

Mayan Numbers Lesson: Investigating Different Bases



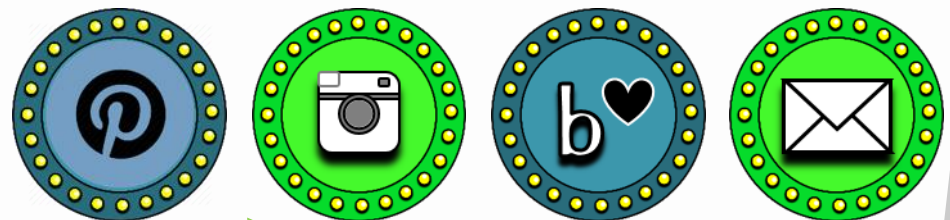
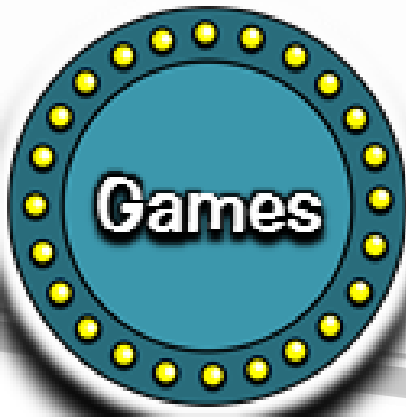
Print the two worksheets for each student or pair. Choose one set of Mayan Number Cards to print on colored cardstock. One set has numbers marked and the other does not. You can laminate these to re-use each year. Project or hand out the first two pages and demonstrate how the Mayan Number System works.

Have students practice working with the cards. One student can set out two cards and the other can determine what number is represented by the two digits. You can also have students play games with the cards. Try a "war" style game where each student flips two (or three) cards and states the number. The winner takes all the cards that are laid down.

Once students are comfortable with the number system, have them try the first worksheet. Then allow students who are ready for a challenge to try the second worksheet with three digit numbers.

Extension: Lead into other base systems. Ask students to write the numbers from 1 to 100 in base 8 (with standard numerals as digits).

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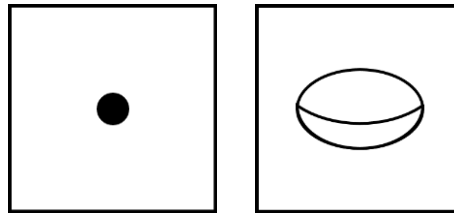
We use ten digits in our number system, representing numbers from 0 to 9.
The Mayans used twenty “digits” to represent numbers from 0 to 19.

The Mayan Number System:

A shell represents “zero,” a dot represents “one,” and a bar represents “five.” So the digit for the number “seven” would include one bar plus two dots. A “sixteen would be represented by three bars plus one dot.

Place Value:

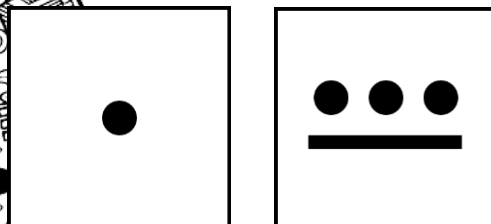
When we want to represent ten, we shift our digit for “one” into the “tens place.” The Mayans used base twenty, so when they shifted their “one” dot to the right, it represented “twenty.”



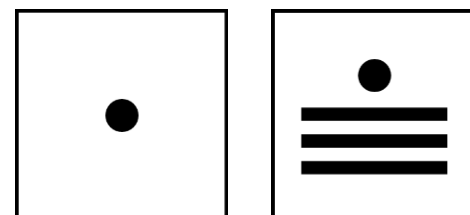
The “zero” shell was used as a placeholder (just as we do).

