

Multiplication Math Art

Patterns in the Unit's Place

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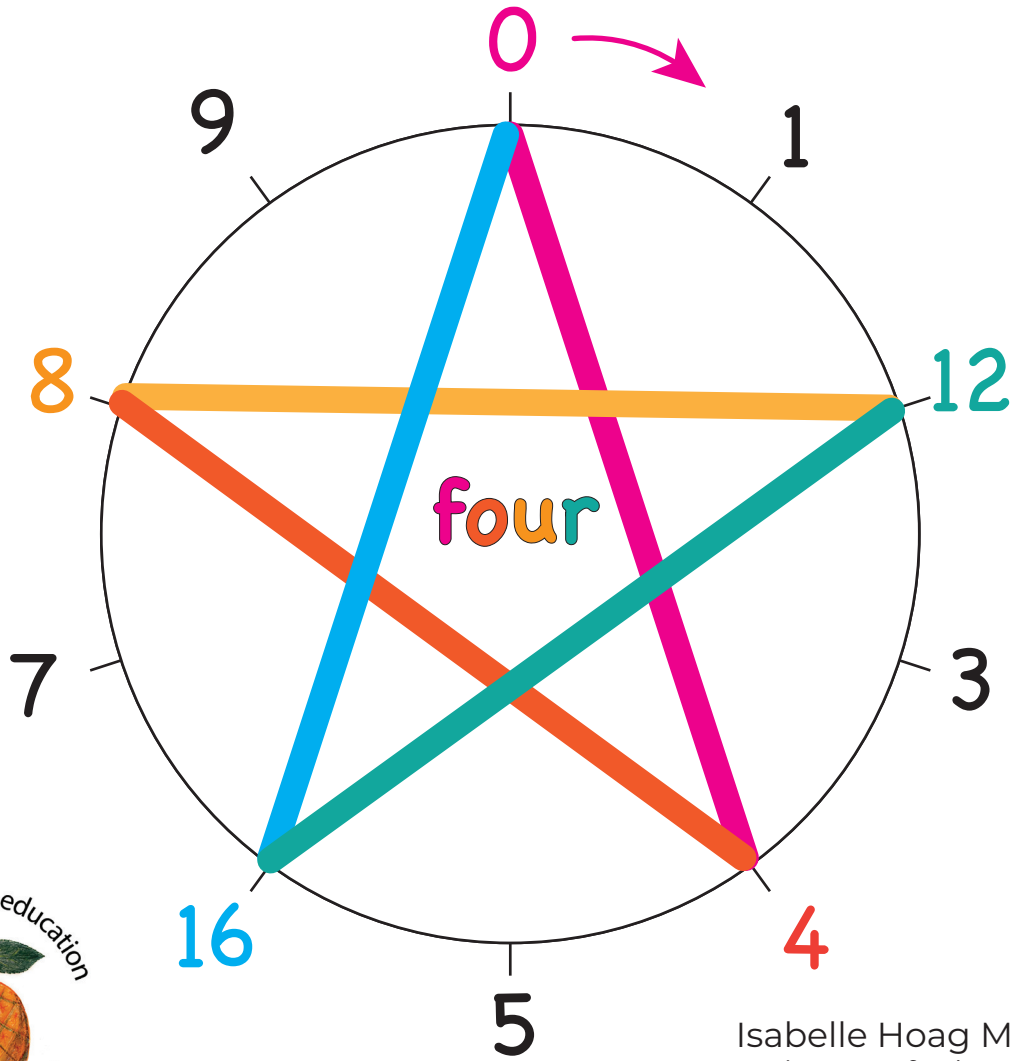
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Isabelle Hoag M. ED.
Director of Education
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captivate students' imaginations

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Hello Teachers,

Thank you for downloading this handout. After decades of teaching, now I am sharing some of the activities I designed for my students and some new ones as well.

Please, check out the self-paced teacher education courses on UnCommon-Core.com.

While you are there, sign up for your free copy of **Colorful Collections: A Mindful Exploration of Proper Fractions**.

Also, visit my Teachers Pay Teachers store UnCommon-Core dot com.

Thank you again. All the best,



Isabelle

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Director of Education
UnCommon-Core.com

Teacher Tips

Materials:

Copies for all students, plus extras. Each student will need a pencil, eraser, ruler, and straight edge,

They may also use:
markers, protractor, crayons, or colored pencils.

