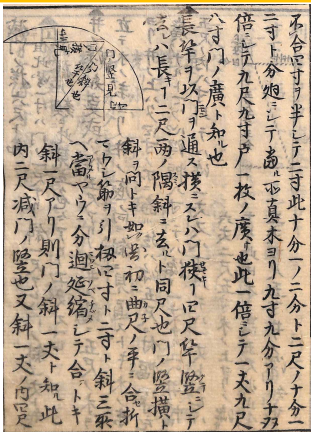# 竜ヶ崎第一高等学校　白幡探究Ⅰ数学領域
三平方の定理を用いた門と竿の長さの測定法　1年　C組　癸班

Measurement of the length of the gate and rod using the Pythagorean theorem

The original

キーワード：三平方の定理
竿の長さ
Keyword: Pythagorean theorem
The length of the rod

Mathematical content

門に対して縦にしても横にしても入らない、竿の長さを調べたい。
棒の長さをX尺とすると
BCに入れようとすると門から4尺はみ出し、BEに入れようとすると門から2尺はみ出す。
BDに入れようとするとぴったりになる。
これらを式で表すと、
△ABDで三平方の定理より
$(X-2)^2+(X-4)^2=X^2$
$X^2-4X+4+X^2-8X+16=X^2$
$X^2-12X+20=0$
$(X-2)(X-10)=0$

$$X=2、10$$

X－4＞0すなわちX＞4よりX=10
1尺は30.3cmより10尺は303cm
よって棒の長さは303cm
よってBCの長さは303－121.2(cm)より181.8cm
　　　AB　``　　303－60.6(cm)より242.4cm

係：半田・水戸部

Modern translation

長竿を持って門に通す。竿を横にすると門は狭く、四尺はみ出る。竿を縦にすると二尺はみ出る。また、竿を斜めにすると門の対角線と同じ長さになる。

門の縦、横、斜辺の長さを示したのが図である。

初めに、曲尺を用い四寸と二寸の長さに線を引く。

そして、四寸と二寸と斜辺の三カ所に当たるようにコンパスを縮める。

そのとき、斜辺の長さは一尺ある。

つまり、図の門の斜辺は一尺と分かる。

このうち竿の長さから二尺引くと門の縦の長さになる。

また、門の斜辺の一尺のうち、竿の長さから四尺引くと門の横となり、六尺と分かる。

つまり、斜辺が一尺だったら門の一尺と分かる。

このように色々工夫すべきである。

係：山本・吉田

English translation

You passed through the gate with a rod.
When you next to the rod, gate protrude 4 [shaku]
When you vertical rod, and 2 [shaku] protrude.
In addition, when the rod diagonally, it is the same size as the diagonal of the gate.
Showed a vertical length of the gate, next to, of the hypotenuse is a diagram.
First, using the carpenter's square, draw a line the length of the 2 and 4 [sun].
And, to shorten the compass to hit the three places of 4 suns and 2 suns and hypotenuse,
when contracted compass, length of the hypotenuse is 1 feet.
In other words, I can see the 1 [shaku] is the hypotenuse of the gate for fig.
Of these become vertical gate and pull from the length of the rod 2 [shaku].
Finally it is seen as 6 feet to become pulled 4 feet and next to the gate from figure length of the rod out of 1 [shaku] of the hypotenuse of the gate.
Also an inch in this figure represents the actual 1 [shaku].
In other words, the hypotenuse is seen as the 1 [shaku], of the gate you were 1 [shaku].
It should be in this manner the various ideas.

A person in charge:Handa and Mitobe

English translation

Method of measuring the length of the gate and the pole using the Pythagorean
To gate, even if the vertical you want to examine the length of the rod that do not fit even on its side.
The length of the rod I to X scale.
If you try to put in length BC to protrude 4 feet from the gate.
If you try to put in length BE to protrude 2 feet from the gate.
If you try to put in length BD to become perfect.
When representing these in the expression, than the Pythagorean theorem in △ ABD
$(X-2)^2+(X-4)^2=X^2$
$X^2-12+20=0$
$(X-2)(x-10)=0$
X=2,10

X-4> 0 in other word X> 4 than X = 10
One feet than 30.3cm, 10 feet is 303cm
Therefore, the length of the rod is 303cm
Length BC is 303 (cm) -121.2 (cm) = 181.8 (cm)
Length AB is 303 (cm) -60.6 (cm) = 242.4 (cm)

A person in charge:Yamamoto and yoshida

Summary・Future issues・impressions

Summary

To determine the length of the rod entering When diagonally gate was determined using the Pythagorean theorem.
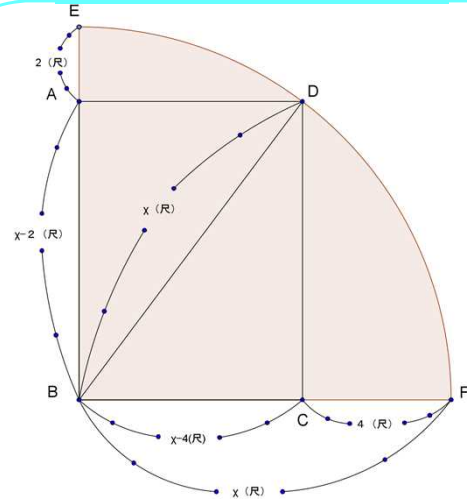
Future issues

As much as possible to the exact English auditors. Because took me some time to understand the modern translation, now you want to be able to understand a little more quickly.

impressions

Modern translation the summation, it was hard to have to fix in English translation.
Was impressed by looking for length using the Pythagorean theorem is also a long time ago.
Measurement method and you're using the familiar ones, such as rod, where you are using a calculation method such as that modern times also used it I thought it was amazing.

Group leader Yokoyama

見立算法規矩分等集
mitate sanpou kiku buntousyu
享保7年
A. D. 1730
著者　万尾　時春
MASHIO tokiharu