

如何系统、科学地提高数学的 英文阅读理解能力

3 个阶段(组成成分):

1. 词汇量 (Words)

2. 句子(Sentences) “这个句子的每个单词我都懂，但是不能确定整个句子的意思。”

3. 段落/文献/教材/专题(passages/articles), 数学不只是做题和打比赛。用英文撰写数学论文 (mathematical papers)。

第一阶段: (词汇量, Words)

- 1. Numbers**
- 2. Operations**
- 3. Geometry**
 - a. Triangles**
 - b. Quadrilaterals**
 - c. Circles**
 - d. Solid Geometry**
 - e. ...**
- 4. Number Theory**
- 5. Combinatorics**
- 6. Algebra**
- 7. ...**

Numbers

数: 个十百千万...

One, two, three, ..., ten, dozen, hundred, thousand, million, billion, trillion

tenth, hundredth (one percent), thousandth,

1234: one thousand two hundred thirty-four

twelve hundred thirty-four

twelve thirty-four

2022:

万: ten thousand

十万: hundred thousand

百万: million

千万: ten million

亿: hundred million

A thousand: 1,000

A million: 1,000,000

A billion: 1,000,000,000

A googol: a “1” followed by one hundred zeros.

A googolplex: a “1” followed by a googol of zeros.

A googolplexian: a “1” followed by a googolplex of zeros.

Operations

运算: 加减乘除乘方开方对数

Arithmetic operations

Addition (+)

$$\left. \begin{array}{l} \text{term} + \text{term} \\ \text{summand} + \text{summand} \\ \text{addend (broad sense)} + \text{addend (broad sense)} \\ \text{augend} + \text{addend (strict sense)} \end{array} \right\} = \text{sum}$$

Subtraction (-)

$$\left. \begin{array}{l} \text{term} - \text{term} \\ \text{minuend} - \text{subtrahend} \end{array} \right\} = \text{difference}$$

Multiplication (×)

$$\left. \begin{array}{l} \text{factor} \times \text{factor} \\ \text{multiplier} \times \text{multiplicand} \end{array} \right\} = \text{product}$$

Division (÷)

$$\left. \begin{array}{l} \frac{\text{dividend}}{\text{divisor}} \\ \frac{\text{numerator}}{\text{denominator}} \end{array} \right\} = \begin{array}{l} \text{fraction} \\ \text{quotient} \\ \text{ratio} \end{array}$$

Exponentiation

$$\text{base}^{\text{exponent}} = \text{power}$$

n th root ($\sqrt[n]{}$)

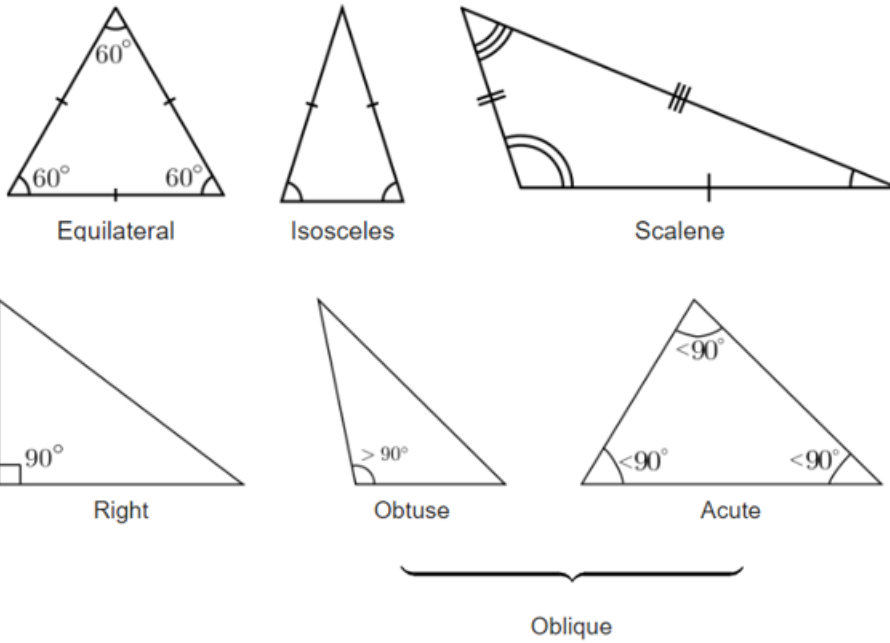
$$\text{degree} \sqrt{\text{radicand}} = \text{root}$$

