relations between objects.

—Jules H. Poincare

Children don't hate math. What they hate is being confused, intimidated, and embarrassed by math. With understanding comes passion, and with passion comes growth—a treasure is unlocked.

—Larry Martinek

Mathematics and poetry are the two ways to drink the beauty of truth.

—Amit Ray

I've come loaded with statistics, for I've noticed that a man can't prove anything without statistics.

—Mark Twain

To inspire more students of color to pursue STEM, we have to redefine what excellent STEM instruction and curriculum look like. Instead of lectures and labs that are disconnected from everyday reality, students need to 'remix the content they've internalized' to create solutions for real people. This remixing involves developing an understanding of what problems can and cannot be solved with technology, learning how to source the necessary tools and work on a team, and discerning scope and scale. New models of learning need to be co-created by educators with the students and communities they serve. It's nuanced, time-intensive work, and requires that more people engage in better conversations.

—Wisdom Amouzou

Arithmetic is numbers you squeeze from your head to your hand to your pencil to your paper until you get the right answer.

—Carl Sandburg

When Grace Hopper enlisted in the U. S. Navy in 1943, she had to get an exemption: The 34-year-old math professor was above the Navy's maximum age and under it's minimum weight. She became a pioneering programmer, joining the team that developed the Mark I computer. After the war, she recommended that computer programs be written in English, a radical change that opened the field to non-mathematicians for the first time. As Hopper reasoned, it's much easier for most people to write an English statement than it is to use symbols. Hopper had a knack for explaining computing in ways laypeople could understand. During the 1980s, she became known for handing out foot-long pieces of wire to show how far electricity could travel in one-billionth of a second.

—*Smithsonian.com*

It is India that gave us the ingenious method of expressing all numbers by means of ten symbols, each symbol receiving a value of position as well as an absolute value; a profound and important idea which appears so simple to us now that we ignore its true merit. But its very simplicity and the great ease which it has lent to computations put our arithmetic in the first rank of useful inventions; and we shall appreciate the grandeur of the achievement the more when we remember that it escaped the genius of Archimedes and Apollonius, two of the greatest men produced by antiquity.

—Pierre-Simon Laplace

There's a fine line between a numerator and a denominator. (Only a fraction of people will find this funny.)

—Internet Meme

I loathed every day and regret every day I spent in school. I like to be taught to read and write and add and then be left alone.

—Woody Allen

Mathematicians may flatter themselves that they possess new ideas which mere human language is as yet unable to express.

—James C. Maxwell

A recent study of 13-year-olds in 6 countries placed Americans last in mathematics and Koreans first. But when students were asked whether they were 'good at mathematics,' 68 percent of the Americans said yes (the highest), compared with only 23 percent of the Koreans (the lowest).
This was no quirk. The psychologist Harold Stevenson, of the University of Michigan, who has studied American and Asian students for years, finds the same relationship. Americans score lower in achievement but, along with their parents, are more satisfied with their performance.
'If children believe they are already doing well—and their parents agree with them—what is the purpose of studying harder?' he writes.

—Robert J. Samuelson

It is hard to convince a high-school student that he will encounter a lot of problems more difficult than those of algebra and geometry.

—Edgar W. Howe

It's 2020…get rid of Algebra 2 in high school and replace it with financial fundamentals. Teach kids about careers (not just college), salaries, credit, budgeting, taking out a loan, investing, college debt, buying a house, filing taxes.

—Larry Geaghan

C. 300 B.C.: Counting Board. Greek market vendors recorded sales by placing pebble between lines in the sand; one column held ones, another tens, and so on. Later versions used beads in grooved trays.

1632: Slide Rule. Anglican minister William Oughtred introduced the first convenient tool to calculate logarithms. With a few improvements, the slide rule became an indispensable tool well into the 20th century.

1820: Arithmometer. The first mass-produced mechanical calculating device, the arithmometer, patented by Charles Xavier Thomas in France, used levers and stepped drums to turn numeral wheels, producing the answers to basic math problems.

