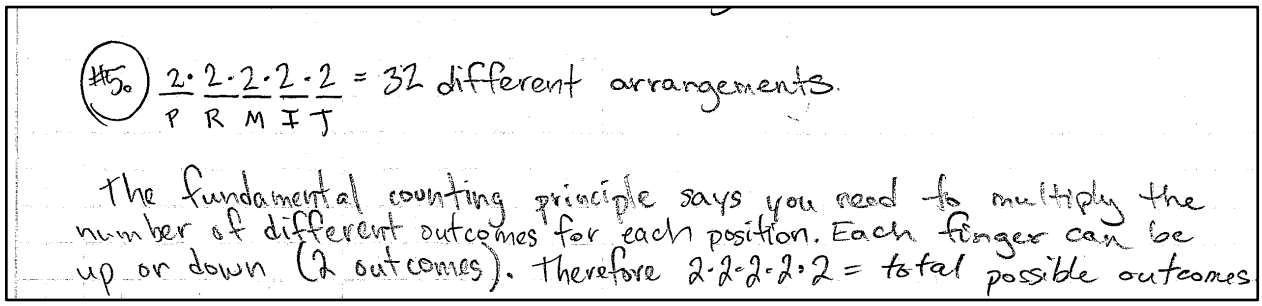
5. Write up a careful explanation:
There are 32 different ways one can hold up the five fingers of a hand.

One way to explain this is to use the fundamental counting principle:



Another way is to use place value to help. This explanation requires more work. Would you add anything to this explanation.

Five fingers → 32 Different Combinations:
With each of the five fingers, you have two options: up or down. Therefore, you systematically execute a sequence of those five fingers so that each of 32 different finger combinations is represented.
Thumb: Begin the sequence by holding up only the Thumb. The thumb is alternated up and down in every step throughout the entire sequence.
Index: For the second step, put the thumb down and raise the Index finger. The index finger stays up for two positions and goes down for two positions, and continues this pattern throughout.
Middle: The middle finger goes up on step four, when both the thumb and index finger are raised together. It will stay up for four positions, and then go down for four positions, and repeat this pattern throughout the sequence. It will go down right after all three fingers to its left are up (thumb, index, and middle).
Ring: The ring finger goes up when the three fingers to its one side are all up. At this point it stays up for eight positions, and then goes down for eight positions, and continues this pattern throughout.
Pinkie: The pinkie finger goes up once all the fingers to its left are raised, which is at the 16th step. The fingers remains raised for 16 more positions until all 32 combinations have been completed.

Compare this to the following problem:
How many numbers are there that have fewer than 4 digits?

2. Explain a pattern in column 2.

2. Here are the following rules for the binary pattern in column 2

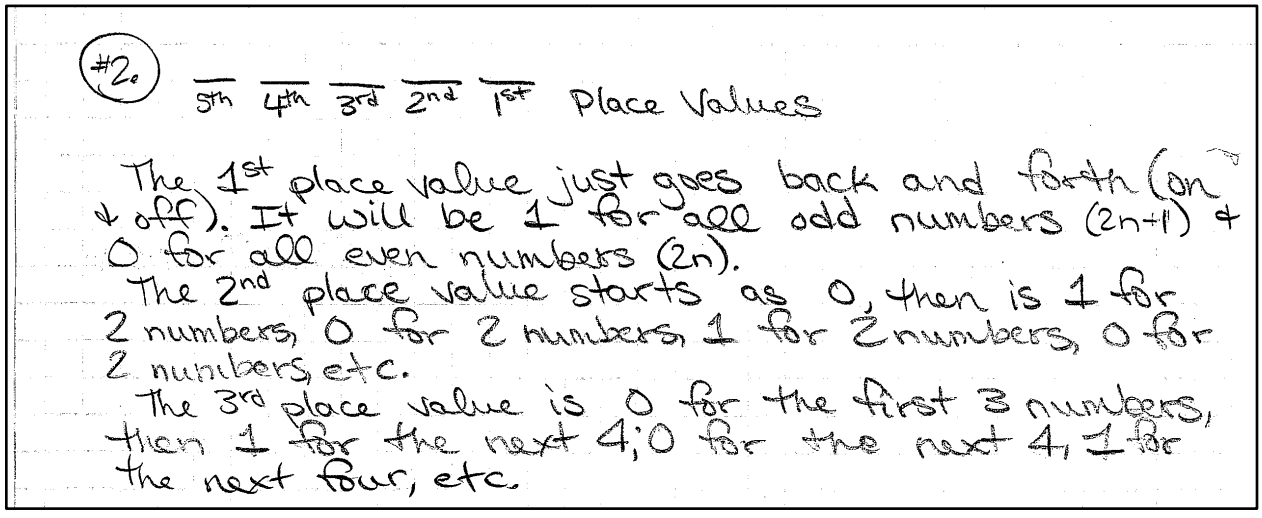
Rule 1: Spot A will alternate being 0 & 1 every other time starting as 1 in Row 1. So using the first 8 rows as an example we know the following right away:

