

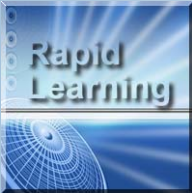
 **Rapid Learning Center**
Chemistry :: Biology :: Physics :: Math 

Rapid Learning Center Presents ...

Teach Yourself
DAT Test-Prep Math in 24 Hours




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 **Introduction to**
DAT Test-Prep Math

Rapid Learning Tutorial Series

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Learning Objectives

By completing this tutorial, you will learn:

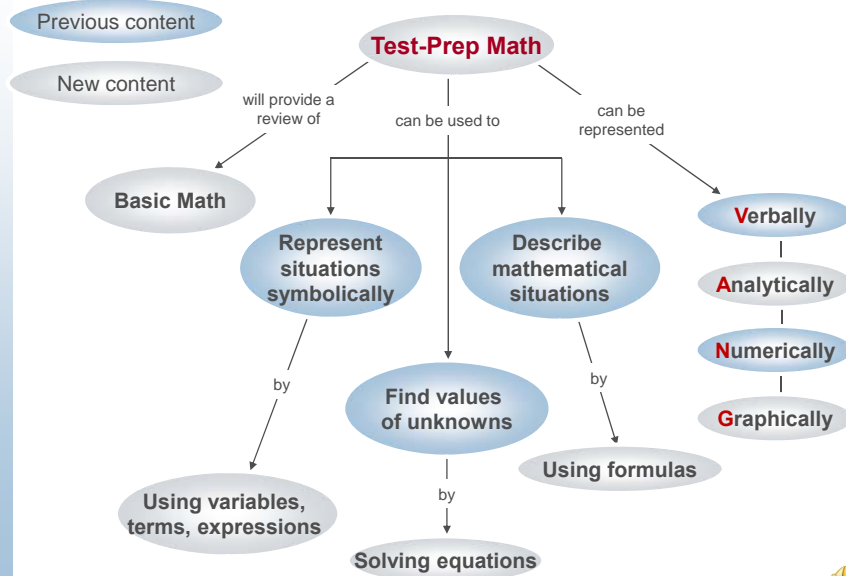


- Language of algebra
- Topics covered in this course
- How to study math
- How to prepare for a test
- Test-taking strategies

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Concept Map



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Foundation Math: Algebra



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Definition: Algebra

Algebra – a branch of mathematics in which symbols, usually letters of the alphabet, are used to represent numbers or quantities.



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Purpose of Algebra

The study of **Algebra** causes the brain to work like a muscle. The more that muscle works out, the better it performs on other types of tasks, such as critical thinking and problem solving.



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Connections to Algebra


Algebra is used in a variety of fields such as:

- Medicine
- Economics
- Art
- Music
- Technology





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The Language of Algebra

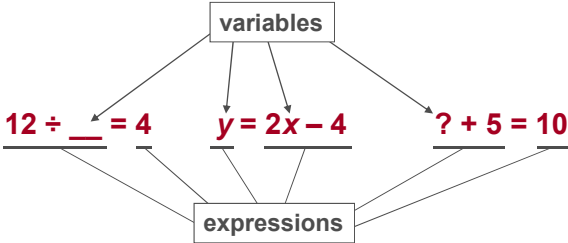


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Definitions: Variable and Algebraic Expression


Variable – a symbol that is used to represent a quantity.



```

graph TD
    V[variables] --> E1["12 ÷ ___ = 4"]
    V --> E2["y = 2x - 4"]
    V --> E3["? + 5 = 10"]
    E1 --> EXP[expressions]
    E2 --> EXP
    E3 --> EXP
    
```

Algebraic expression – a quantity that combines variables, numbers, and operation symbols.

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Evaluating Algebraic Expressions

To **evaluate** an algebraic expression, substitute a given number for each variable and find the value of the resulting numerical expression.



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Example: Evaluating Algebraic Expressions

Evaluate the expression for the given value of the variable:

$$2d - 7 \text{ for } d = 5$$

Solution:

$$\begin{aligned} 2d - 7 &= 2(5) - 7 \\ &= 10 - 7 \\ &= 3 \end{aligned}$$

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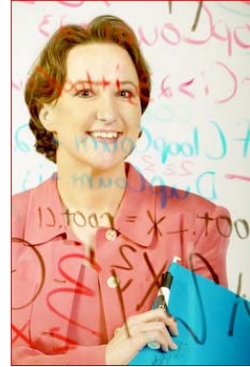
Definitions: Term and Like Terms

Term – a variable, number, or the product of a number and a variable.