1886: Printing Adding Machine. A full numerical keyboard and a mechanism for printing receipts made William Seward Burrough's invention popular not with mathematicians, but with business owners and accountants.

1970: Hand-Held Electronic Calculator. The fist electronic calculator, which debuted in the 1960s, was the size of a typewriter. Within a few years, the machines had shrunk considerably; the first hand-held, still capable of only basis functions, cost about $400.

—Anna Diamond

In World War II, the need for computation exploded. Over 200 women were hired at the University of Pennsylvania's Moore School of Electrical Engineering, creating artillery-trajectory tables for the Army. By 1944…about half of all computers were women. One contractor of the Applied Mathematics Panel used the term 'kilogirl' to refer to 1,000 hours of female calculation work. Another astronomer spoke of 'girl-years' of work.

—Clive Thompson

Mathematics and Poetry are... the utterance of the same power of imagination, only that in the one case it is addressed to the head, in the other, to the heart.

—Thomas Hill

I'm glad I learned about parallelograms in high school math instead of how to do my taxes. It comes in so handy during parallelogram season.

—Internet Meme

Grace Murray Hopper (1906-1992) A mathematician, computer scientist and rear admiral in the U.S. Navy, Hopper led the Eckert-Mauchly Corporation team in the 1950s that created the first computer language compiler; the breakthrough program translated English language instructions into machine code understood by computers.

—Susan Dominus

Klaradan Von Neumann (1911-1963) The self-taught mathematician was a primary developer of coding for the 1940s ENIAC computer. Yet she is not listed as an author on the paper announcing that work.

—Susan Dominus

I never failed in mathematics. Before I was 15 I had mastered differential and integral calculus.

—Albert Einstein

In the 1980s…Logo was a programming language that was…created by mathematician and computer scientist Seymour Papert at MIT. The language enabled students to use computer code to move a digital turtle around on the screen. Dragging a pen behind it, the turtle's programmed movements could result in drawing exciting geometric designs. Papert wanted to provide a way for students to learn math by giving them a language with which they could think mathematically in order to produce images. It was a way of using the computer as a machine for helping us learn to think.

—David Warlick

When the phone in your pocket pinpoints your location in seconds, it's easy to forget just how new that technology is—the U.S. military launched its first GPS satellite only in 1978—and just how laborious it used to be to gather and synthesize definitive geographic data. Unlike a traditional survey used to determine property lines or mark the route for a new road, a geodetic survey of a region accounts for the curvature of the Earth and even variations in this curvature. That extra precision becomes more critical over long distances….[with geodesy] any point on Earth's surface could be defined by numerical coordinates, and its distance and direction from any other point calculated with precision.

—Greg Miller

For low-income students, math is often an impenetrable barrier to academic success. Algebra II, which includes polynomials and logarithms, and is required by the new Common Core curriculum standards used by 47 states and territories, drives dropouts at both the high school and college levels. The situation is most dire at public colleges, which are the most likely to require abstract algebra as a precondition for a degree in every field, including art and theater.

—Dana Goldstein

We are really destroying a tremendous amount of talent—people who could be talented in sports writing or being an emergency medical technician, but can't even get a community college degree. I regard this math requirement [Algebra II] as highly irrational.

—Andrew Hacker

What do you get if you divide the circumference of a pumpkin by its diameter?
A: Pumpkin π

—*theoatmeal.com*

Math professors, consumed by their esoteric, super-specialized research, simply don't care very much about the typical undergraduate, Hacker contends. At universities with graduate programs, tenure-track faculty members teach only 10 percent of introductory math classes. At undergraduate colleges, tenure-track professors handle 42 percent of introductory classes. Graduate students and adjuncts shoulder the vast majority of the load, and they aren't inspiring many students to continue their math education. In 2013, only 1 percent of all bachelor's degrees awarded were in math. In a way, math departments throughout the country don't worry. They have big budgets because their classes are required, so they keep on going.

—Andrew Hacker

There are three legs on which math rests: math fact, math algorithm, and conceptual understanding. American kids are OK on facts, OK on algorithm, and near zero on conceptual understanding. It goes back to preschool. And this is what countries like Singapore do so well. They start with the conceptual business very, very early.