After the art works have been created, you might slide them into a transparent sheet protector to keep them safe.

Make it easier for students:

Give them a list of multiples for each factor before they begin.

Demonstrate the process first.

Rather than going in numerical order, let your students begin with some of the easier patterns.

Have them practice on a small model first before trying a larger one. Remind them to use pencils at first.

Remind students to write a title immediately after they finish. The title is usually the name of the factor. It fits nicely in the center of the design, except when it doesn't!

Art Supplies:

Discuss how students could express some of the mathematical relationships in their art. Art could be made with:

tissue paper ~ recycled paper ~ watercolors ~ acrylic paint ~ markers ~ chalk
stickers ~ stamps ~ rubbings ~ photos ~ technology ~ markers ~ glitter glue
natural pigments (berries, beets, flowers) ~ or anything else

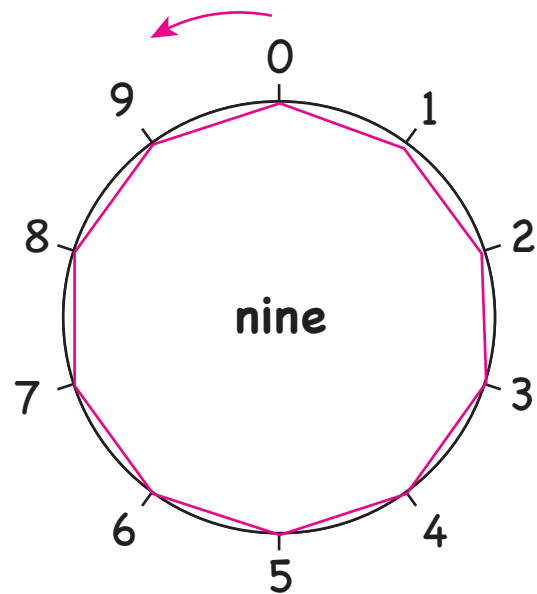
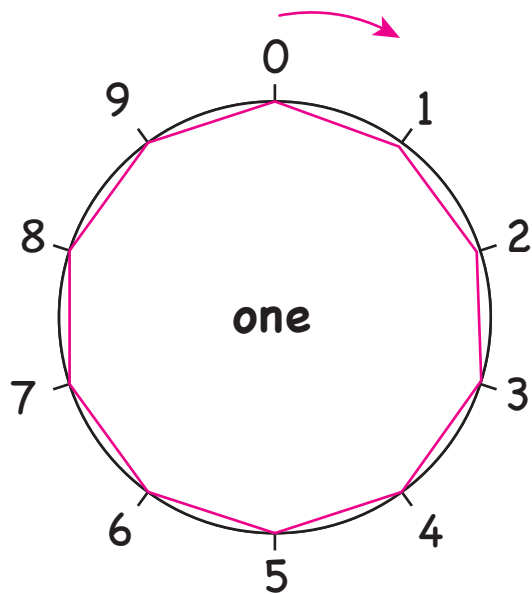
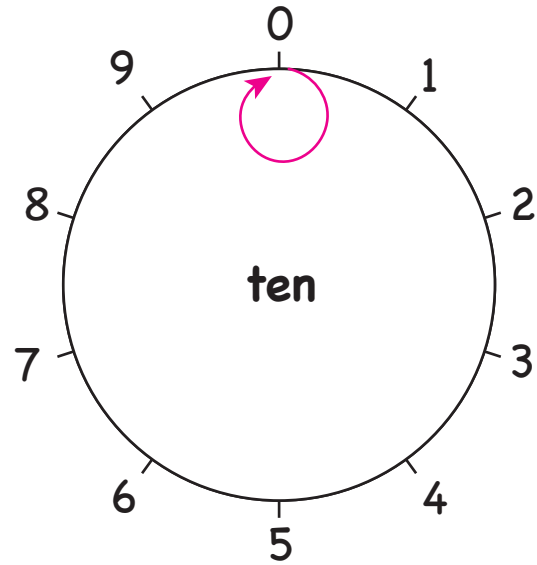
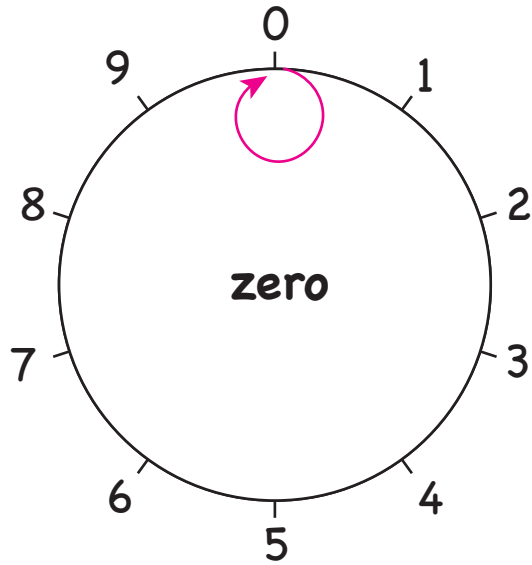
[Please post art on our Facebook page!](#)