Logarithm (log)

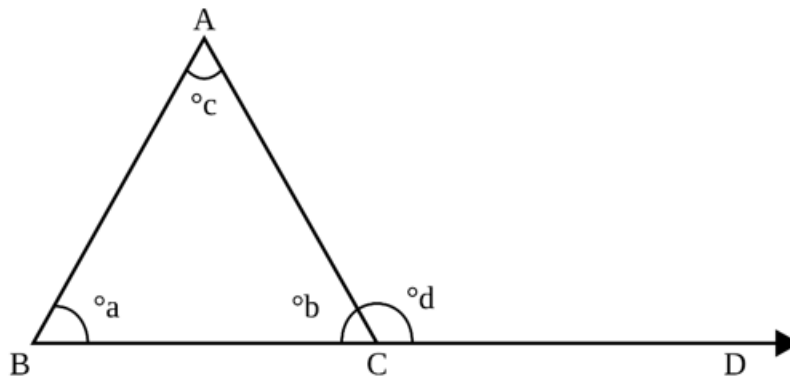
$$\log_{\text{base}}(\text{anti-logarithm}) = \text{logarithm}$$

Geometry

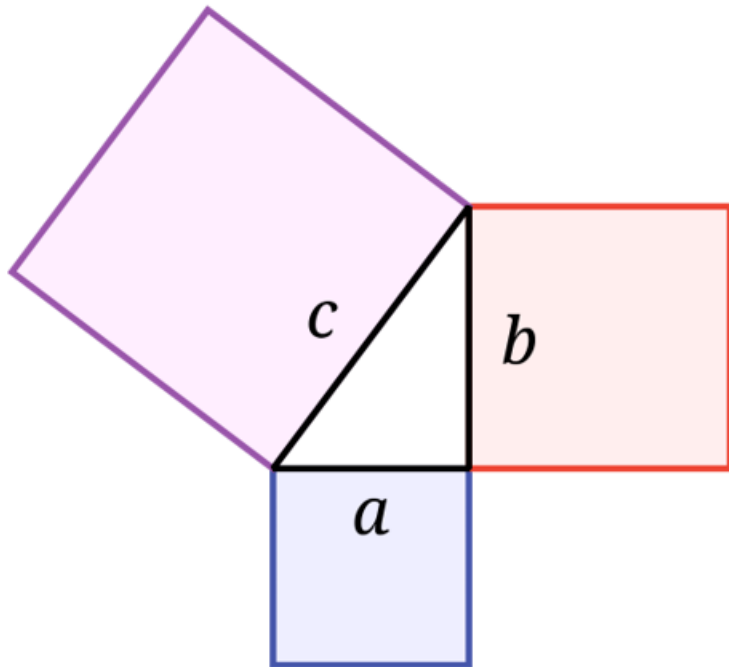
Triangles



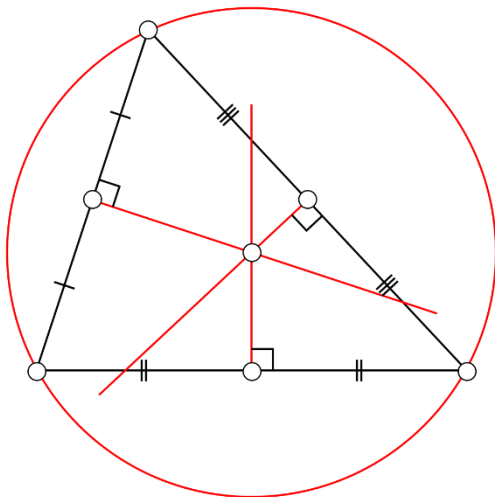
Edges, vertices (vertex), angles



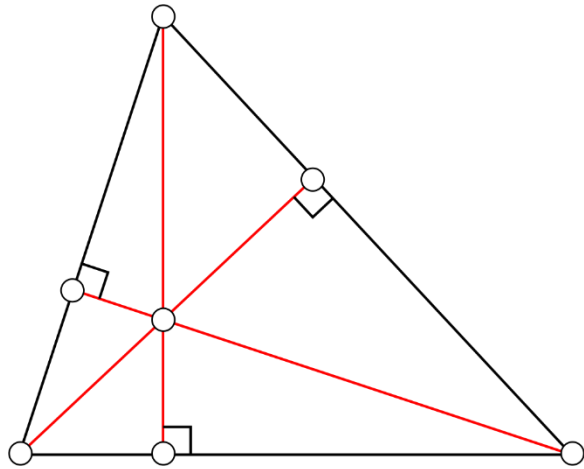
Interior angles, exterior angles,



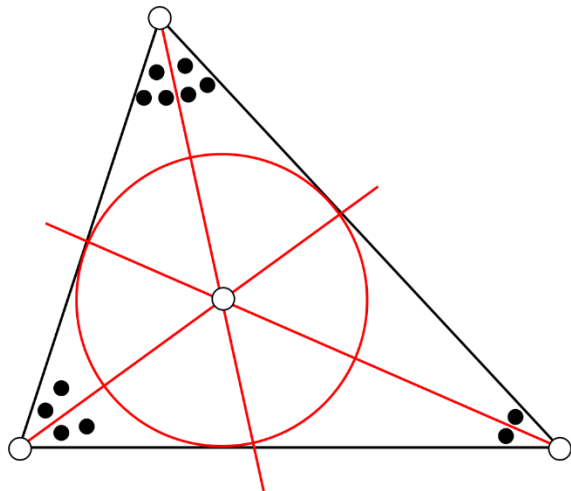
Hypotenuse, legs, the Pythagorean theorem



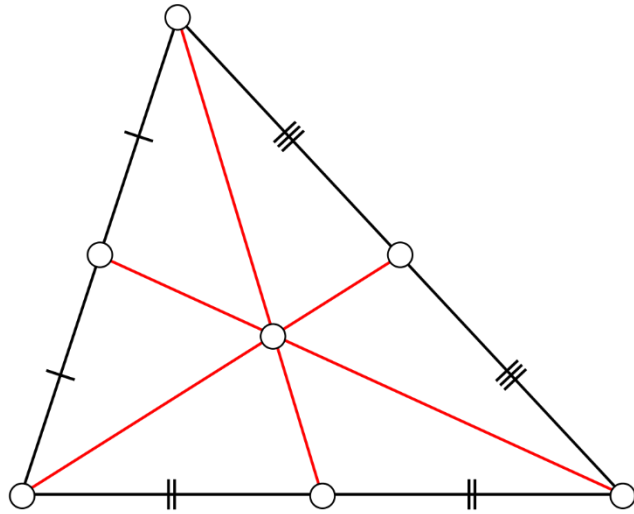
Perpendicular bisector, midpoint, circumcenter, circumcircle



