Overview

Going forward, I would like to transfer my semiconductor/data knowledge to additive manufacturing, gene therapy, artificial intelligence, or applied neuroscience themes.

Given the privilege, my degrees in Chemical Engineering and Physical Chemistry, along with a solid research background in Materials Science, provide ample experience to perform the duties required in the marketplace. A majority of semiconductor projects I encountered, involved either processing or characterization, so I am strong in both areas.

With over 20 years as a Research Scientist, I have coauthored roughly 16 papers, half under the direction of John Haggerty at MIT, and the remainder with support from Klaus Bachmann at NC State. During the course of research, I have: (1) grown the first laser-induced, chemical vapor deposition, amorphous silicon solar cells, (2) developed a microwave plasma, chemical vapor deposition system, to create polycrystalline diamond from methane gas, in a regime where kinetics dominates over thermodynamics, (3) monitored the surface evolution of compound semiconductor heterostructure films, in a chemical beam epitaxy system, with plane polarized reflectance spectroscopy, pioneered by our research group.

In more recent years, I plunged into the world of macroeconomics, human behavior, and statistical analysis, through futures trading. Using quantitative investment strategies, participants seek high probability trades. To handle market data, I applied digital signal processing techniques, in the spirit of John Ehlers, an Electrical Engineer from Raytheon. Along the way, I combined statistics with digital signal processing to produce highly responsive indicators, enhancing trade signal clarity. By immersing myself in the data science of financial markets, and backtesting of trading strategies, I have improved my computer programming skills, and established more techniques to deal with data interpretation.

Going forward, I would like to transfer my semiconductor/data knowledge to additive manufacturing, gene therapy, artificial intelligence, or applied neuroscience themes. I invite you to visit my personal website to view current literature and computational projects. If you have any concerns, feel free to contact me.

Christopher J Harris

Christopher J Harris
Philadelphia, PA

Skype
cjharrisatru

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https://cjharris.github.io/

Profile

Chemical Engineer seeking a Process Engineer, Quality Engineer, Research & Development, or Data Scientist role, leading to a Chief Technology Officer position:

crystal growth	plasma chemistry	gene therapy
surface science	laser excitation	applied neuroscience
chemical vapor deposition	optical characterization	computer modeling
molecular beam epitaxy	electrochemical methods	statistical analysis
semiconductor devices	additive manufacturing	process control

Thesis

Real Time Reflectometry of Ga–based Compound Semiconductor Films on Silicon during Plasma Enhanced Molecular Beam Epitaxy, NCSU Materials Science Dept: **1999**.

Clifton Strengths

Character

Strategic	faced with any given scenario, can quickly spot the relevant patterns.
Learner	have a great desire to learn and want to continuously improve.
Ideation	able to find connections between seemingly disparate phenomena.
Futuristic	inspired by the future and what could be.
Self-Assurance	possess an inner compass yielding confidence in decision making.

Experience

Laboratory Technician, Medical Diagnostic Laboratory, Genesis Biotechnology Group: Hamilton, NJ (7/20 to present)

- Perform conventional Polymerase Chain Reaction (PCR) and real-time PCR.
- Investigate Gynecology, Infectious Diseases, Infectious Arthritis, Tick-borne Diseases, Mycology, and Chronic Fatigue Syndrome.
- Operate Rotor-Gene and Thermocycler apparatus.

Engineering Consultant, Independent (6/11 to present)

- Compose webpage content to demonstrate work skills.
- Become a Gerson Lehrman Council Member, April 2020, to testify in patent lawsuits.

Futures Trader, Independent (9/06 to present)

- Shift from fundamental evaluation of stocks to technical analysis of futures.
- Combine statistics with digital signal processing to produce indicators with better trade signal clarity.

Research Assistant, Maine Chemistry Dept: Orono, ME (8/03 to 5/06)

- Synthesize aurophilic gold compounds, a potential drug candidate for arthritis.
- Apply cyclic voltammetry to investigate catalytic activity in gold compounds.
- Induce electrochemiluminescence in a ruthenium compound for DNA analysis.