—Daniel Willingham

The *Forbes* article [March, 2019 by Tom VanderArk] in a nutshell says the following:

- Algebra 2 is currently a gatekeeper course, used as a requirement for graduation in many school districts and colleges.
- Its role as gatekeeper is a holdover from a bygone time, starting in the 1990s with concerns brought up by 'A Nation at Risk' which then morphed into Common Core standards. But whatever needs used to be in place for requiring Algebra 2, are today not as valid (if not completely irrelevant).
- In fact there is reason to believe that Algebra 2 perpetuates inequities among some student demographics, and anyway the 'vast majority' (Tom's words) of people don't actually use the rote symbolic manipulation skills of Algebra 2.
- So instead, students should study coding and computational thinking. And there are some emerging examples in the real educational world where this is happening.

—Robert Talbert

The tragedy of high school math. Less than 20% of adults ever use algebra. No adult in America still does integrals and derivatives by hand—the calculus that blocks so many from career paths. It remains in the curriculum because it's easy to test, not important to learn.

—Ted Dintersmith

If you want to make a compelling case for improving math education in this country, talk to math teachers and see what they are doing, what's working, and what's true. Linking to news articles about schools doesn't count. Get in there, up close with teachers and let them inform you.

—Robert Talbert

Come on up, Mark. Attempting math in front of your friends, bullies and crushes is an important step on the road to hating math.

—Tony Carrillo

Wherever there is number, there is beauty.

—Proclus (410–485)

The true spirit of delight . . . is to be found in mathematics as surely as in poetry.

—Bertrand Russell

When I was in 7th grade I got a C in algebra because I was sick for two weeks and missed school. The teacher said maybe I just wasn't good at math. Anyway, I'm a theoretical physicist who does a lot of math.

—Robert McNees

Alphabet: a symbolic system used in algebra, with applications that have yet to be discovered by dyslexics and two thirds of college graduates.

—Bauvard

They say that maths is a language. So how do I order a pizza with extra cheese in maths?

—Greg Curtis

Besides keeping us honest, math is also the most economical and unambiguous terminology that we know of. Language is malleable; it depends on context and interpretation. But math doesn't care about culture or history. If a thousand people read a book, they read a thousand different books. But if a thousand people read an equation, they read the same equation.

—Sabine Hossenfelder

Historians of Mesopotamian mathematics have concluded that the Pythagorean rule was in widespread use during the Old Babylonian period (20th to 16th centuries BC), over a thousand years before Pythagoras was born.

—Jöran Friberg

As long as I could connect every new thing I learned to this universe, I had an easy time with math. And I noticed that classmates who had problems with math weren't struggling with math; they were struggling with connections. They were trying to memorize equations, but no one had successfully shown them how those equations connect with everything they had already learned. They were doomed.

—Gabriel Wyner

I don't know who needs to hear this, but you're not a failure because you got C in pre-calc!

—Kelly Martinez

Young people's attainment is linked to their ideas about what it means to be male or female. Those who defy traditional gender stereotypes appear to do better in the classroom….The 'modern' and 'wild' girls typically…displayed signs of low engagement and motivation: they gave up easily when faced with difficult tasks, and generally put less effort into their work…..One reason for the close correspondence between gender profile and academic achievement is that adolescents tend to express strong and inflexible ideas about gender, which influences their attitude towards school, for example, 'cool guys', who prize risk-taking and winning, consistently admitted to not trying hard at school—probably because doing so maintained the illusion that they would succeed if they put in more effort.
Attitudes towards gender probably also influence pupils' engagement with certain subjects. Previous studies have, for example, shown that Maths is often perceived as 'male'. Tellingly…tomboys—girls who rejected 'feminine' traits—earned higher grades than the other girls in Maths.

—Dr. Junlin You,
University of
Cambridge (2020)

'Name a book that made you cry.'
'*Algebra 1, Math for the Modern World*.'

—Internet Meme

You can either have a nice day or you can help your child with their math homework. You can't have both.