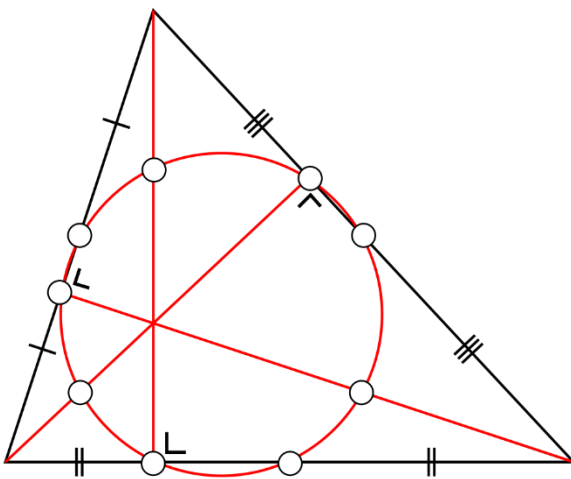
Altitude, base, foot, orthocenter



Angle bisector, incenter, incircle, inradius



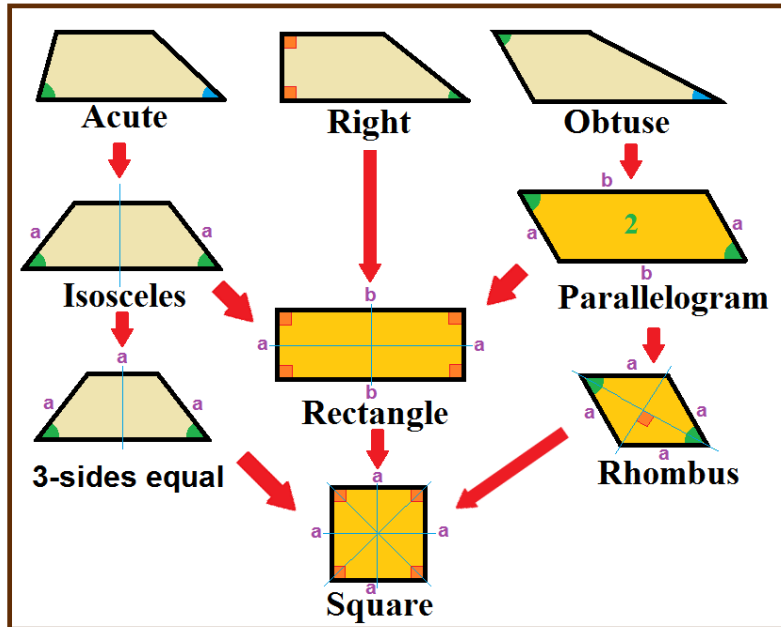
Median, centroid, center of mass,



Nine-point circle

Polygon: triangle, quadrilateral, pentagon, hexagon, heptagon, octagon,

Trapezoids



Circles:

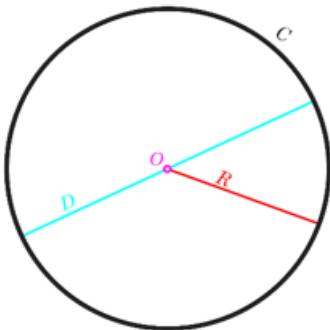


Figure: A circle (black), which is measured by its circumference (C), diameter (D) in cyan, and radius (R) in red; its center (O) is in magenta.