Examples: $2x$, 5 , or 15

Like terms – two or more terms that have the same variable raised to the same power.

Example: $3m^2$ and $8m^2$ are like terms.



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Combining Like Terms

Combining Like Terms

To combine like terms, add the coefficients and keep the same variable and power.

Example: Combine like terms.

$$9k + 2j - 3k + 5j = 9k + 2j - 3k + 5j$$

$$= 6k + 7j$$

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Simplifying Algebraic Expressions

To **simplify** an algebraic expression, perform all possible operations and combine like terms.



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Example: Simplifying Algebraic Expressions

Simplify the expression:

$$2(3b + 2f) + 9f$$

Solution:

$$\begin{aligned} 2(3b + 2f) + 9f &= 6b + 4f + 9f \\ &= 6b + 13f \end{aligned}$$

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Definition: VANG

VANG – an acronym used to remember the four ways an algebraic relationship can be expressed.

Verbal
Analytical
Numerical
Graphical



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VANG – Verbal

Algebraic relationships can be described with **words**.

Example: When a car is filled with gas, the total cost is the number of gallons that are purchased times the price per gallon.

$$\text{Total Cost} = \text{Gallons} \times \text{Price per Gallon}$$



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VANG – Analytical (or Algebraic)

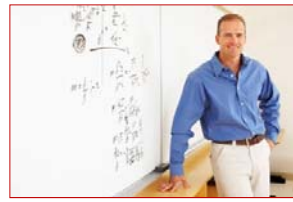
Algebraic relationships can be described using **symbols**.

Example:

Total Cost = Gallons × Price per Gallon

Use variables to represent each quantity,

$$c = g \cdot p$$



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VANG – Numerical

Algebraic relationships can be described **with numbers**, often displayed in a table.

Example: If gas is \$3 per gallon, the total cost depends on the number of gallons.

Number of Gallons	Total Cost
1	3
2	6
3	9
5	15
10	30
40	120
g	$3g$

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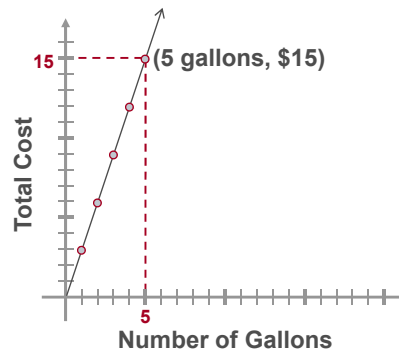




VANG – Graphical

Algebraic relationships can be represented with **graphs**.

Example: If gas is \$3 per gallon, the total cost depends on the number of gallons.



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Topical Overview



This is a brief overview on the required math topics. The in-depth chapter-by-chapter contents will be followed in the tutorials later.

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Math Topics

Math topics covered in this course include:

- Arithmetic Operations and Whole Numbers
- Real Numbers
- Fractions, Proportion and Percent
- One-Variable Equations & Inequalities
- Linear Equations
- Polynomials
- Probability and Statistics
- Geometry
- Applied Math and Problem Solving

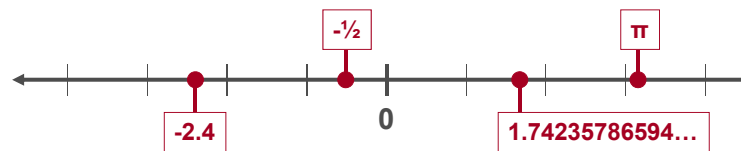


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Real Numbers

Real number – any number that can be represented with a point on the real number line.



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Equations

Equation – a mathematical statement in which two or more expressions are set equal to each another.

Solution of an Equation – the value that makes an equation true when the variable is replaced by the value.

Example:

$$\underline{x + 5 = 13} \rightarrow \text{is true when } \underline{x = 8} \rightarrow (8) + 5 = 13$$

equation

solution

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Inequalities

Inequality – a mathematical statement comparing two or more expressions using $<$, $>$, \leq , and \geq .