—*Coronalations* 03:30

Mathematics…can only be discovered, never invented.

—Stanisław Lem

Whoever put 2 L's in 'parallel' was a genius.

—Internet Meme

Mathematics is much more than a language for dealing with the physical world. It is a source of models and abstractions which will enable us to obtain amazing new insights into the way in which nature operates.

—Melvin Schwartz

It is a safe rule to apply that, when a mathematical or philosophical author writes with a misty profundity, he is talking nonsense.

—Alfred North Whitehead

They shouldn't be allowed to teach math so early in the morning.

—Kendare Blake

All the geography, trigonometry, and arithmetic in the world are useless unless you learn to think for yourself. No school teaches you that. It's not in the curriculum.

—Carlos Ruiz Zafón

Working an integral or performing a linear regression is something a computer can do quite effectively. Understanding whether the result makes sense—or deciding whether the method is the right one to use in the first place—requires a guiding human hand. When we teach mathematics we are supposed to be explaining how to be that guide. A math course that fails to do so is essentially training the student to be a very slow, buggy version of Microsoft Excel.

—Jordan Ellenberg

Mathematics has very subtle processes which can serve as much to satisfy the inquiring mind as to aid all the arts and diminish man's labor.

—Descartes René

Tell a boy he needs to take a virtual math class that will focus on graphing, ratios, mean, and median, and the announcement might elicit a yawn. Then tell him that this online math class will use baseball to teach those concepts and, if he's a fan, he's likely to be enthusiastic.

—Jamey T. Fitzpatrick

Imagine how different U.S. schools and society would be if every child entering 5th grade had 5th grade reading and math skills.

—Robert E. Slavin

Researchers dispel the myth that, for most of the children in poverty, academically challenging work in mathematics and literacy should be postponed until they are 'ready'—that is, until they have acquired full mastery of basic skills. Although such students are often lacking in certain basic skills, they can acquire these skills at the same time that they gain advanced skills (which provide a broader, more meaningful context for learning 'the basics'.

—Michael S. Knapp, Patricia M. Shields and Brenda J .Turnbull

Rene Descartes came up with the theory of coordinate geometry by looking at a fly walk across a tiled ceiling.

—Tony Jeary and John Davis

All odd numbers have the letter 'e' in them.

—Internet Meme

Numerous studies of mathematics achievement at different grade and ability levels show that children benefit when real objects are used as aids in learning mathematics. Teachers call these objects 'manipulatives.'

Objects that students can look at and hold are particularly important in the early stages of learning a math concept because they help the student understand by visualizing. Students can tie later work to these concrete activities.

The type or design of the objects used is not particularly important; they can be blocks, marbles, poker chips, cardboard cutouts—almost anything. Students do as well with inexpensive or homemade materials as with costly, commercial versions.

The cognitive development of children and their ability to understand ordinarily move from the concrete to the abstract. Learning from real objects takes advantage of this fact and provides a fit foundation for the later development of skills and concepts.

—U. S. Department of Education—*What Works*

No mathematician in the world would bother making these senseless distinctions: 2 1/2 is a *mixed number* while 5/2 is an *improper fraction*. They're EQUAL for crying out loud. They are the exact same numbers and have the exact same properties. Who uses such words outside of fourth grade?

—Paul Lockhart

Mental acuity of any kind comes from solving problems yourself, not from being told how to solve them.

—Paul Lockhart

Pi Day is just a fake holiday created by math companies to sell more math.

—Frankie Zelnick

Whereas the math curriculum at most American high schools tops out at Calculus I, multivariable calculus and linear algebra—subjects normally reserved for college sophomores or juniors—are widespread among moneyed high schools.

—Liam O'Connor

J. Nathan Matias…argues that algorithms are totally unlike any other product devised by human beings. 'If you buy a car from Pennsylvania and drive it to Connecticut,…you know that it will work the same way in both places. And when someone else takes the driver's seat, the engine is going to do what it always did.' Algorithms, by contrast, change as human behavior changes. They resemble not the cars…but something more like the bacteria in our intestines, living organisms that interact with us.