Teaching Assistant, Rutgers Chemistry Dept: New Brunswick, NJ (1/00 to 1/03)

- Present lab techniques to students on all undergraduate levels, including PChem.
- Pass the cumulative exam, the written portion of a PhD degree.

Research Assistant, NCSU Materials Science Dept: Raleigh, NC (1/87 to 12/99)

- Develop a microwave plasma, chemical vapor deposition system, to create polycrystalline diamond from methane gas, in a regime where kinetics dominates over thermodynamics.
- Achieve unique ellipsoidal plasma, energizing the surface, relative to spherical geometry.
- Design a radio frequency nitrogen plasma source for GaN film growth.
- Monitor the surface evolution of compound semiconductor heterostructure films, in a chemical beam epitaxy system, with plane polarized reflectance spectroscopy.

▸ Derive substrate temperature from plane polarized reflectance intensity.

Research Specialist, MIT Advanced Energy Materials Lab: Cambridge, MA (11/84 to 1/87)

▸ Invent a new approach for process control to optimize laser power.

▸ Write a Pascal based data acquisition program for DOS environment in 1986, long before LabView enters the Windows market.

▸ Analyze optical signals from a ceramic powder reaction chamber, leading to a computer monitoring scheme, which replaces a human operator.

▸ Construct interferometer to measure film thickness, providing a realtime signal, to calibrate growthrate.

▸ Refine process control loop to stabilize laser power, producing a steady deposition rate with reliable material properties.

▸ Collect in-situ stress measurements of growing films, through deflection of an optical laser, as sample curvature evolves.

▸ Grow the first laser-induced, chemical vapor deposition, amorphous silicon solar cell.

Stock Investor, Independent (5/84 to 9/06)

▸ Evaluate fundamental aspects of technology and phamaceutical sectors.

▸ Choose lucrative issues, including initial pubic offerings, IPOs, based on semiconductor knowledge, similar to a venture capitalist.

Intern

Mass Field Station: Waltham, MA (5/83 to 8/83)
Grow vegetables on sewage sludge layers to determine plant uptake of heavy metals.

International Paper: Camden, AR (5/82 to 8/82)
Apply quality control principles to glossy file folder stock in a papermill process.

Sun Oil Company: Main Pass, LA (5/81 to 8/81)
Perform system maintenance, technical evaluation on an offshore oil & gas production platform: MP-293A.

Sun Oil Company: Snyder, TX (5/80 to 8/80)
Explore gas compressor repair, plant process control on a cryogenic natural gas processing facility.

Literature

Real-time Monitoring of Surface Processes by P-polarized Reflectance, J. of Vacuum Science & Technology: **1997**, *A15*, 807.

Molecular Layer Epitaxy by Real-time Optical Process Monitoring, Applied Surface Science: **1997**, *112*, 38.

Boron Incorporation in Hydrogenated Amorphous Silicon Films Prepared by Chemical Vapor Deposition, J. of Noncrystalline Solids: **1987**, *97*, 1419.

Laser-induced Chemical Vapor Deposition of Hydrogenated Amorphous Silicon: Photovoltaic Devices and Material Properties, Solar Cells: **1987**, *21*, 177.

Education

MS *Physical Chemistry*	Rutgers: New Brunswick, NJ	Jan 2003
MS *Material Science*	North Carolina State: Raleigh, NC	unofficial
BS *Chemical Engineering*	Texas A&M: College Station, TX	May 1984
HS *Diploma*	Waltham High: Waltham, MA	Jun 1979

Certificate

Computational Investing	Georgia Tech: Coursera	Dec 2014
Computational Neuroscience	Washington: Coursera	Jul 2015
Data Scientist's Toolbox	Johns Hopkins: Coursera	Mar 2015
Python Programming for Everybody	Michigan: Coursera	May 2015
Data Analysis and Statistical Inference	Duke: Coursera	May 2015

Honor

Bausch & Lomb Science Award

Education Philosophy

Through the medium of verbal narrative and visual illustration, demonstrate how scientists think and test their hypotheses using basic logic.