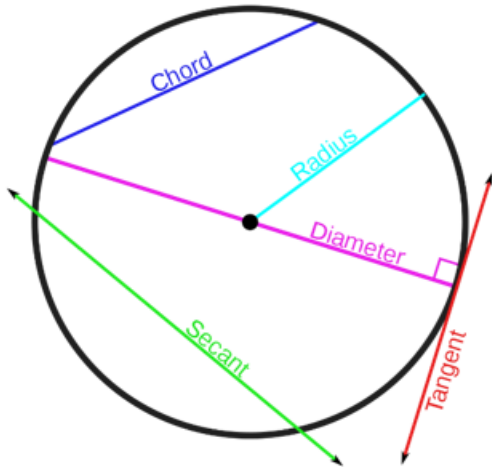


Figure: Chord, secant, tangent, radius, and diameter

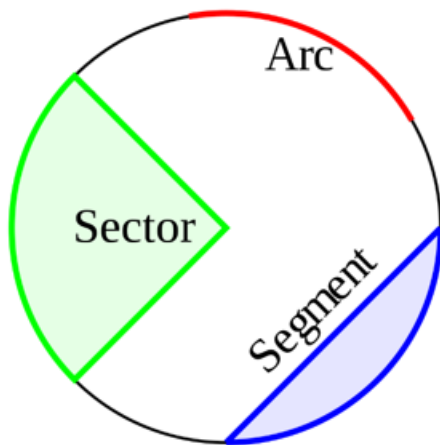


