

LESSON School and Education

In this lesson, you will read three texts about mathematics and learning. Then, you will answer questions and complete a task to show your understanding of the texts.

TEXT 1 The Invention of Algebra*Paragraph 1*

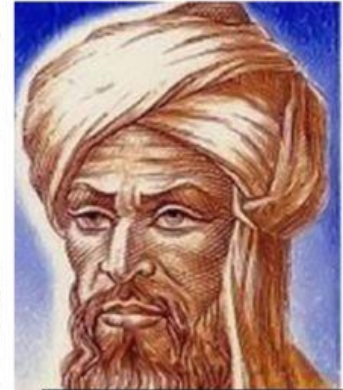
Did you know that the word '**algebra**' comes from the Arabic language? Its original meaning was to complete, or to bring broken parts together. This is because the man who many call the inventor of modern algebra spoke Arabic. His name was Muhammad ibn Musa al-Khwarizmi. He lived many hundreds of years ago, between the years 750 and 850, and studied and worked in Baghdad at a place called the House of Wisdom.

Paragraph 2

Although a Greek mathematician, Diophantus, was the first to work with **basic** algebraic principles, Muhammad ibn Musa al-Khwarizmi developed important **concepts** that define modern algebra. His book, *The Compendious Book on Calculation by Completion and Balancing*, was the first to explain ways to solve for positive roots of first and second degree **polynomial equations**. He also created a new algebraic method, called reduction.

Paragraph 3

Muhammad ibn Musa al-Khwarizmi wrote out equations using words, rather than **symbols** and numbers, and wrote detailed descriptions of solutions to the problems that he put forth. His work allowed other mathematicians to develop algebra further. Abu Kamil Shu'ba used Muhammad ibn Musa al-Khwarizmi's ideas to help him write a book about algebra that included **geometrical** proofs and illustrations. Muhammad ibn Musa al-Khwarizmi's work also provided the mathematicians Abu al-Jud and Omar Khayyam with a starting point to develop several solutions of the cubic equation.



A drawing of Muhammad ibn Musa al-Khwarizmi

VOCABULARY

algebra: a type of math

basic: simple

concepts: ideas

polynomial: using many numbers

equation: used to express to mathematical phrases that are equal

symbol: a sign used to represent a number or word

geometrical: related to geometry

Instructions: Use the information in **TEXT 1** to answer the questions below. Read the questions, and choose the correct answer, **A**, **B**, or **C**.

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|----------|--|
| 1 | Which choice is the best title for Paragraph 1?
A An Arab Mathematician
B Developments in Algebra
C Contributions from Other Mathematicians |
| 2 | Which sentence best describes the differences between Paragraphs 2 and 3?
A Paragraph 2 is focused on Muhammad ibn Musa al-Khwarizmi's early work, while Paragraph 3 describes his accomplishments later in life.
B Paragraph 3 includes more detailed information about Muhammad ibn Musa al-Khwarizmi's contributions to modern Algebra than Paragraph 2 does.
C Paragraph 2's main purpose is to outline how Muhammad ibn Musa al-Khwarizmi developed algebraic ideas and Paragraph 3 explains how others built on his ideas. |

TEXT 2 A Bad Result

"I have some bad news, Dad," Fatima said nervously, holding a paper behind her back.

"Well, Fatima, what is it?" her dad answered, **gesturing** for Fatima to enter his office.

Fatima lowered her eyes and approached her father's desk **reluctantly**. "I am afraid I got a bad mark on my last maths exam," she said nervously, placing the paper on the desk.

"I see," her father said, picking up the paper and **inspecting** it quietly. "Sit down, for a moment, Fatima. Tell me why you are having a difficult time with maths, so that I can help you. Did you study for this exam?"

"I studied a little bit," Fatima answered, lowering herself into the chair in front of her father's desk. "But it was difficult for me. Maths is so boring! And I cannot see the point of it. I don't think I will ever need to use this subject in real life, when school is finished."

Fatima's father looked very stern, and Fatima sat quietly, worried that she had made him feel disappointed.

As the silence **stretched** between them, Fatima's dad began to smile. "That was a very silly thing to say, Fatima, but I am not disappointed in you," he said. "The truth is, I use the math skills I learned at school every day at work, in real life. How could I run a business without them? It is very important for me use those skills so that I can keep track of my **profits** and losses, **monitor** my company's **inventory**, and sign **contracts** with banks. Are you sure you will never need skills like those after you leave school?"

"I had not thought if it that way, Father," Fatima admitted, shrugging her shoulders.

"Well, let's think about it, together," her dad replied, opening his laptop. "Come and sit next to me, and we will research some ways that people use maths in real life."

"That sounds like a good idea," Fatima said. "I am sorry that I got a bad result on my maths exam, but I am happy that you are here to help me."

