

Title: The Modern High School Math Curriculum Model: Perceptions of Usefulness in Daily Life

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Basic Finance Concepts	Average Score (95% CI)
Budgeting/planning and how to use your money wisely	8.52 (8.42, 8.61)
Saving and Investing - setting aside money and learning how to make it grow	8.14 (8.04, 8.24)
Understanding different types of bank accounts and how banks work	8.17 (8.07, 8.26)
Learning about using credit/credit cards responsibly and how to manage debt	8.30 (8.20, 8.39)
Protecting yourself financially by having appropriate insurance coverage	8.02 (7.92, 8.12)
Understanding how taxes work and why we pay them	8.11 (8.02, 8.21)
Learning about starting and running a business, including making a profit	7.21 (7.10, 7.33)
Setting financial goals and making plans to achieve them	8.11 (8.01, 8.21)
Knowing your consumer rights and responsibilities	7.78 (7.67, 7.88)

Reflecting on your high school finance class(es), how useful have they been in your daily life?	
Perceived usefulness	N = 1,625 (%)
Not useful	109 (6.7)
Somewhat useful	493 (30.3)
Very useful	1,023 (63.0)

- FINDINGS**
- Only 22% of respondents took statistics/probability in HS, but 66% reported that they draw upon it in their daily life.
 - Only 31% of respondents took a finance in HS, but 87% reported that they draw upon it in their daily life.
 - Conversely, algebra (83%), algebra II (65%) and geometry (69%) was taken by the majority, but only reported as drawn upon in daily life by 44%, 26% and 31%, respectively

MAIN RESULT: Finance course topics showed higher perceived usefulness than statistics and standard math topics

BACKGROUND

The current standard high school math curriculum (algebra I and II, geometry, trigonometry, pre-calculus, calculus) was instituted in the 1950s and 60s largely in response to the Cold War and the space race. These political and technological circumstances drove a need for technological capabilities and advancements, particularly in military technology and space exploration which in turn required a strong foundation in mathematics and science. Much has changed since the 1950s and 60, but not the standard mathematics education in the US.

OBJECTIVE

Assess the use of mathematical, statistical and financial concepts and techniques taught in secondary and post-secondary education and their commonality of application in daily life after completion of high school.

- METHODS**
- A nationally representative sample of adults (N=1,948) was asked to complete an internet survey during the summer of 2024 (CINT USA, Inc.; Lawrenceville, NJ; www.cint.com).
 - Quota-based sampling ensured an equal sex, age, and racial/ethnic group composition to provide a representative sample of the American public.
 - In addition to some basic demographic information, the survey included three 9-question assessments of the usefulness in daily life post-high school of the main, basic concepts found in high school standard math, statistics and finance courses
 - AI was utilized to identify, then put into layman's terms all the individual finance, statistics/probability and basic math concepts

- INCLUSION CRITERIA (No exclusion criteria)**
- 25-65 years of age
 - Completed high school at least 5 years ago
 - Attended a high school in the United States

Basic Statistical and Probability Concepts	Average Score (95% CI)
Differentiating types of information and ways to organize it	7.18 (7.06, 7.29)
Identifying most common value/average	6.95 (6.83, 7.06)
Understanding variability	6.42 (6.29, 6.54)
Figuring out how likely something is to happen	6.77 (6.65, 6.89)
Making predictions about the future	6.16 (6.03, 6.29)
Recognizing common patterns in information	6.93 (6.81, 7.05)
Understanding how one thing can be related to another	7.09 (6.98, 7.21)
Learning how to read charts/graphs that represent relationships	7.02 (6.90, 7.14)
Making educated guesses about a larger group based on information from a smaller group	6.53 (6.41, 6.66)