Example:

$$2x + 7 > 13$$

$$2x > 6$$

$$x > 3$$

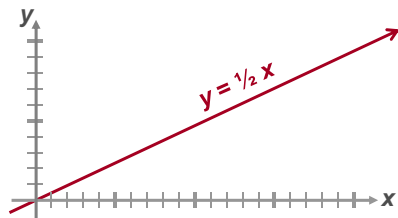
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Linear Equations

Linear equation – an equation that represents a line.



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Polynomials

Polynomial – an expression made up of terms containing variables with whole number exponents.

Examples:

$$2x + 5 \quad 3x^2 + 27 \quad 17 + n + m + p$$



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Probability

Probability – a number from 0 to 1 that tells how likely an event is to occur.

When $P(\text{event}) = 0$, the event is **impossible**.

When $P(\text{event}) = 1$, the event is **certain**.



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Geometry

Area – the amount of space inside a two-dimensional shape.




Volume – the amount of space enclosed in a solid object.




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How to Study Math



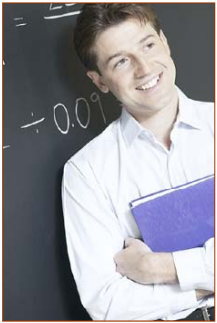
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Learning Algebra

Algebra is the foundation of math, learn it well.

- Approach algebraic situations verbally, analytically, numerically and graphically (VANG).
- Strive to understand the meaning of variables and basic mathematical principles.
- Focus on variables and other key features of basic functions.



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Connecting Topics

- Connect new topics to things you already know. Use concept maps to visualize connections.
- Apply these connections to problem solving.



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Ask Questions

If you have trouble understanding the material, **ask questions**.



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Study With a Group

Partner with someone who is taking the same test and study together. Also, form a study group to help and motivate each another.



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Focus on the Concepts

Everything may not make sense all at once. Focusing on the **concepts** and how the **procedures** fit into the **big picture** will help you succeed in math.



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Practice - Practice - Practice

- Practice solving problems, including the multi-step problems.
- Be persistent until you get it.
- Resist the temptation to look at the solution guide for answers.



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Test Preparation Strategies



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➤ Test Preparation Overview

Follow this four-step process to successfully prepare for the math section of the test:

```

    graph TD
      A[Manage Time] --> B[Understand Concepts]
      B --> C[Do Practice Problems]
      C --> D[Review Efficiently]
      D --> A
    
```


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➤ Time Management – Study & Focus

Study only the topics that will be on the test. The test does not contain every single math concept.

Focus core study hours on weak areas.

It is a waste of time to continue to study all of the topics concurrently.



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Forward Planning

Plan ahead: Set a study schedule



1. Set aside a couple of hours every day to study.
2. Do NOT put off your study schedule.
3. You need to practice **EVERY DAY** in the coming weeks and months.

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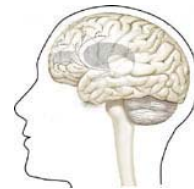


Long Term Study Goals

Some students incorrectly believe that if they study more as the test date approaches, they will remember more.

Building long term memory by studying in set doses ahead of time increases memory and understanding of concepts.

Trying to cram too much information will make you nervous the night before the exam, which can negatively affect your score.



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Seek Answers to Questions

Get your questions resolved!

Scan your study materials, search online yourself or email someone who can answer your question.

Though tedious, these unanswered questions will show up again and probably on your test.



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Study with Practice Problems

Practice problems can solidify conceptual understanding.

- **Grab a math textbook:** Solve the chapter review questions and chapter test problems then check your solutions in the manual.
- **Search online:** There are countless practice problems online, including full-length practice exams.
- **Make your own mock exam:** Come up with the top five concepts; there's a good chance they will show up on the actual exam!

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Study Aides

Use the following aides to help you study:

- **Cheat sheet** - A cheat sheet is a summary of what you learned. It should include key terms and concepts.
- **Flash cards** - Flash cards are index cards with a question on one side and the answer on the other side. Test yourself by using the flash cards. Be brief, do not write in detail, **DO NOT BUY** pre-made flash cards!



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DAT Test Taking Strategies



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Test Taking Tips

Follow these steps during the test:

- Know the basic layout of the test before you take the test.
- Plan your attack the minute the test begins.
- Use focusing techniques to improve your score.
- Apply techniques to eliminate incorrect answers.
- If you don't know the answer, make an educated guess.