A teacher plays a role comparable to an orchestra conductor, with dialogue between the leader and the band members. The maestro listens to the orchestra, then makes suggestions on how to improve the sound using an interpretation of a composer's intentions. Similarly, a teacher provides exercises, then shows the class the most acceptable way to solve a particular problem, consistent with the leader's perception of theory.

People learn things best if you present the subject matter like layers of an onion. No matter what the topic, explain things from first principles, start from common knowledge, and build up to the final result. Encourage note taking, provide a rational structure to the discussion, invite questions, and draw as many graphical representations as possible. With this approach, students engage the content, regardless of learning style. When the time comes to provide feedback, I maintain a policy of not marking an answer wrong, unless I can prove it, which avoids an awkward situation of arguing with the student, and promotes innovative solutions to the problem, based on the student's level of understanding.

In a democratic learning environment, if creativity represents the highest form of intelligence, I prefer not to compare one student's performance against another. Pupils who take longer to absorb educational content, could eventually develop a deeper understanding, as a consequence. Therefore, my vision of differential learning includes exposing all students to the same material, but assessing them according to their skill level. Polling class constituents on what they'd like to do each day provides a sense of unity among class members and strengthens instructor bonds, to yield a more effective teaching environment. When students perceive an activity with an element of fun, minds become more receptive to learning. Children never cease to amaze me with their imagination, suggesting better ideas than I would conceive alone.

Through the medium of verbal narrative and visual illustration, demonstrate how scientists think and test their hypotheses using basic logic. When volunteers attempt example problems on the board, it gives me insight where students need help, and reassures fellow class members their peers have similar struggles with the concepts. Place emphasis on:

> *define problem*
> *list each assumption*
> *specify known quantities*
> *identify unknowns*
> *propose strategy*
> *carry units*
> *show intermediate steps*
> *challenge whether answer seems reasonable*

according to original expectations. If circumstances warrant refinement, where did initial impressions fail, and how should next iteration proceed.

To prepare for an upcoming information age, middle schools should return to their traditional goal as trade exploration centers. Middle schools lay the foundation for high school in the same way that kindergarten programs set the stage for elementary school. Recently, learning institutions have come forward praising double sessions of English and Math as a means to prepare the masses for higher education. Without substantial context to apply these skills, dramatic behavior issues pervade the middle school atmosphere. According to child psychologists, kids act up when an imbalance exists between learning and fun. Ironically, teachers favor punishment over rewards, in response to student misbehavior. At the middle school age, hands-on classes in woodwork, metal fabrication, technical drawing, music, and art leave a more permanent impact on individuals than academic disciplines. These formative years represent a chance to let the students play with gadgets, just as they did in kindergarten with toys. Why not invite children of all educational genres to develop computer games, explore the boundaries of 3-D printing, or invent rudimentary robotic devices. Perhaps the student body will have an incentive to convey their ideas through English and Math.

Understanding by Design

Teacher	Christopher Harris	**Grade**	11
Date	12 April 2014	**Subject**	Algebra II

Stage 1 Desired Results

Established Goals	Solve quadratic equations in one variable. CCSS.MATH.CONTENT.HSA.REI.B.4
Understandings	Students will comprehend how to solve quadratic equations using the quadratic formula.
Essential Questions	What role does the discriminant play? How many solutions are expected? What type of values anticipated? What parameters influence parabola shape?
Student will know…	How to interpret numerical values of the discriminant. How to process coefficients to generate quadratic equation solutions. What the graphical representation looks like based on numerical solution.
Student will be able to…	Determine the discriminant. Predict solutions from the quadratic formula. Graph the results.