VOCABULARY

gesturing: using a movement to communicate

reluctantly: used to describe an action that a person does not want to take

inspecting: looking at something closely

stretched: became longer

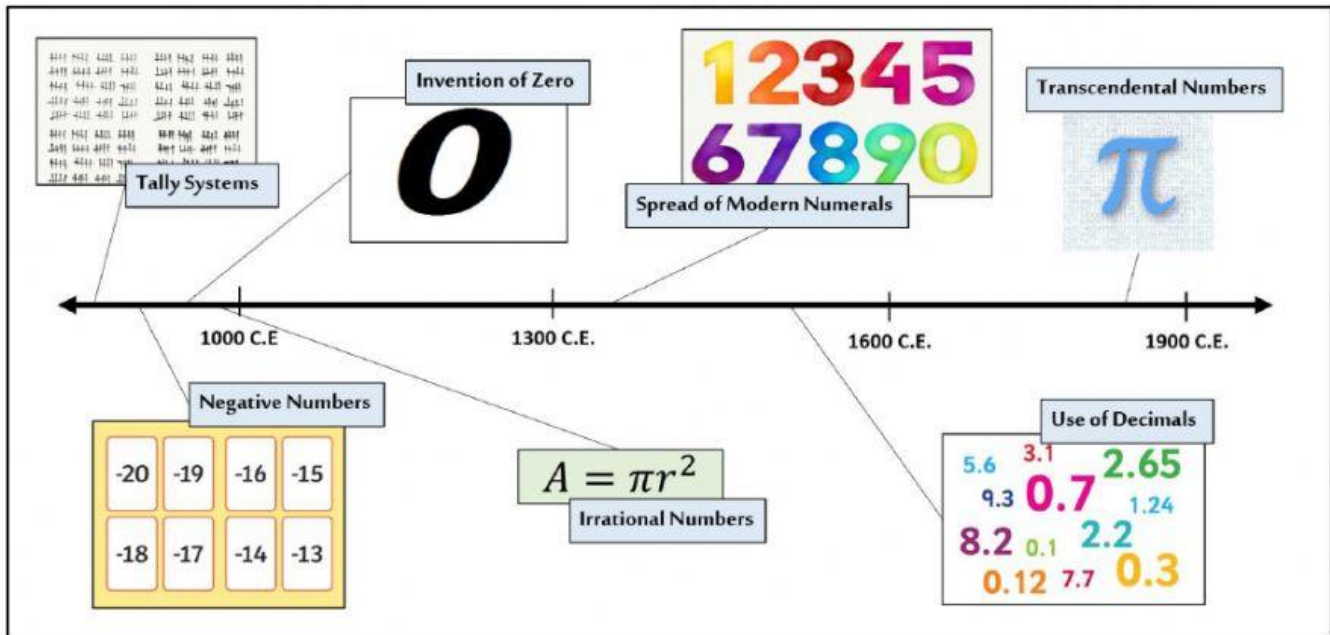
monitor: to keep track of something

inventory: a list of items

contracts: agreements

Instructions: Use the information in **TEXT 2** to answer the questions below. Read the questions, and choose the correct answer, **A**, **B**, or **C**.

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|----------|---|
| 3 | How does Fatima's dad react when she says that she does not think maths is a useful subject?
A He is disappointed in Fatima.
B He explains how he uses math skills.
C He tells Fatima that she needs to study more for exams. |
| 4 | What is the text's main purpose?
A to explain why it is important to prepare for exams
B to convince readers that maths is an interesting subject
C to tell a story about an interaction between two family members |

TEXT 3 The History of Numbers

Instructions: Use the information in **TEXT 3** to answer the question below. Read the question, and choose the correct answer, **A**, **B**, or **C**.

- 5 A student created this timeline for a school project. What step should they take to make the timeline more informative?
- A Remove the pictures.
 - B Add a description of each event.
 - C Explain their work to their teacher.

Instructions: Use the information in **TEXTS 1, 2** and **3** to answer the questions below. Read the questions, and choose the correct answer, **A**, **B**, or **C**.

- 6 Which text would be most useful to help a student write a report about the history of math?
- A Text 1
 - B Text 2
 - C Text 3
- 7 Which choice best supports your response to Question 6?
- A The story in Text 2 would not be a useful source when writing the report.
 - B The timeline in Text 3 has lots of information about topics that could be included in the report.
 - C There is not enough detail in the article in Text 1 to help write the report.

Instructions: Use the information in **TEXTS 1, 2** and **3** to complete the task below.

- 8 Texts 1, 2 and 3 are different. Text 1 is an article, Text 2 is a story and Text 3 is a timeline. Which of the three texts do you prefer? Think about your answer, and write down your ideas. Then, follow your teacher's instructions to discuss your ideas with a partner or in a group.