Basic Math Concepts	Average Score (95% CI)
Deciphering or resolving challenges related to numerical problems	6.89 (6.76, 7.01)
Addressing mathematical scenarios involving squared numbers	4.81 (4.68, 4.95)
Evaluating problems that require a series of steps to solve	6.75 (6.63, 6.88)
Rearranging and simplifying numbers to figure things out or get specific answers	6.28 (6.15, 6.40)
Understanding numbers that get bigger or smaller over time	6.78 (6.64, 6.89)
Understanding different shapes, their transformations, and patterns	5.62 (5.49, 5.76)
Figuring out angles and distances using special number relationships	5.45 (5.31, 5.58)
Understanding limits and predicting what happens when numbers approach one other	5.42 (5.28, 5.55)
Figuring out how things speed up or slow down, and how they change over time	5.82 (5.69, 5.95)

- PARTICIPANT CHARACTERISTICS**
- Age [mean ± SD]: 45.5 ± 10.7
 - Male (50.1%), Female (49.7%)
 - White (70.9%), Black (16.5%) Hispanic/Latino (6.5%)
 - Income \$0-\$50k (37.3%), \$50-\$75k (26.9%), \$75-100k (17.0%), >\$100k (18.8%)
 - HS type: Public (89.9%), Private (9.1%)
 - HS location: Urban (32.2%), Suburban (47.0%), Rural (20.8%)
 - HS class size: <100 (20.5%), 101-500 (55.9%), 501-1000 (17.4%), >1000 (6.2%)
 - HS GPA: A (31.0%), B (53.7%), C (14.2%)
 - Highest degree: HS diploma/GED (24.3%), Some college (21.9%), Associate's (14.8%), Bachelor's (27.1%), Professional (10.7%), Doctorate (0.01%)
 - Occupation category: Professional/Technical/Managerial (42.0%), Service/Support/Community (20.4%), Sales/Administrative/Arts (17.6%), Manual/Skilled Trades/Military (20.0%)

Reflecting on your high school statistics (probability) class(es), how useful have they been in your daily life?	
Perceived usefulness	N = 1,690 (%)
Not useful	267 (15.8)
Somewhat useful	759 (44.9)
Very useful	664 (39.3)

Reflecting on your high school basic math classes (Algebra, Algebra II, Geometry, Trigonometry, Pre-Calculus and/or Calculus), how useful have they been in your daily life?	
Perceived usefulness	N = 1,921 (%)
Not useful	480 (25.0)
Somewhat useful	850 (44.3)
Very useful	591 (30.7)

Mean usefulness of each subject in your daily (any aspect of work and/or personal) life after high school [1 to 10 scale]?		
Topic	Mean (95% CI)	P-value
Overall		<0.0001
Finance	8.04 (7.94, 8.14)	<0.0001
Statistics	6.78 (6.69, 6.88)	<0.0001
Standard math	5.98 (5.88, 6.08)	ref

- FINDINGS (continued)**
- 53% found their HS finance classes to be 'very useful'
 - 34% found their HS statistics/probability classes to be 'very useful'
 - 30% found their HS basic math classes to be 'very useful'
 - On a scale of 1 to 10, all finance topics scored, on average, in the 7s and 8s out of 10 (overall mean 8.04)
 - On a scale of 1 to 10 (1=not useful at all, 10=essential), average usefulness in your daily (any aspect of work and/or personal) life after high school of nine finance skills was 8.04, nine statistics/probability skills was 6.78 and nine basic math skills was 5.98 (p<0.0001)

- DISCUSSION**
- The mathematical needs of society have dramatically changed since the current math curriculum was implemented.
 - In the Information Age we live in, we believe the HS math curriculum model should be 'flipped': finance and statistics/probability courses should be required, and the current basic math courses should become elective.
 - A mainstream conversation rethinking required and elective math-related courses in high school is long overdue.

Course	Taken in HS n (%) N=1,948	Draw upon in daily life n (%)
Algebra	1,624 (83.4)	720/1,624 (44.3)
Algebra II	1,260 (64.7)	331/1,260 (26.3)
Geometry	1,349 (69.3)	421/1,349 (31.2)
Trigonometry	645 (33.1)	116/645 (18.0)
Pre-Calculus	608 (31.2)	92/608 (15.1)
Calculus	465 (23.9)	130/465 (28.0)
Statistics (and Probability)	419 (21.5)	275/419 (65.6)
Basic Finance	601 (30.9)	523/601 (87.0)