Stage 2 Assessment Evidence


Performance Tasks	Set up the quadratic equation in the proper format. Evaluate the discriminant. Determine whether there are real or imaginary solutions. Solve the quadratic equation. Determine the symmetry axis, intercepts, vertex, and orientation.

Other Evidence	$y=f(x)=ax^2+bx+c=0$

$D=b^2-4ac$ > 0   2 real :   x-axis cross

                 = 0   1 real :   tangent to x-axis

                 < 0   2 complex :   no x-axis cross

x-intercept(s): $x=\dfrac{-b\pm\sqrt{D}}{2a}; y=0$

y-intercept: $y=f(0)=c$

symmetry axis: $x=\dfrac{-b}{2a}$

vertex: $[\dfrac{-b}{2a},f(\dfrac{-b}{2a})]$

orientation: deduce from vertex & intercept positions.

Evidence Summary	Recognize critical values derived from quadratic formula.
Self-Assessments	Compare results with solution set. Identify where bottlenecks or mistakes took place. Write a journal entry outlining universal procedures to accomplish goals and achieve success.

Stage 3 Learning Plan

Learning Activities	Warmup

Objective

Feedback

Key concepts

Derivation:

www.mathsisfun.com/algebra/quadratic-equation-derivation.html

Guided practice

Independent exercise

Assessment:

www.mathwarehouse.com/quadratic/discriminant-in-quadratic-equation.php

Journal Entry
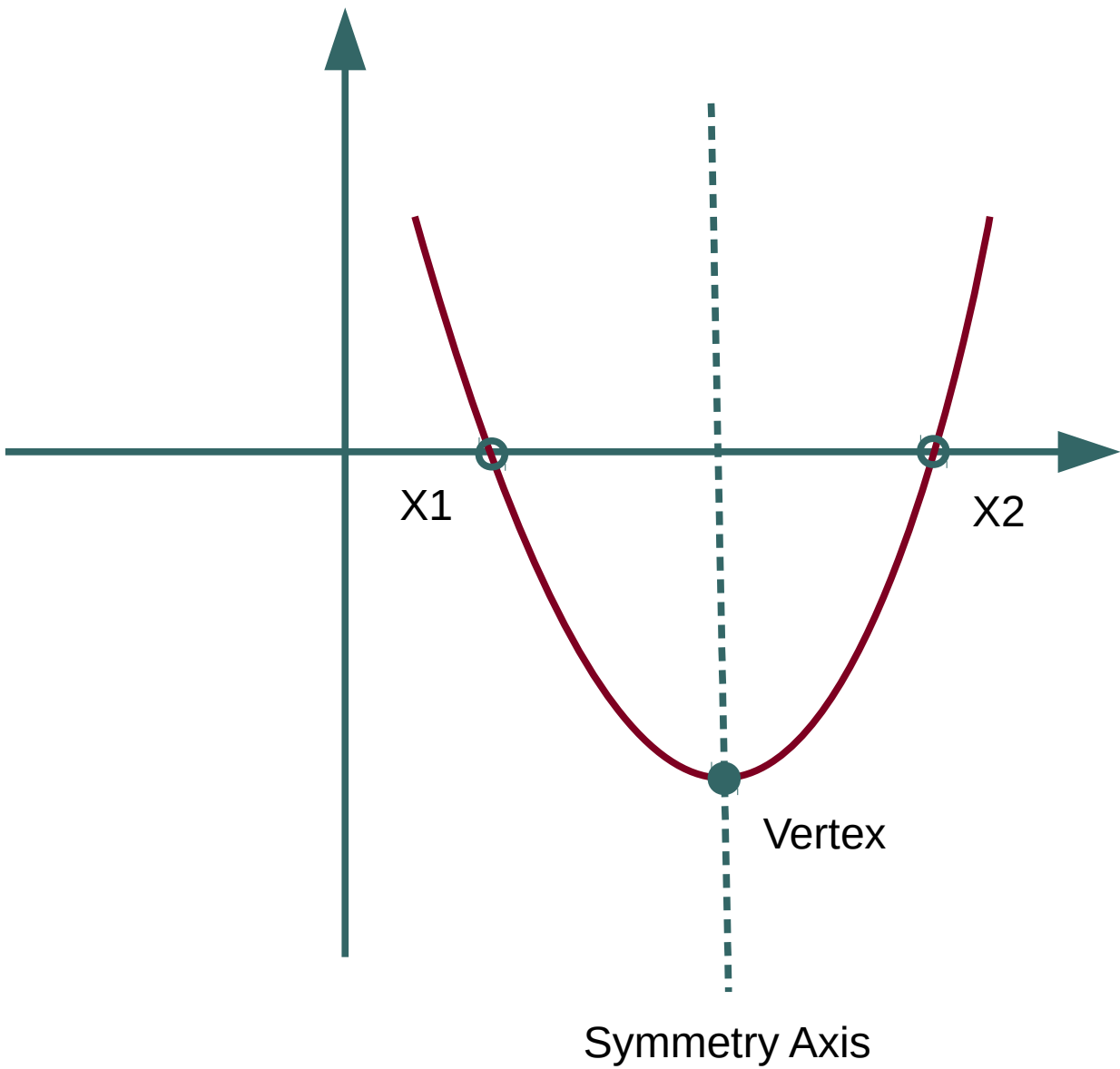
$$y = f(x) = a\,x^2 + b\,x + c = 0$$