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Test Day Tips

To prepare for test day:

- Arrive early and prepared.
- Double check the time and location of the test.
- Have a backup alarm clock just in case.
- Arrive at least 15 minutes early for the test.



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Items to Bring to the Test

Remember to bring photo identification and a watch to the testing site.

Do not bring any other personal items. Leave your headphones and other gadgets at home.



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Know the Test Format

By the time you take the exam, you should:

- Memorize the instructions.
- Memorize how the test proceeds.
- Know the number of questions in each section and the time allotted for each section.
- Know what types of questions are in each section.



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Plan Your Attack

Take 30 seconds to go through the questions at the beginning of a section.

Pace yourself on your watch, after making a mental note of the half-way point and when you should be there.

Set a time limit for each question.

Divide the total time allowed by the number of test questions to estimate the time limit per question. A good limit is about 1 or 2 minutes to answer each question.



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Tips for Multiple Choice Questions

- **Read First:** Come up with an answer before scanning so you are less likely to be trapped by wrong choices.
- **Beware of the Familiar:** Some answer choices seem to be the obvious correct answer. This tempts students to choose the wrong answer because it seems correct at first glance.
- **Watch out for Absolutes:** Notice words like *always, never, none, all, every, or nothing*. Such answers are usually wrong because it only takes one exception to make the statement false.
- **Pay Attention Similar Answers:** If two answer choices are very similar in wording then the answer is probably neither of them. If two answer choices are opposites, one of them is probably correct, because the exam requires you to differentiate between two core ideas.



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Example: Eliminating Choices – 1

What happens to the period of a simple pendulum if the mass of the bob is doubled?

- ~~A. Period of the pendulum is doubled.~~
- B. Period of the pendulum is inversely proportional to the mass of the bob.
- C. Period of the pendulum increases, but does not double.
- D. Period is independent of the mass.
- E. Period of the pendulum is tripled.

In this problem, choice A is the trap because most students intuitively assume that as the mass is doubled, so is the period.

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Example: Eliminating Choices – 2

What happens to the period of a simple pendulum if the mass of the bob is doubled?

- ~~A. Period of the pendulum is doubled.~~
- B. Period of the pendulum is inversely proportional to the mass of the bob.
- C. Period of the pendulum, increases, but not does not double.
- D. Period is independent of the mass.
- ~~E. Period of the pendulum is tripled.~~

Choice E is similar to choice A and is not correct.

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Example: Eliminating Choices – 3

What happens to the period of a simple pendulum if the mass of the bob is doubled?

- ~~A. Period of the pendulum is doubled.~~
- ~~B. Period of the pendulum is inversely proportional to the mass of the bob.~~
- C. Period of the pendulum, increases, but not does not double
- D. Period is independent of the mass.
- ~~E. Period of the pendulum is tripled.~~

On observation, we see that choice B is an absolute statement which makes an assumption.

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Example: Eliminating Choices – 4

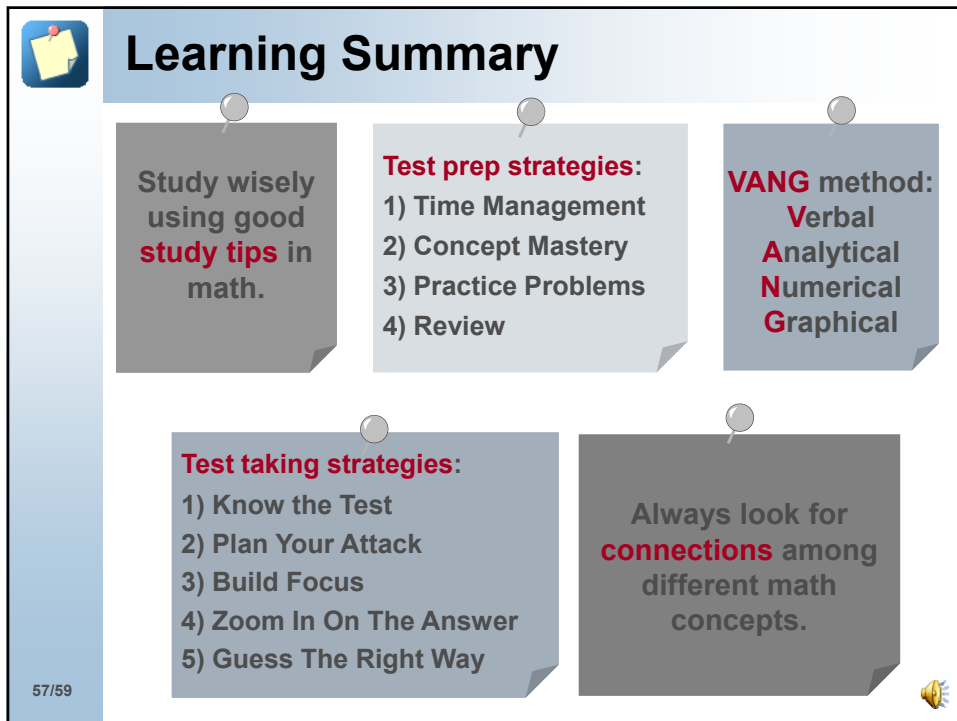
What happens to the period of a simple pendulum if the mass of the bob is doubled?