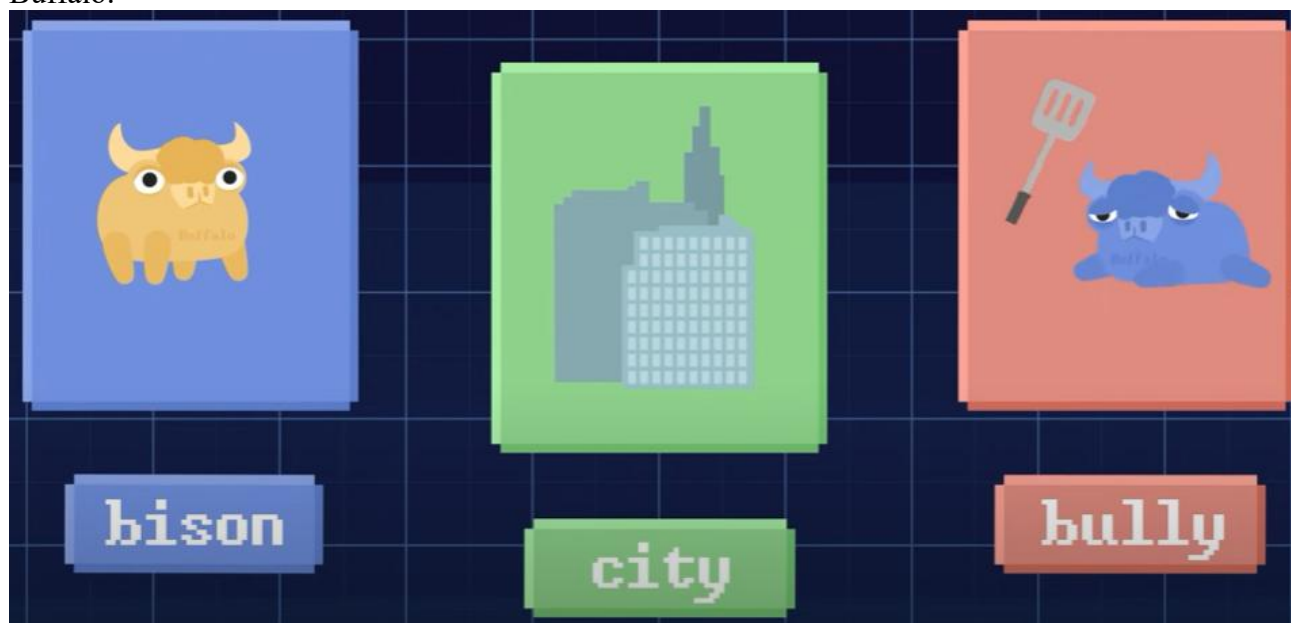
Figure: Arc, sector, and segment

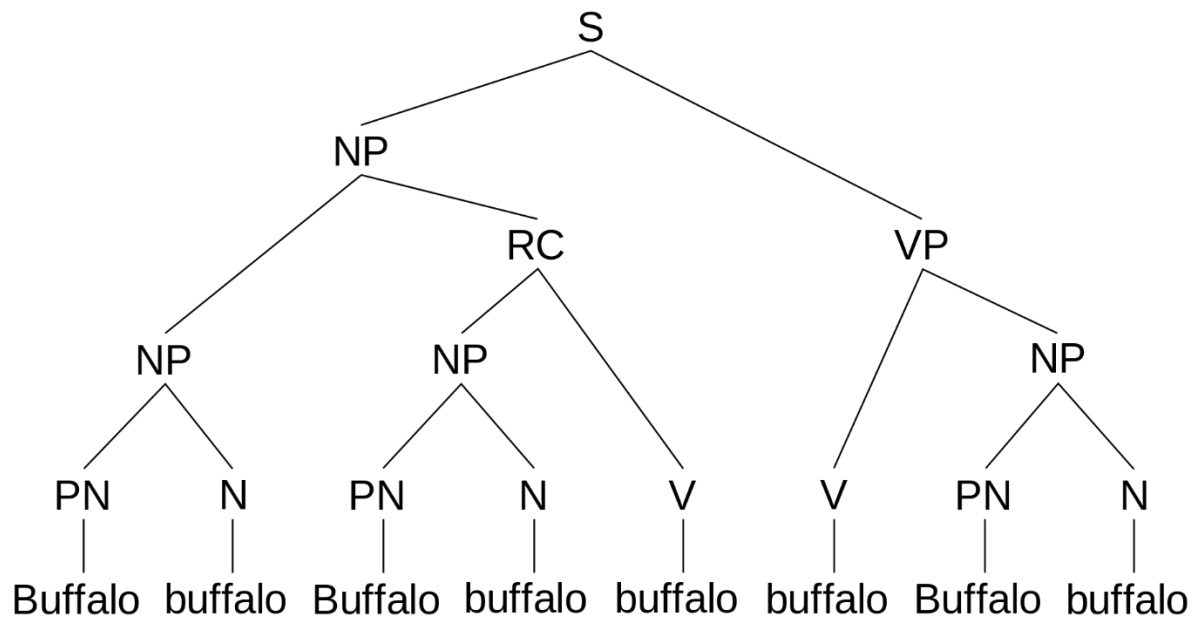
第二阶段: 句子(Sentences)

