25/30 Matthew Mendoza

1) Positional Numbering System: leverages base powers organized by their order of occurance to denote their multipliers; for example, in decimal base 10 Number 16 verbosely written is $(1 \cdot 10^1 + 6 \cdot 10^0)$ and in base 2, decimal, the same number is written as 10000 and that is $1 \cdot 2^4 + 0 \cdot 2^3 + 0 \cdot 2^2 + 0 \cdot 2^1 + 0 \cdot 2^0$ ✓ ✓

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Merit

Versitile works in base 10 for everyday math and base 2 for computers & has decimal precision ✓

drawback

For large #'s it can be hard to ~~the~~ read & write. Needs symbols for groupings (a comma) to be read easier 10,000 or 10.000

symbols not standard in diff. Countries

Multiplicative:

a Character is given for Multipliers

ie: 二十五 is 25 → 五十五 is 55 ✓

Merits

great for grouping multipliers and quicker to grasp learning numbers. great for addition math... ✓

drawback

does not work well with complex arithmitic or would have an easy time as one would with positional # sys.

Simple ~~Additive~~: Just add everything up

Merits

easy all numbers are simply added up

drawback

multiple ways to express the same Number

ie ℓ∩∩ = 102 ✓

ℓ∩| = 102

2) Because the use the simple grouping system to represent their numbers all symbols are added up to get their value. To represent fractions they add a dot or an ovel over their integer values. Not they operate in "unique" fractions so to represent $\frac{2}{5} = \frac{1}{3} + \frac{1}{15}$, but in reality there ~~a~~ is no such thing as "unique fractions" as given by this $\frac{1}{n} = \frac{1}{n+1} + \frac{1}{n(n+1)}$

$\frac{7}{10}$

$\cancel{25}$	$\cancel{36}$
1st col.	2nd col
2	36
4	72
8	144
16	
→ ~~32~~	

start with 1

35	26
21 → 1	26
42 → 2	52
84 → 4	104
168 → 8	208
32 → 16	416
64	
96	

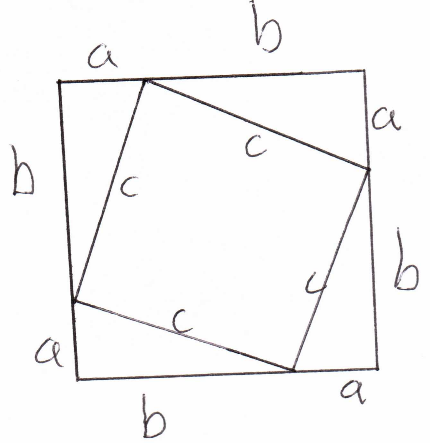
Now Find values that add up to the header in 1st col

doesn't work above header in column

Looks like we get an aproximation ∴ 416?

Circle the rows that add to 35. So circle 1 and 2 as well.

4) If "a" and "b" are the legs of a right triangle then "c" is the hypotenuse, so gives us $a^2+b^2=c^2$



Outter square
Law of squares
$(a+b)^2$

~~Inter~~ interior objects

$$\underbrace{c^2}_{\text{the smaller square}} + \underbrace{(4\cdot\tfrac{1}{2}a\cdot b)}_{\text{4 triangles}}$$

$$(a+b)^2 = c^2+(4\cdot\tfrac{1}{2}\cdot a\cdot b)$$

$$\to a^2+2ab+b^2 = c^2+2ab$$
$$-2ab \qquad\qquad -2ab$$

$$\boxed{\to a^2+b^2=c^2}$$ ■

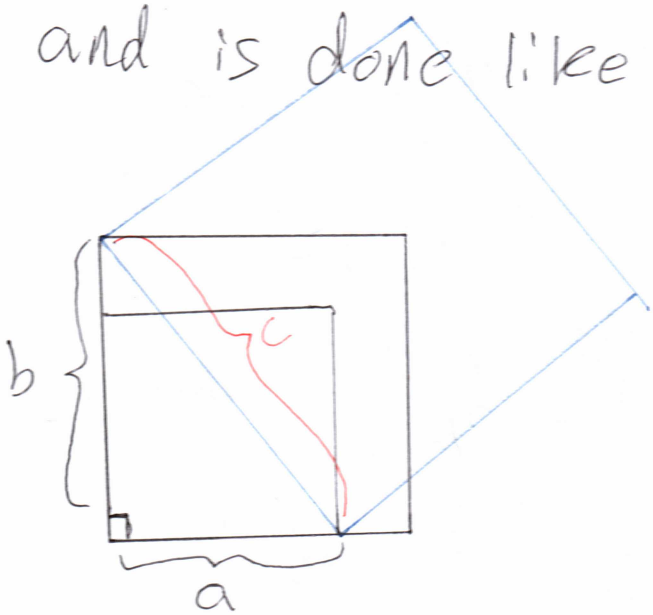
Back

For #5

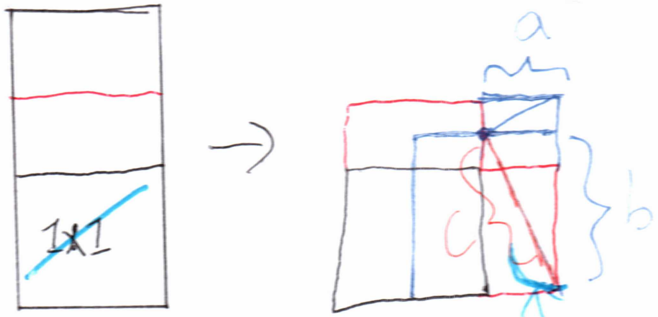
express $a^2+b^2=c^2$

5) Vedic Math... to "square a pair of squares" is to produce a square with the area ~~of~~ with the sum of the two other squares and is done like so

8/10



To square a rectangle is to produce ~~an~~ a square with the same area of a given rectangle



all the way to the corner

Show what is happening here. Draw in correct dimensions (not 1x1)

Exam 1 Essay Questions

On the day of your exam, I will choose 4 of these 6 problems. You will have to write on 3 of the 4 chosen problems.

1. Discuss the positional number system, the multiplicative grouping system, and the simple grouping system. Give an example of each system (using proper symbols) and write about their merits and drawbacks.

2. Discuss how ancient Egyptians wrote their integers and their fractions. Use their symbols and include examples. We also talked about two methods the Egyptians used to multiply two numbers. Using one of these methods (your choice), show how they would have multiplied $25 \cdot 36$. (Note: These numbers will be changed on exam day.)

3. Discuss math done in ancient China. Include a discussion of the *Nine Chapters* and the *fang cheng* method.

4. State and prove the Pythagorean theorem. You may give any of the 300+ valid proofs.

5. Ancient Indians found a way to "square a pair of squares" and to "square a rectangle." Describe what is meant by this, and show the procedure they used.

6. Discuss Euclid's *Elements*. Include a discussion on how it was structured and its historical impact on math. Also, show how Euclid bisected an angle using a straightedge and compass.