Patterns in the Unit's Place

of factors from zero to twelve

Answer Key

There are many numerical patterns worth exploring. This activity gives students just a taste of what is available. While their comments and reflections on this activity will vary, the patterns found in the unit's place of multiples will remain the same. These are shown below. An arrow has been included to indicate the direction in which the pattern began.

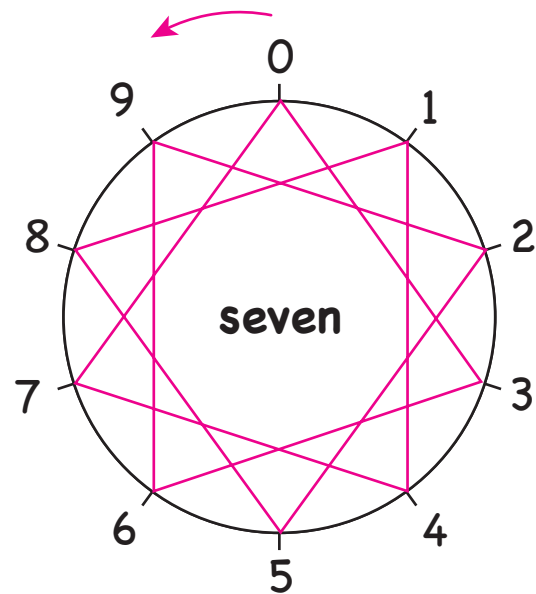
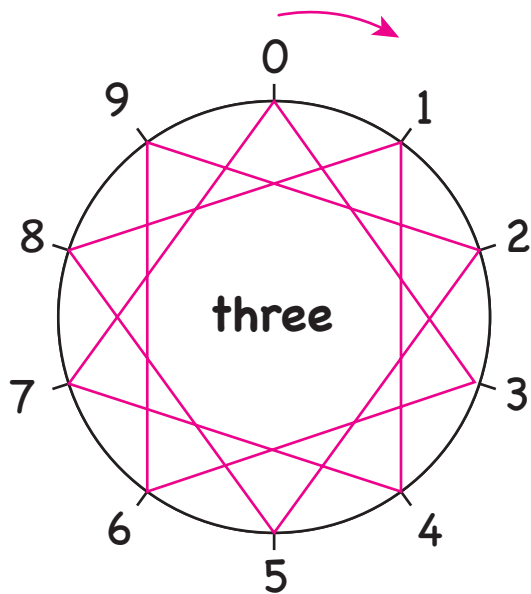
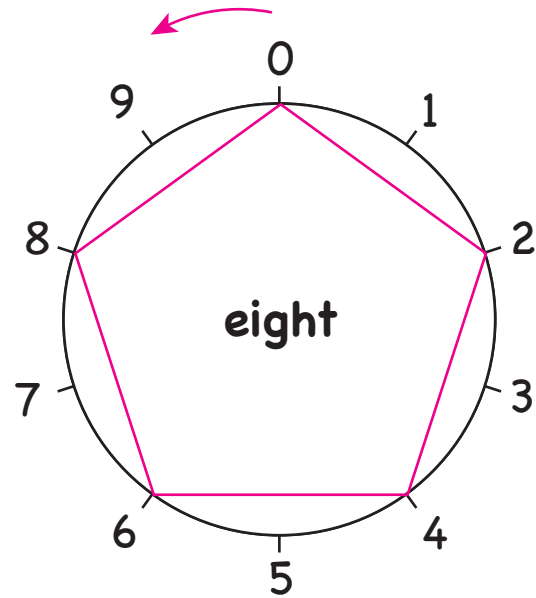
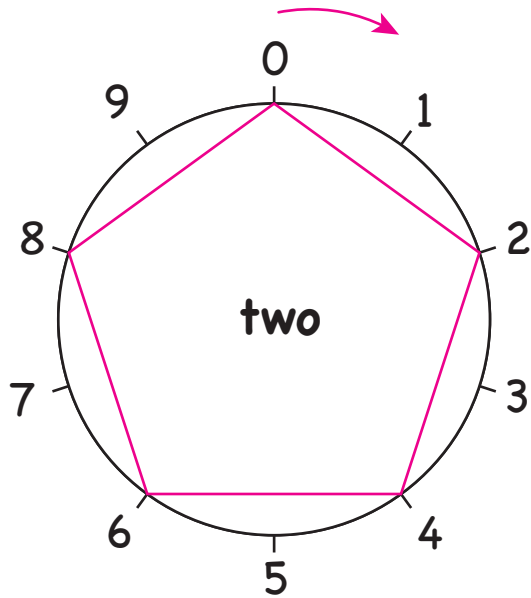