—Anne Applebaum and
Peter Pomerantsev

In 1666 we had the great plague. *Cambridge University* was shut down and a 23-year-old boy was sent home, and he saw an apple fall on his estate. And then he realized that the laws that control an apple are the same laws that control the moon. So the epidemic gave Isaac Newton an opportunity to sit down and follow the mathematics of falling apples and falling moons. But of course there was no mathematics at that time. He couldn't solve the problem so he created his own mathematics.

—Michio Kaku

Almost out of nothing, out of an era of witchcraft and sorcery, he [Isaac Newton] comes up with the mathematics of the universe, he comes up with a theory of almost everything. That's incredible. Einstein piggybacked on Newton, using the calculus of Newton to work out the dynamics of curved spacetime and general relativity. They are like supernovas, blindingly brilliant and illuminating the entire landscape and changing human destiny. Newton's laws of motion set into motion the foundation for the *Industrial Revolution*. A person like that comes along once every several centuries.

—Michio Kaku

I wouldn't have minded school if they taught you important things like how to have good sex and what brand of wine is the best… But for some reason they were hell bent on teaching me algebra.

—Ben Mitchell

Commentators have suggested a variety of reasons to explain why U.S. students don't score higher in math. The curriculum is undemanding; the coverage is brief and shallow; teachers emphasize algorithms, not concepts. There might be something else at work as well. Students probably learn what is valued in a society. In this country, not being able to read is a source of shame, and elementary teachers spend more time teaching reading than they do math and science combined. On the other hand, it's perfectly acceptable to say, 'I'm no good at math.'

—Gerald W. Bracey

As for integrating geography…all subjects can benefit from the use of the geographic perspective—not to push out other subjects—but to enhance them, to improve overall learning. Novels and plays have settings, even paintings and music often have geographic settings. Why not use real-world problems of time and distance, latitude and longitude, to help teach math skills? I would use maps in every history or current events discussion, or lesson about cultures, or languages, or politics.

—Gilbert M. Grosvenor

Researchers…dispel the myth that, for most of the children in poverty, academically challenging work in mathematics and literacy should be postponed until they are 'ready'—that is, until they have acquired full mastery of basic skills. Although such students are often lacking in certain basic skills, they can acquire these skills the same time that they gain advanced skills (which provide a broader, more meaningful context for learning 'the basics.'

—Michael S. Knapp,
Patricia M.
Shields, and
Brenda J. Turnbull

In highly specialized technical fields, soft-skills are critical to the career path. A survey the American Enterprise Institute conducted last year found that nearly half of workers in science, technology, engineering and math fields thought that good writing and communication skills were extremely important and around 70% said the same regarding critical thinking skills. At the same time, less than 40% of these workers said that high level math, analytical or computer skills were extremely important.

—Brent Orrell

There is a number so big, no one has ever wrote it, said it, or even thought of it.

—Internet Meme

In the 1980s, A&W tried to compete with the McDonald's Quarter Pounder by selling a ⅓ pound burger at a lower cost. The product failed, because most customers thought the ¼ pound was bigger.

—Internet Meme

Hindu-Arabic numerals, set of 10 symbols—1, 2, 3, 4, 5, 6, 7, 8, 9, 0—that represent numbers in the decimal number system. They originated in India in the 6th or 7th century and were introduced to Europe through the writings of Middle Eastern mathematicians, especially al-Khwarizmi and al-Kindi, about the 12th century. They represented a profound break with previous methods of counting, such as the abacus, and paved the way for the development of algebra.

—Noah Tesch

Each generation has its few great mathematicians, and mathematics would not even notice the absence of the others. They are useful as teachers, and their research harms no one, but it is of no importance at all. A mathematician is great or he is nothing.

—Alfred Adler

The mathematical life of a mathematician is short. Work rarely improves after the age of twenty-five or thirty. If little has been accomplished by then, little will ever be accomplished.

—Alfred Adler

In the company of friends, writers can discuss their books, economists the state of the economy, lawyers their latest cases, and businessmen their latest acquisitions, but mathematicians cannot discuss their mathematics at all. And the more profound their work, the less understandable it is.