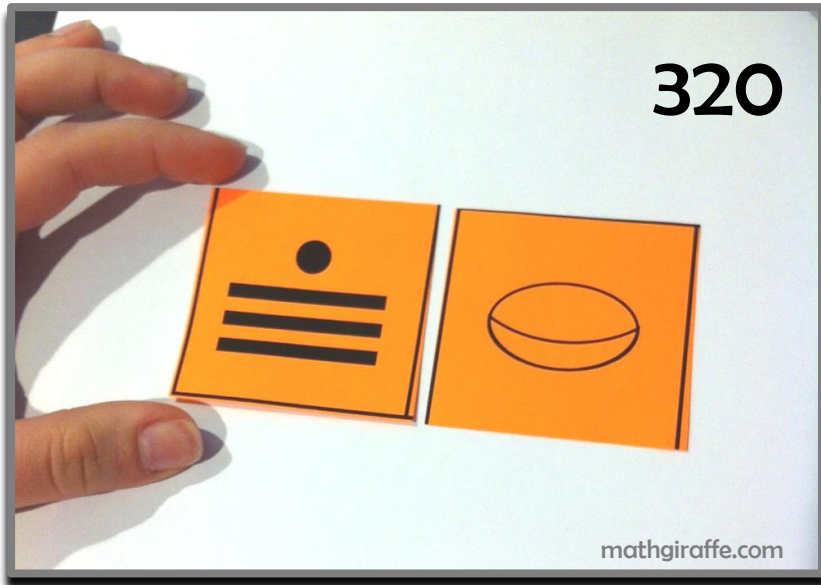
Here are some examples of the Mayan Number System:

28



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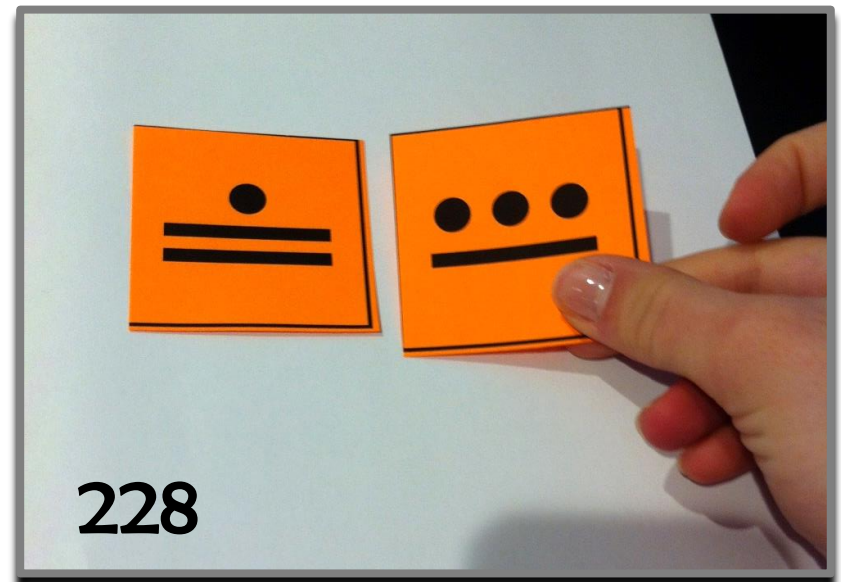
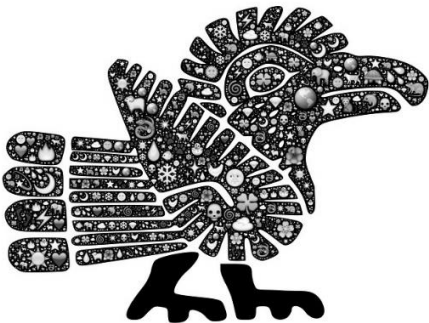
A sixteen in the
“twenties place” is
worth 320
(16 x 20)

The zero in the
“ones place” is just a
place holder.