- ~~A. Period of the pendulum is doubled.~~
- ~~B. Period of the pendulum is inversely proportional to the mass of the bob.~~
- C. Period of the pendulum, increases, but not does not double
- D. Period is independent of the mass.**
- ~~E. Period of the pendulum is tripled.~~

This leaves only choice C and choice D. The correct answer choice is D, as the period of the simple pendulum is independent of the mass.

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Learning Summary

Study wisely using good **study tips** in math.

Test prep strategies:

- 1) Time Management
- 2) Concept Mastery
- 3) Practice Problems
- 4) Review

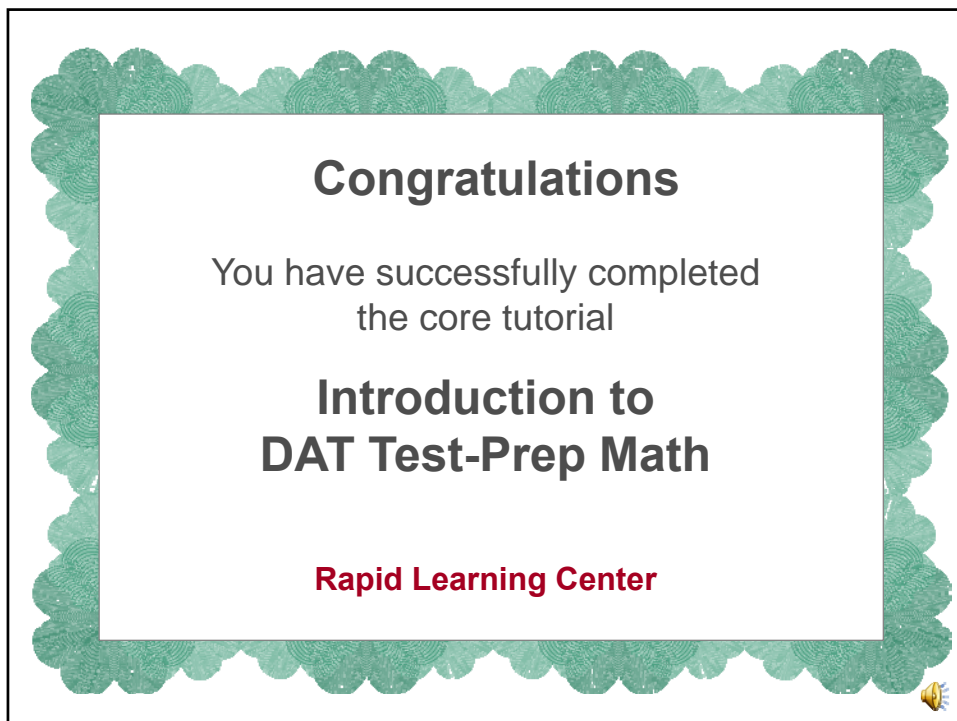
VANG method:
Verbal
Analytical
Numerical
Graphical

Test taking strategies:

- 1) Know the Test
- 2) Plan Your Attack
- 3) Build Focus
- 4) Zoom In On The Answer
- 5) Guess The Right Way

Always look for **connections** among different math concepts.

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Congratulations

You have successfully completed
the core tutorial

**Introduction to
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What's Next ...

Step 1: Concepts – Core Tutorial (Just Completed)

→ Step 2: Practice – Interactive Problem Drill

Step 3: Recap – Super Review Cheat Sheet

Go for it!



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