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Answer Key

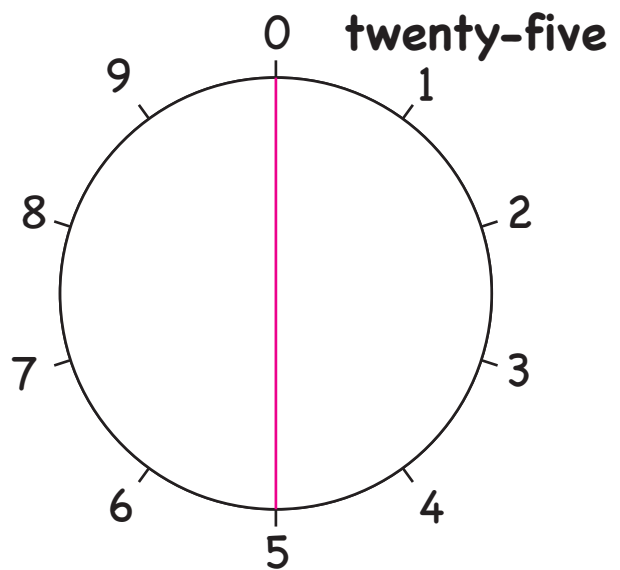
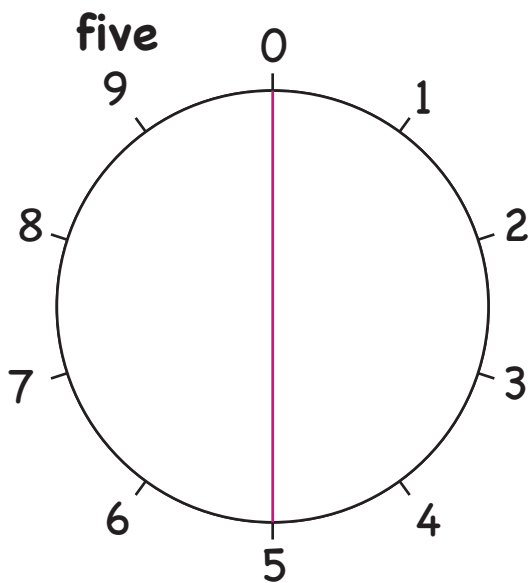
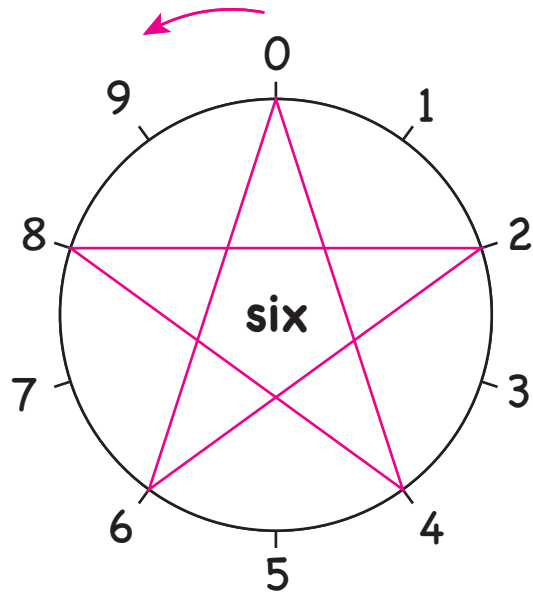
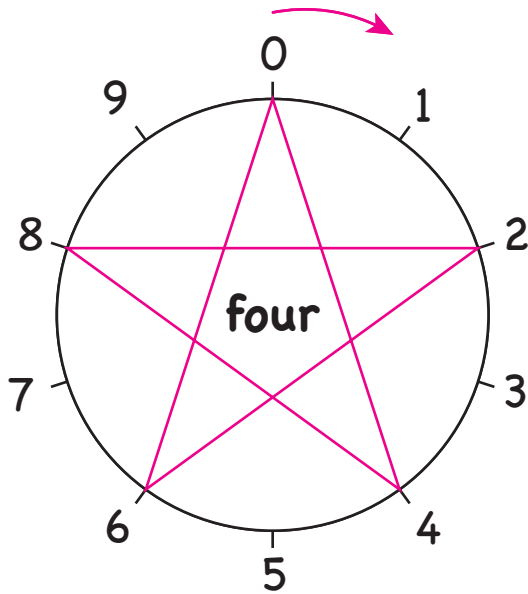
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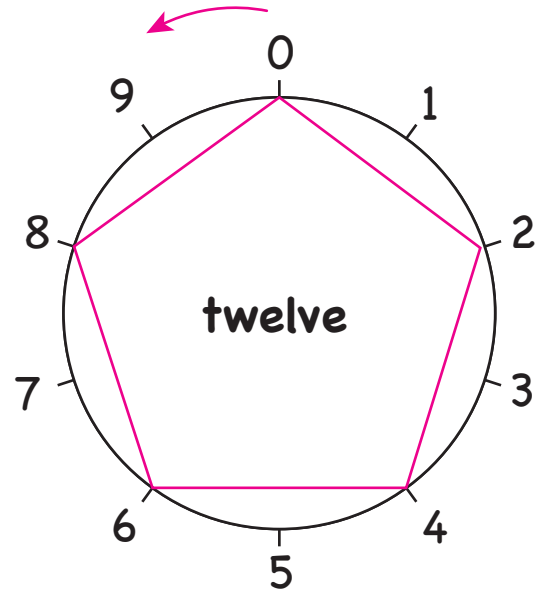
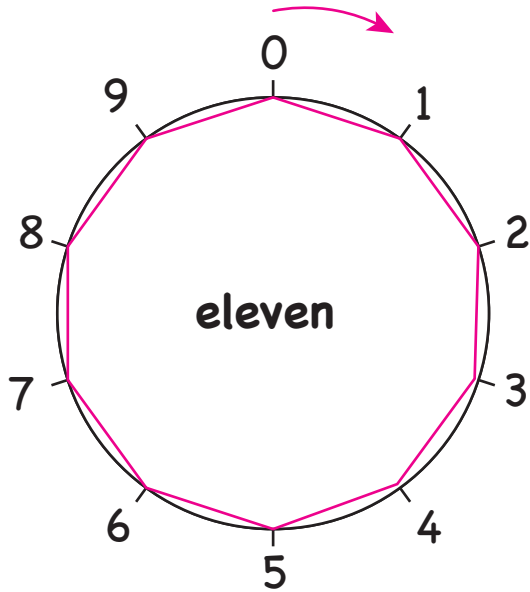


Patterns in the Unit's Place

of factors from zero to twelve

Answer Key

There are many numerical patterns worth exploring. This activity gives students just a taste of what is available. While their comments and reflections on this activity will vary, the patterns found in the unit's place of multiples will remain the same. These are shown below. An arrow has been included to indicate the direction in which the pattern began.



Thinking about the unit's place:

Circle the digit in the unit's place in each number:

1,729

43,805

Explain how the value given to digits changes, based on their place in the number.