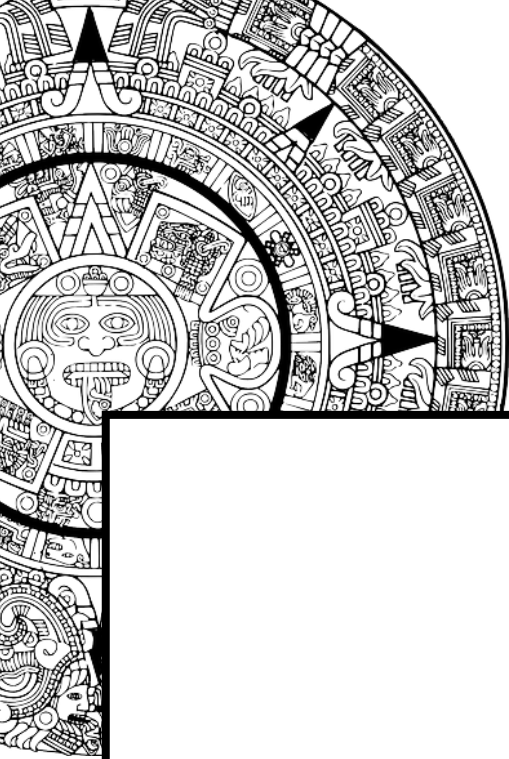


An eleven in the “twenties
place” is worth 220
(11 x 20)

An eight in the “ones
place” is worth 8.



How would you determine the value of the first digit in a three-digit number? (What we call the “hundreds place”)?



Try to represent each number using the
Mayan number cards.



49

107

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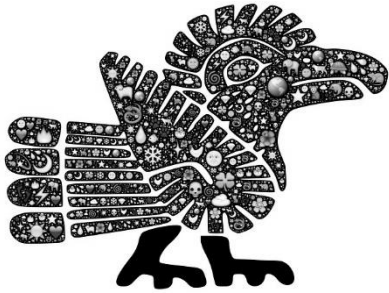
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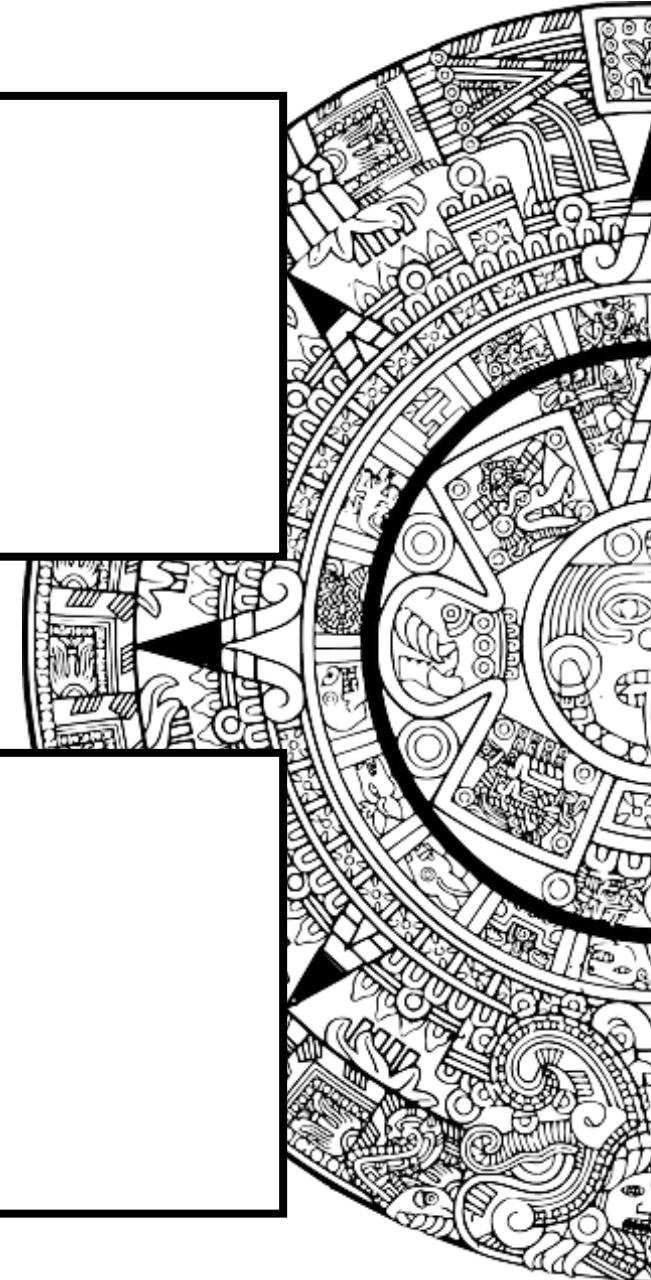
Challenge: Try to represent each number using the Mayan number cards.