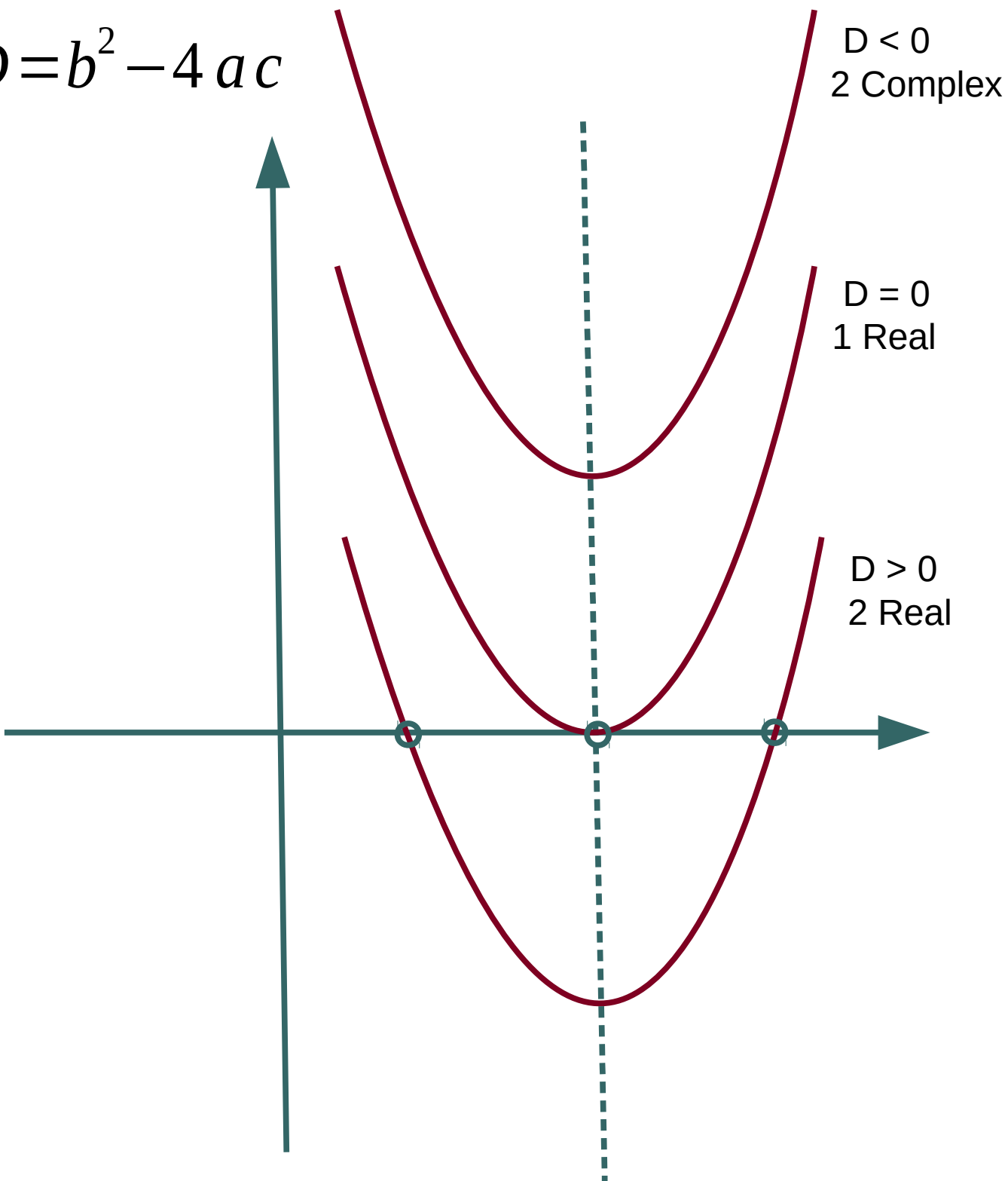Figure 1: Basic Parabola Features

$$D = b^2 - 4ac$$

D < 0
2 Complex

D = 0
1 Real

D > 0
2 Real

Figure 2 : Discriminant Role in Solutions

BACKGROUND INFORMATION

Test Taker's Name:	HARRIS, CHRISTOPHER J	Candidate ID Number:	10520493
Social Security Number: (Last 4 Digits)	5549	Sex: M	Date of Birth: 07/11/1961

EDUCATIONAL INFORMATION

College Where Relevant Training Was Received: **TEXAS A&M UNIV COLLEGE STATION**

Undergraduate Major: **ENGINEERING**

Graduate Major: **CHEMISTRY**

Educational Level: **EARNED MASTER'S DEGREE**

GPA: **3.0 - 3.49**

SCORE RECIPIENT(S) REQUESTED

Code #	Recipient Name	Code #	Recipient Name
R7065	DELAWARE DEPT OF EDUCATION	R7403	MARYLAND DEPT OF EDUCATION
R7666	NEW JERSEY DEPT OF EDUCATION	R8425	VIRGINIA STATE DEPT EDUCATION
R8033(A)	PENNSYLVANIA DEPT OF EDUCATION		

CURRENT TEST DATE: 06/06/2017

Test Code	Test Name	Your Score	Possible Score Range	Average Performance Range**	R7065	R7403	R7666	R8425	R8033
5712	CORE ACAD SKILLS FOR EDUC: READING	196	100-200	160-184	Y	Y	Y	Y	Y
5732	CORE ACAD SKILLS FOR EDUC: MATH	200	100-200	140-168	Y	Y	Y	Y	Y

Score Recipient Code(s) from Current Administration

HIGHEST SCORE AS OF: 06/09/2017

Score Recipient Code(s)

Test Date	Test Code	Test Name	Your Highest Score	Possible Score Range	R7065	R7403	R7666	R8425	R8033
03/14/2015	5051	TECHNOLOGY EDUCATION	191	100-200	Y	Y	Y	Y	Y
06/06/2017	5712	CORE ACAD SKILLS FOR EDUC: READING	196	100-200	Y	Y	Y	Y	Y
06/06/2017	5732	CORE ACAD SKILLS FOR EDUC: MATH	200	100-200	Y	Y	Y	Y	Y

ETS will retain your score for ten years for reporting purposes.

** For more details on Average Performance Range refer to footnote on last page of this score report.

Message Codes: A = SCORE AUTOMATICALLY REPORTED TO STATE LICENSING AGENCY.

Y = SCORE REPORTED TO RECIPIENT LISTED.

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