	E	D	C	B	A
Row 1					1
Row 2					0
Row 3					1
Row 4					0
Row 5					1
Row 6					0
Row 7					1
Row 8					0

Rule 2: Moving from right to left, spots B through E will take turns changing to 1; starting with B and ending with E. You will not move to the next spot until all spaces to the right of the active spot are all showing 1 at the same time. Inactive spots will change to 1 in order from left to right, only after the active spot and spot A has been completed. The only exception is spot A, which follow rule 1. Look at the following example of the first 8 rows.

	E	D	C	B	A	
Row 1	0	0	0	0	1	Since there is nothing to the right of A, it is now spot B's turn
Row 2	0	0	0	1	0	
Row 3	0	0	0	1	1	Now that all spots to the right are showing 1, the active spot changes to C
Row 4	0	0	1	0	0	
Row 5	0	0	1	0	1	Now that the active spot and spot A have been completed, the inactive spots will change to 1 from left to right.
Row 6	0	0	1	1	0	
Row 7	0	0	1	1	1	All inactive spots to the right are now showing 1, it is now spot D's turn.
Row 8	0	1	0	0	0	

The next one is a different but interesting and didn't really come up in class with this definitive statement. Can you continue the statement for two more places? What's the pattern?



3. Find patterns that exists from left to right in the table. For example, explain how to take a number from column 3 and, from that, compute the corresponding number in column 2. Both of the following give ways of computing a number in column 3 given the number in column 2. Can you figure out how to go backwards? How can you get the binary number in column 2 given some decimal number in column 3

2. A pattern I noticed in column 2 was that each '1' in the binary code represented a raised finger. For example, every time there was the use of a thumb, there would be a '1' in its position at the right end of the binary sequence. A binary code like 10001 translated to the pinky and thumb being raised. It also represented the number 17, which will be explained below.

3. Each place value in binary represents an exponential value of two.

Ex. 32 16 8 4 2 1

For any binary sequence that includes the number one, its position in the sequence will determine its overall value. With a binary number add all of the numbers in the sequence based on their respective positions.

Take, for example, the number 5

Five is 4 +1. Therefore we would need:

Value:	32	16	8	4	2	1
Binary:	0	0	0	1	0	1

Value:	32	16	8	4	2	1
Binary:	1	0	0	1	0	1

32+4+1 = 37

2. One way to see pattern is by each column has a value
value 16 | 8 | 4 | 2 | 1

Pattern then begins on right column and you add to the left ex # 2 is (00010) and to make it a#3 it adds column 1 (00011) now since both right column is full you go to next collumn which gives you #4 (00100)

Then you go to right again (#5 00101) you then put the right down & the other right up (#6 00110) then you put right up again (#7 00111) Now since all Right are up you move to next collumn & repeat. to check on number you can add up the values.

#7 00111 = 4+2+1 = 7