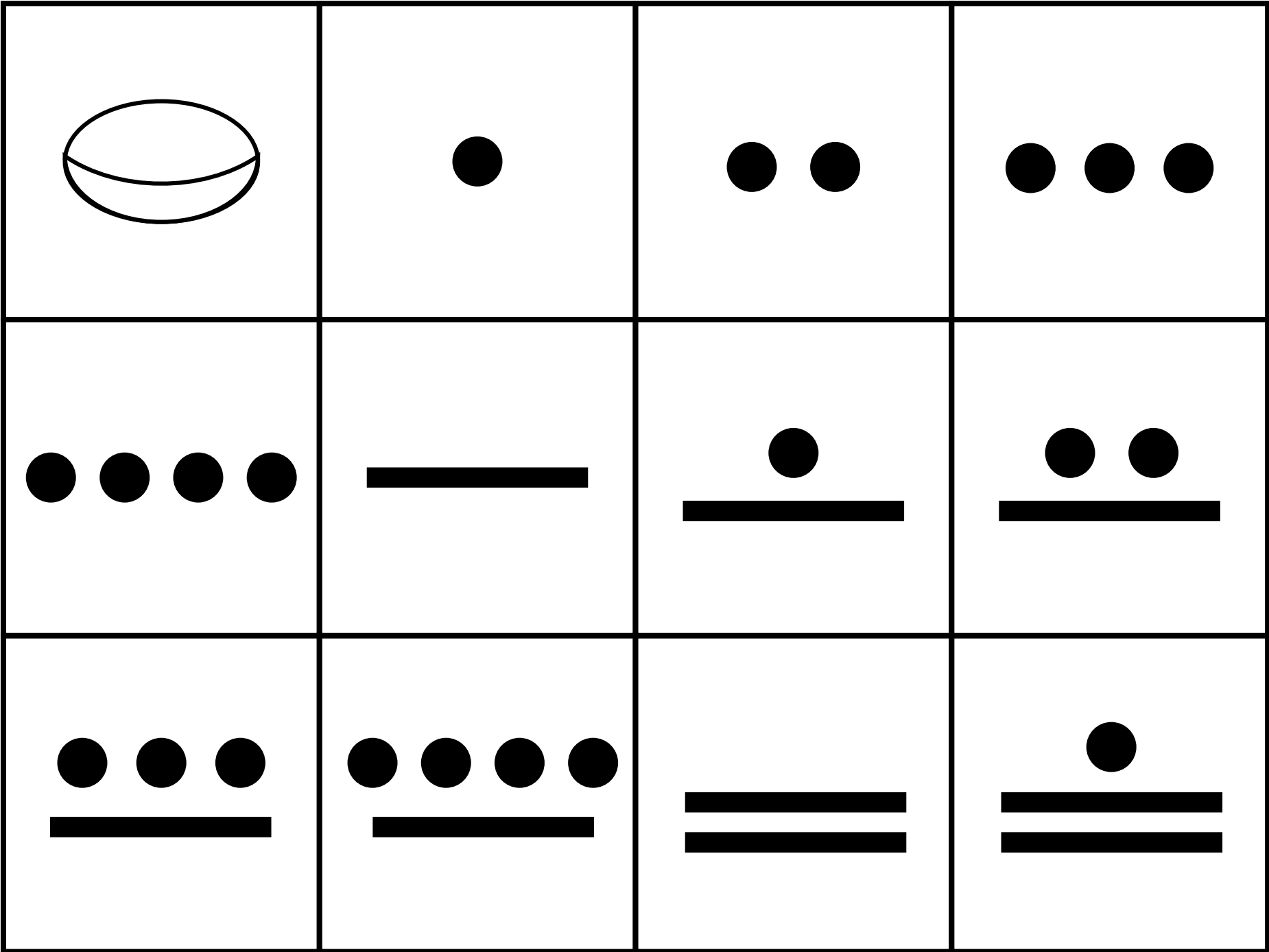
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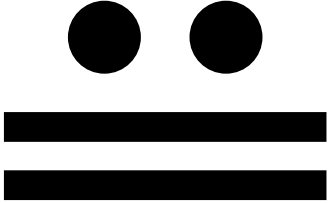
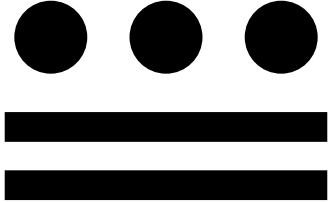
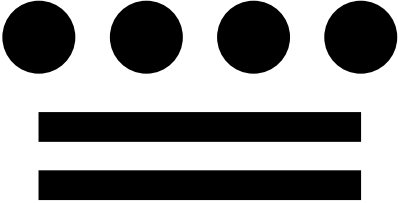