“这个句子的每个单词我都懂，但是不能确定整个句子的意思。”

Buffalo buffalo Buffalo buffalo buffalo buffalo Buffalo buffalo.

Buffalo:





Simplified parse tree

S = sentence

NP = noun phrase

RC = relative clause

VP = verb phrase

PN = proper noun

N = noun

V = verb

1.

A is 5 times faster than B. – A 比 B 快 5 倍。 - 为什么这样说是歧义的?

A is 5 times as fast as B. – A 是 B 的 5 倍。

2. 以下 3 个问题的精确翻译是什么?

a. A farmer was asked how many pigs he had. "Well," he said, "if I had just as many more again, plus half as many more, plus another 1.5 times more, I would have three dozen." How many pigs did he have?

b. The 2nd act of a 3-act play is $\frac{1}{3}$ the length of the entire play. If the 1st act is twice as long as the 3rd, what fraction of the play is the 3rd act?

c.

(Time Limit: 7 minutes) What is the greatest possible length of the shortest altitude of a right triangle whose hypotenuse has length 17?

3. ratio (比和比例) and percentage (百分数、百分比). 以下列出了 5 个中国学生比较难以理解、或者容易混淆和出错的例子:

d. 21 of 2% fat milk + 31 of 3% fat milk = 51 of 2% fat milk.

e. Lee the crow ate a grams of feed that was 1% seed, b grams of feed that was 2% seed, and c grams of feed that was 3% seed. If combined, all the feed he ate was 1.5% seed. What is a in terms of b and c ?

f. If a bank were to raise the interest rate on a savings account from 3% to 4%, the statement that "the interest rate was increased by 1%" is ambiguous and should be avoided. The absolute change in this situation is 1 percentage point ($4\% - 3\%$), but the relative change in the interest rate is:

$$(4\% - 3\%) \div 3\% = 0.33... = 33 \frac{1}{3}\%$$

So, one should say either that the interest rate was increased by 1 *percentage point*, or that the interest rate was increased by $33 \frac{1}{3}\%$.

g. Percent changes applied sequentially do not add up in the usual way. For example, if the 10% *increase* in price considered earlier (on the \$200 item, raising its price to \$220) is followed by a 10% *decrease* in the price (a decrease of \$22), the final price

will be \$198, not the original price of \$200. The reason for the apparent discrepancy is that the two percent changes (+10% and -10%) are measured relative to different quantities (\$200 and \$220, respectively), and thus do not "cancel out".

h.

A shopkeeper makes a profit of 20% of the selling price of an article. The percent profit the shopkeeper makes on the cost is

- A) 20% B) 25% C) 40% D) 80%

段落/文献/教材/专题(passages/articles), 数学不只是做题和打比赛。用英文撰写数学论文 (mathematical papers)。

如果你想了解美国 Math League 组委会 Rainier 博士开设的
“如何系统、科学地提高数学的英文阅读理解能力”的课程，
请微信联系 Rainier 博士。谢谢！祝顺利！



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