—Alfred Adler

There are very few things which we know, which are not capable of being reduced to a Mathematical Reasoning; and when they cannot it's a sign our knowledge of them is very small and confused; and when a Mathematical Reasoning can be had it's as great a folly to make use of any others, as to grope for a thing in the dark, when you have Candle standing by you.

—John Arbuthnot (1692)

Mark all mathematical heads which be wholly and only bent on these sciences, how solitary they be themselves, how unfit to live with others, how unapt to serve the world.

—Roger Ascham
(1515-1568)

Computers are composed of nothing more than logic gates stretched out to the horizon in a vast numerical irrigation system.

—Stan Augarten

The pursuit of pretty formulas and neat theorems can no doubt quickly degenerate into a silly vice, but so can the quest for austere generalities which are so very general indeed that they are incapable of application to any particular.

—Eric Temple Bell

The cowboys have a way of trussing up a steer or a pugnacious bronco which fixes the brute so that it can neither move nor think. This is the hog-tie, and it is what Euclid did to geometry.

—Eric Temple Bell

I advise my students to listen carefully the moment they decide to take no more mathematics courses. They might be able to hear the sound of closing doors.

—James Caballero

When I am violently beset with temptations, or cannot rid myself of evil thoughts, [I resolve] to do some Arithmetic, or Geometry, or some other study, which necessarily engages all my thoughts, and unavoidably keeps them from wandering.

—Jonathon Edwards
(1703-1758)

A formal manipulator in mathematics often experiences the discomforting feeling that his pencil surpasses him in intelligence.

—Howard W. Eves

One is hard pressed to think of universal customs that man has successfully established on earth. There is one, however, of which he can boast the universal adoption 0f the Hindu-Arabic numerals to record numbers. In this we perhaps have man's unique worldwide victory of an idea.

—Howard W. Eves

The solution of problems is one of the lowest forms of mathematical research,…yet its educational value cannot be overestimated. It is the ladder by which the mind ascends into higher fields of original research and investigation. Many dormant minds have been aroused into activity through the mastery of a single problem.

—Benjamin Franklin
Finkel

Life is a school of probability.

—Walter Bagehot

Whereas at the outset geometry is reported to have concerned herself with the measurement of muddy land, she now handles celestial as well as terrestrial problems: she has extended her domain to the furthest bounds of space.

—W. B. Frankland

Biographical history, as taught in our public schools, is still largely a history of boneheads: ridiculous kings and queens, paranoid political leaders, compulsive voyagers, ignorant generals—the flotsam and jetsam of historical currents. The men who radically altered history, the great scientists and mathematicians, are seldom mentioned, if at all.

—Martin Gardner

I have had my results for a long time: but I do not yet know how I am to arrive at them.

—Karl Friedrich Gauss

Mathematics is a language.

—Josiah Willard Gibbs
(1839-1903)

To be a scholar of mathematics you must be born with talent, insight, concentration, taste, luck, drive and the ability to visualize and guess.

—Paul R. Halmos

One of the big misapprehensions about mathematics that we perpetrate in our classrooms is that the teacher always seems to know the answer to any problem that is discussed. This gives students the idea that there is a book somewhere with all the right answers to all of the interesting questions, and that teachers know those answers. And if one could get hold of the book, one would have everything settled. That's so unlike the true nature of mathematics.

—Leon Henkin

10th August 1851: On Tuesday evening at Museum, at a ball in the gardens. The night was chill, I dropped too suddenly from Differential Calculus into ladies' society, and could not give myself freely to the change. After an hour's attempt so to do, I returned, cursing the mode of life I was pursuing; next morning I had already shaken hands, however, with Diff. Calculus, and forgot the ladies.

—Thomas Archer Hirst

There are no deep theorems—only theorems that we have not understood very well.

—Nicholas P. Goodman

The truth of the matter is that, though mathematics truth may be beauty, it can be only glimpsed after much hard thinking. Mathematics is difficult for many human minds to grasp because of its hierarchical structure: one thing builds on another and depends on it.