The digit is multiplied by the magnitude of its place in the number. A digit in the hundred's place is multiplied by 100 to determine its value. Three in the ten's place is 30 whereas in the thousand's place it represents 3,000.

Thinking about Number Patterns: Answer Key

Describe the patterns.

There is a variation of this question on every page:

What do you notice about the patterns?

How are the patterns alike or different?

How did you make the pattern?

Is there any difference at all in the patterns made by five and twenty-five?

If you were given a list of the digits in the unit's place of these two numbers how could you tell which was which?

Students' answers will vary, however there are certain ideas to look out for.

In all patterns: The number of sides of the inner most shape matches the number of digits in the unit's place used in multiples of that factor. Arrows show if the pattern was created in a clockwise or counterclockwise direction.

Zero, Ten, 100 and so on: The 'pattern' in the unit's place in multiples of these numbers is that all the multiples will have a zero in the unit's place.

One, Nine, Eleven, and so on: At first these patterns may seem identical. In fact, the only difference is in the order in which the digits appear. This order determines the direction in which the pattern is created.

Two, Eight, Twelve, and so on: Again, the only difference is the direction in which the pattern was created.

Three, Seven, and so on: Like the ones and nines, all ten digits appear in the unit's place in multiples of three and seven. The difference is the order in which the digits appear.

Four, Six, and so on: Numbers found in the unit's place of multiples of four and six cycle through the same five digits. over and over. These patterns can be used to practice drawing a star shape.

ART: When students are ready to make their art, help them plan their projects carefully. Choices include: big posters with many patterns, mini posters showing two related patterns, or a creative display showing a single pattern. Students may want to use the template as part of their work, while others might want to start from scratch. Decide in advance which art supplies will be available for the students. If their work will need to dry, make sure to clear some space in advance. Enjoy.

Answer Key

Other Questions:

Do you like exploring number patterns in math? Why or why not? Were you surprised by the pattern? How could you use a list of the multiples to help you figure out which pattern belongs to which number?

There will be a variety of responses to these questions. Inviting students to consider how and why questions encourages elaboration - adding detail to the topic under study: in this case multiplication facts. Elaboration helps students remember the multiplication facts.

Exploring number patterns can be interesting and engaging. Patterns make more sense and can sometimes show the logic behind numerical relationships. Patterns can help students recall number facts. Exploring number patterns is fun, like assembling a giant puzzle.

Having class discussions about these and other patterns found in numbers can get students thinking about big ideas in math. Class discussions can be used to clarify ideas and vocabulary, as well as to prepare students for writing in their math journals.

Additional Activities

Some students might want to explore:

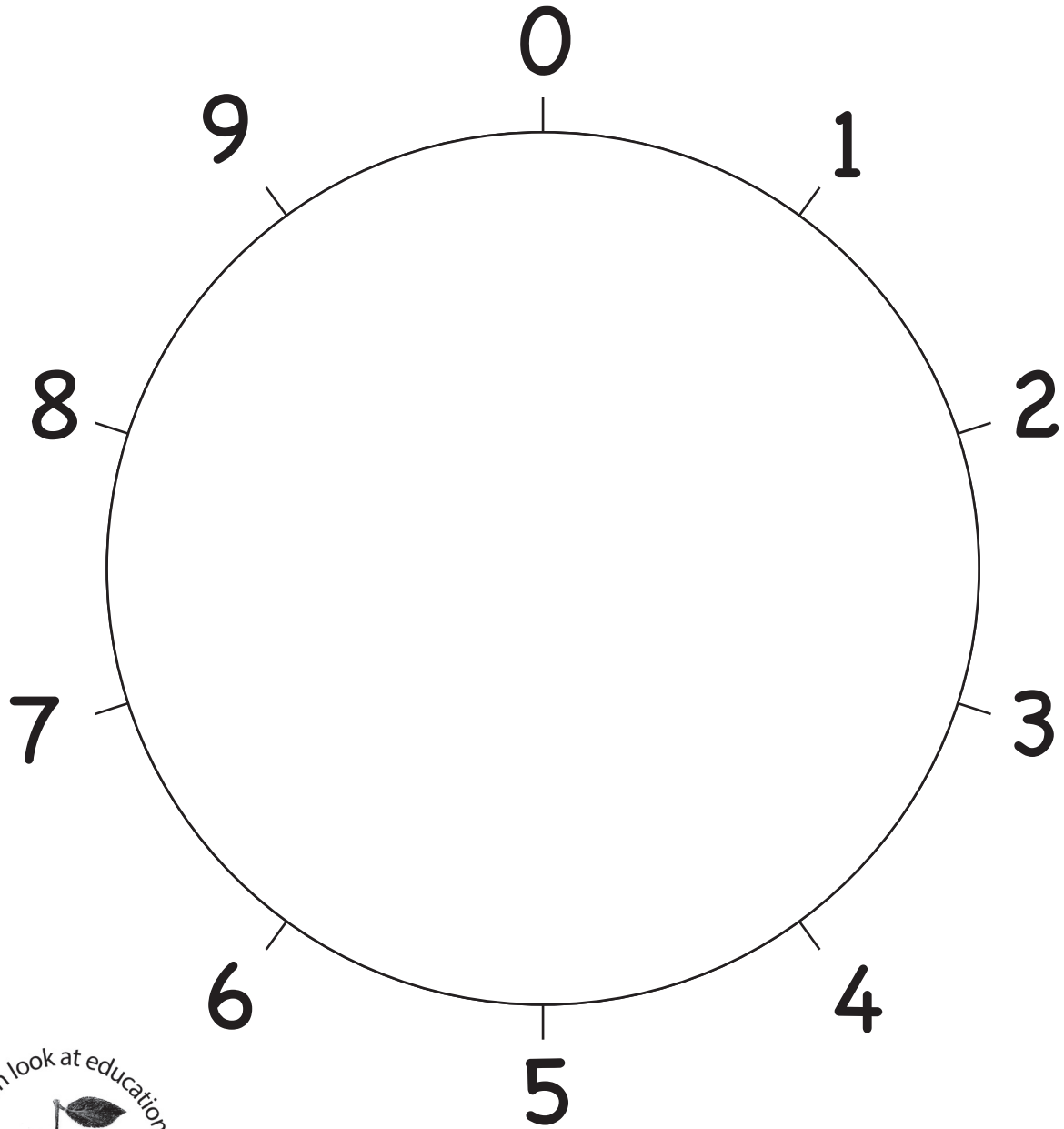
which two digit numbers will produce similar patterns

if multiples of other numbers could have a different pattern in the unit's place

or questions of their own

Multiplication Math Art

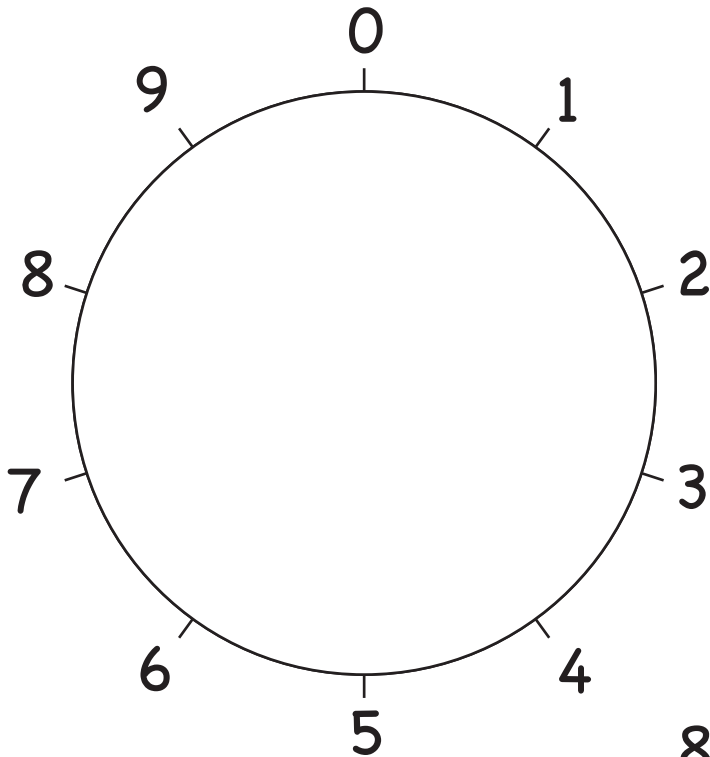
Patterns in the Unit's Place



Patterns in the Unit's Place

Multiples of Zero and Ten

name: _____



Multiples of Ten Pattern in the Unit's Place

Imagine what the pattern in the unit's digits of multiples of ten will look like.