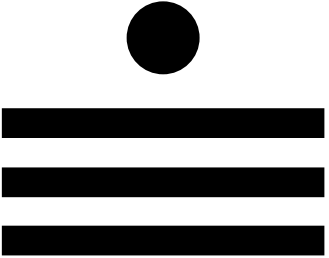
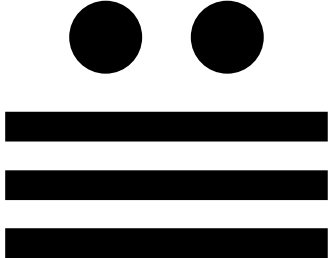
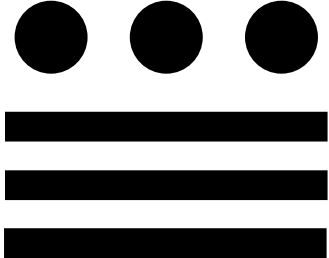
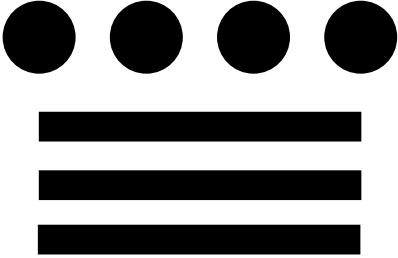
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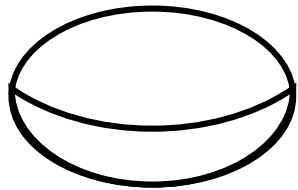
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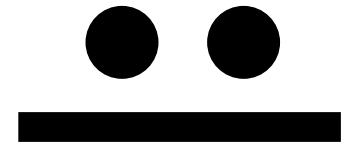
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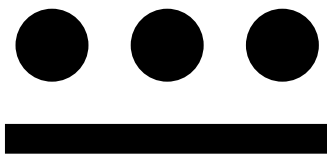
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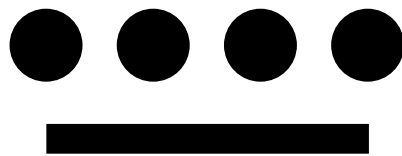
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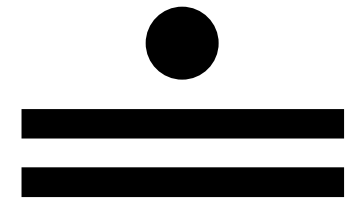
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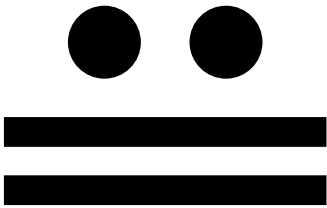
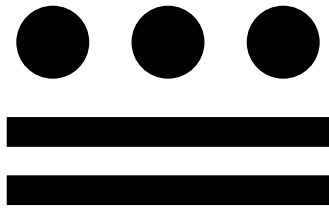
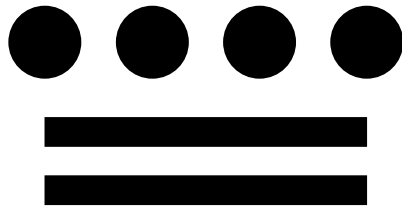