—M. Holt and D. T. E. Marjoram

I admit that mathematical science is a good thing. But excessive devotion to it is a bad thing.

—Aldous Huxley

The admitted accuracy of mathematical processes is allowed to throw a wholly inadmissible appearance of authority over the results obtained by them. Mathematics may be compared to a mill of exquisite workmanship, which grinds your stuff of any degree of fineness; but, nevertheless, what you get out depends on what you put in; and as the grandest mill in the world will not extract wheat flour from peascods, so pages of formulae will not get a definite result out of loose data.

—Thomas Henry Huxley (1825-1895)

Geometry enlightens the intellect and sets one's mind right. All of its proofs are very clear and orderly. It is hardly possible for errors to enter into geometrical reasoning, because it is well arranged and orderly. Thus, the mind that constantly applies itself to geometry is not likely to fall into error. In this convenient way, the person who know geometry acquires intelligence.

—Ibn Khaldun (1332-1406)

Mathematics is the science of what is clear by itself.

—Carl Jacobi

Mathematics is man's own handiwork, subject only to the limitations imposed by the laws of thought.

—E. Kasner and J. Newman

Mathematics is the science which uses easy words of hard ideas.

—E. Kasner and J. Newman

Perhaps the greatest paradox of all is that there are paradoxes in mathematics.

—E. Kasner and J. Newman

I feel as if I should succeed in doing something in mathematics, although I cannot see why it is so very important…The knowledge doesn't make life any sweeter or happier, does it?

—Helen Keller

Where there is matter, there is geometry.

—Johannes Kepler (1571-1630)

The chief aim of all investigations of the external world should be to discover the rational order and harmony which has been imposed on it by God and which He revealed to us in the language of mathematics.

—Johannes Kepler (1571-1630)

Mathematics is indeed dangerous in that it absorbs students to such a degree that it dulls their senses to everything else.

—Prince Kraft of Hohenlohe-Ingelfingen (1827-1892)

No human investigation can be called real science if it cannot be demonstrated mathematically.

—Leonardo da Vinci

When the passions become masters, they are vices.

—Blaise Pascal

Mathematics began to seem too much like puzzle solving. Physics is puzzle solving, too, but of puzzles created by nature, not by the mind of man.

—Maria Goeppert Mayer

Most of the arts, as painting, sculpture, and music, have emotional appeal to the general public. This is because these arts can be experienced by some one or more of our senses. Such is not true of the art of mathematics; this art can be appreciated only by mathematicians, and to become a mathematician requires a long period of intensive training. The community of mathematicians is similar to an imaginary community of musical composers whose only satisfaction is obtained by the interchange among themselves of the musical scores they compose.

—Cornelius Lanczos

It is now quite lawful for a Catholic woman to avoid pregnancy by a resort to mathematics, though she is still forbidden to resort to physics and chemistry.

—H. L. Mencken
(1880-1956)

Mathematicians boast of their exacting achievements, but in reality they are absorbed in mental acrobatics and contribute nothing to society.

—Sorai Ogyu (1666-1729)

Geometry is a skill of the eyes and the hands as well as of the mind.

—Jean Pedersen

He who can properly define and divide is to be considered a god.

—Plato

Mathematics is like checkers in being suitable for the young, not too difficult, amusing, and without peril to the state.

—Plato

Life is good for only two things, discovering mathematics and teaching mathematics.

—Siméon Poisson

Mathematics is the cheapest science. Unlike physics or chemistry, it does not require any expensive equipment. All one needs for mathematics is a pencil and paper.

—George Polyá

The simplest schoolboy is now familiar with facts for which Archimedes would have sacrificed his life.

—Ernest Renan

Mathematics consists of proving the most obvious thing in the least obvious way.

—George Polyá

If I feel unhappy, I do mathematics to become happy. If I am happy, I do mathematics to keep happy.

—Alfréd Rényi

We often hear that mathematics consists mainly of 'proving theorems.' Is a writer's job mainly that of 'writing sentences?"