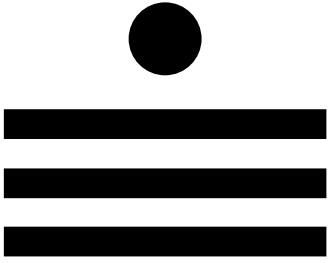
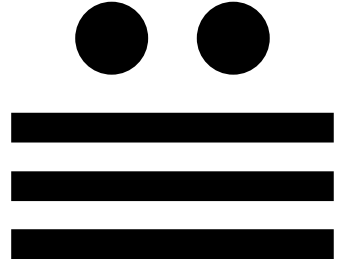
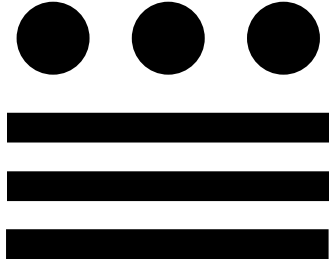
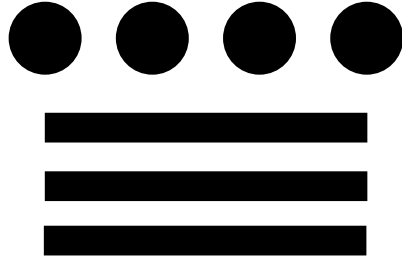
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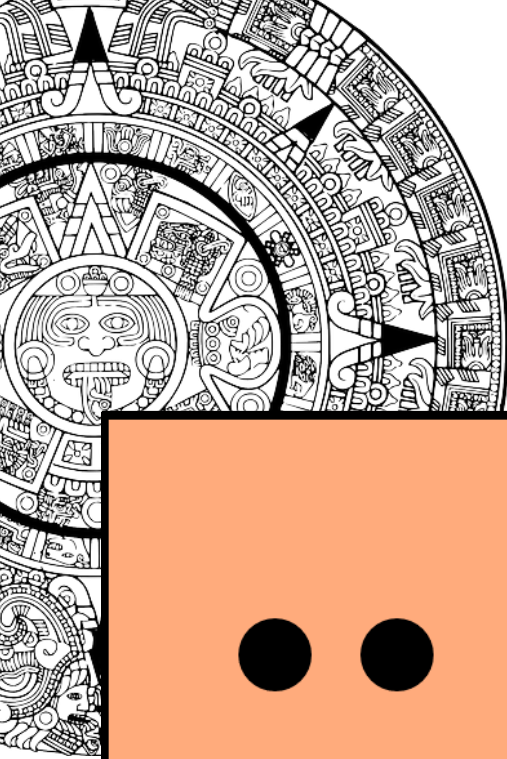


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 <p>12</p>	 <p>13</p>	 <p>14</p>	 <p>15</p>
 <p>16</p>	 <p>17</p>	 <p>18</p>	 <p>19</p>





Try to represent each number using the
Mayan number cards.





49

ANSWER KEY



107


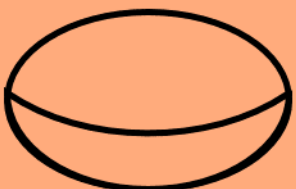
	
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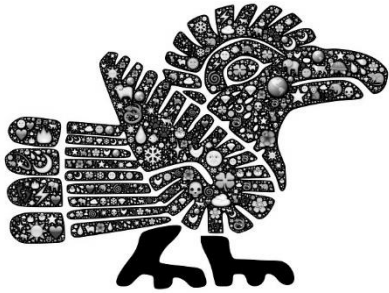
	
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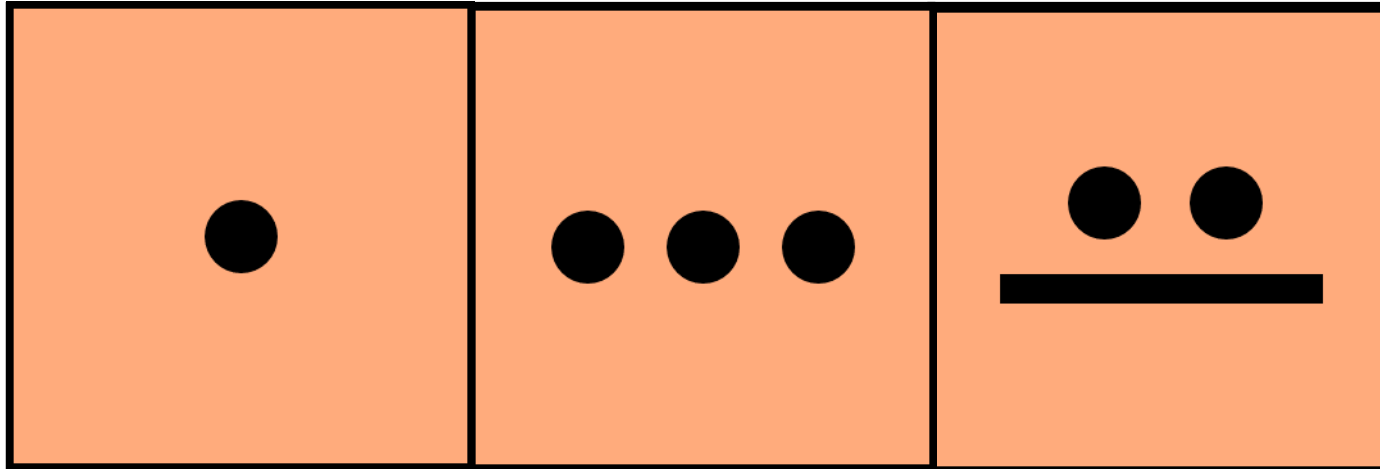
	
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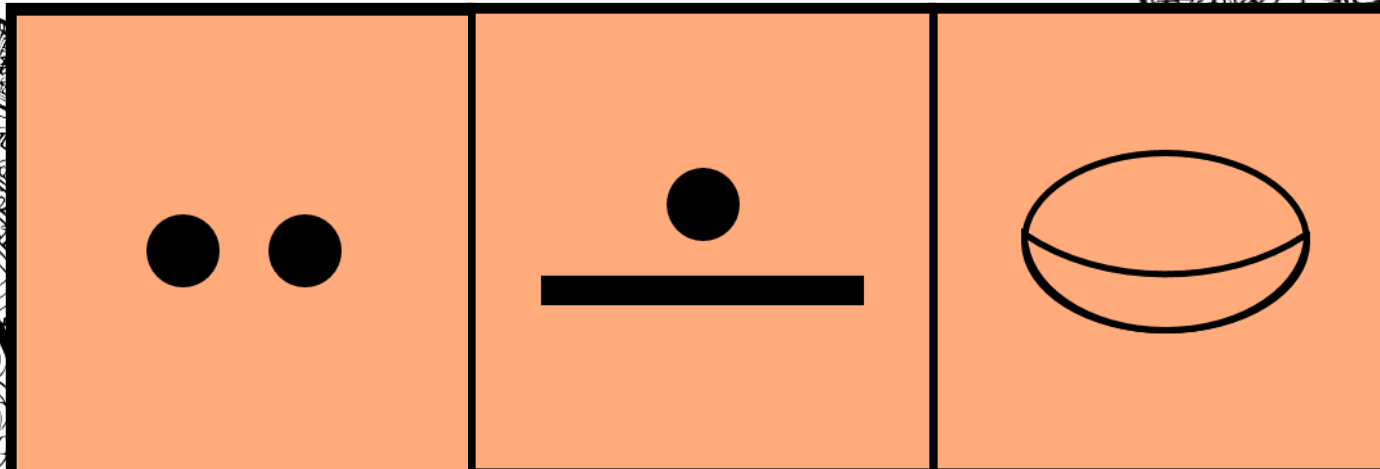
Challenge: Try to represent each number using the Mayan number cards.

ANSWER KEY

467



920



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