—Gian-carlo Rota

At the age of eleven, I began Euclid, with my brother as my tutor. This was one of the great events of my life, as dazzling as first love. I had not imagined there was anything so delicious in the world. From that moment until I was thirty-eight, mathematics was my chief interest and my chief source of happiness.

—Bertrnad Russell

The main duty of the historian of mathematics, as well as his fondest privilege, is to explain the humanity of mathematics, to illustrate its greatness, beauty and dignity, and to describe how the incessant efforts and accumulated genius of many generations have built up that magnificent monument, the object of our most legitimate pride as men, and of our wonder, humility and thankfulness, as individuals. The study of the history of mathematics will not make better mathematicians but gentler ones, it will enrich their minds, mellow their hearts, and bring out their finer qualities.

—G. Sarton

The mathematician is fascinated with the marvelous beauty of the forms he constructs, and in their beauty he finds everlasting truth.

—J. B. Shaw

Mathematics, as much as music or any other art, is one of the means by which we rise to a complete self-consciousness. The significance of mathematics resides precisely in the fact that it is an art; by informing us of the nature of our own minds it informs us of much that depends on our minds.

—John William Navin Sullivan

If they would, for Example, praise the Beauty of a Woman, or any other Animal, they describe it by Rhombs, Circles, Parallelograms, Ellipses, and other geometrical terms.

—Jonathan Swift from
Gulliver's Travels

What vexes me most is, that my female friends, who could bear me very well a dozen years ago, have now forsaken me, although I am not so old in proportion to them as I formerly was: which I can prove by arithmetic, for then I was double their age, which now I am not.

—Jonathan Swift

A man is like a fraction whose numerator is what he is and whose denominator is what he thinks of himself. The larger the denominator the smaller the fraction.

—Count Lev Nikolgevich
Tolstoy

In many cases, mathematics is an escape from reality. The mathematician finds his own monastic niche and happiness in pursuits that are disconnected from external affairs. Some practice it is as if using a drug. Chess sometimes plays a similar role. In their unhappiness over the events of this world, they immerse themselves in a kind of self-sufficiency in mathematics. (Some have engaged in it for this reason alone.)

—Stanislaw Ulam

Angling may be said to be so like mathematics that it can never be fully learned.

—Izaak Walton (1653)

Every mathematician worthy of the name has experienced…the state of lucid exaltation in which one thought succeeds another as if miraculously…this feeling may last for hours at a time, even for days. Once you have experience it, you are eager to repeat it but unable to do it at will, unless perhaps by dogged work.

—Andre Weil

Algebra and money are essentially levelers; the first intellectually, the second effectively.

—Simone Weil

Without the concepts, methods and results found and developed by previous generations right down to Greek antiquity one cannot understand either the aims or achievements of mathematics in the last 50 years.

—Hermann Weil (1950)

When I heard the learn'd astronomer,
When the proofs, the figures, were ranged in columns before me,
When I was shown the charts and diagrams, to add, divide, and measure them,
When I sitting heard the astronomer where he lectured with much applause in the lecture room,
How soon unaccountable I became tired and sick,
Till rising and gliding out I wander'd off by myself,
In the mystical moist night-air, and from time to time,
Look'd up in perfect silence at the stars.

—Walt Whitman
(1819-1892)

Mathematics is a field in which one's blunders tend to show very clearly and can be corrected or erased with a stroke of the pencil. It is a field which has often been compared with chess, but differs from the latter in that it is only one's best moments that count and not one's worst. A single inattention may lose a chess game, whereas a single successful approach to a problem, among many which have been relegated to the wastebasket, will make a mathematician's reputation.

—Norbert Weiner

I'm sorry to say that the subject I most disliked was mathematics. I have thought about it. I think the reason was that mathematics leaves no room for argument. If you made a mistake, that was all there was to it.

—Malcom X

Keywords: #Quotes #Quotations #Education #School #Teacher #Teaching #college #learning #students #wisdom #research #Reference #math #mathematics #numbers #statistics #geometry #algebra #measurement #trigonometry #calculate #calculation #calculus #addition #subtraction #division #multiplication #figures