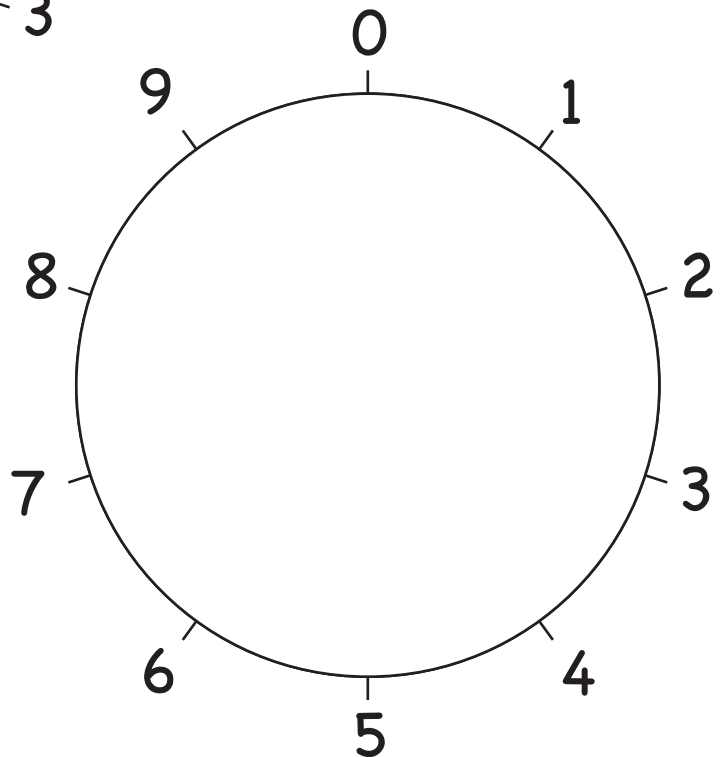
Then trace a path from zero to the numbers in the unit's place in sequential order.

Multiples of Zero Pattern in the Unit's Place

Zero is always the first number in the unit's place for multiples of any number.

Imagine what the pattern in the unit's digits of multiples of zero will look like.

Find a way to show that pattern here.

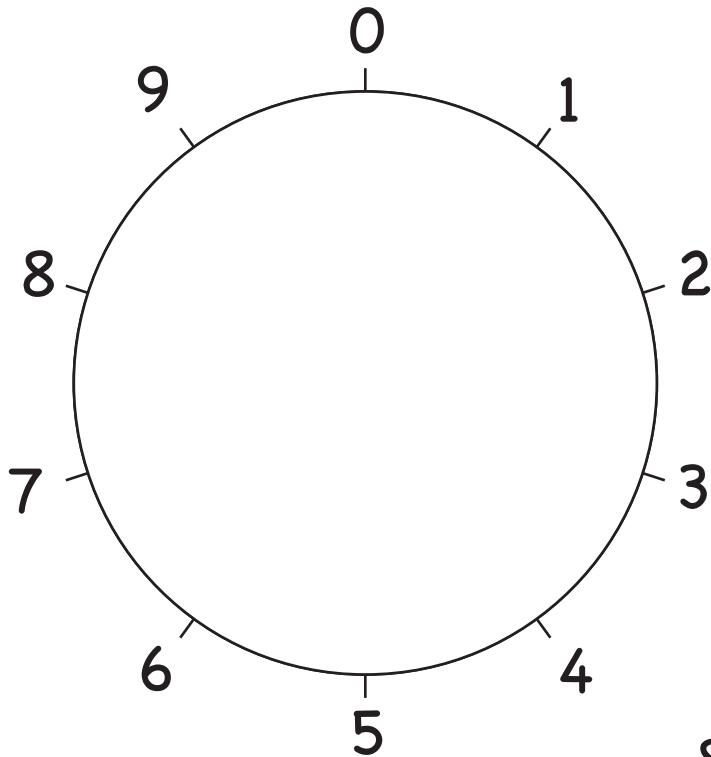


Thinking about Number Patterns: The patterns in the unit's place of multiples of zero and ten were tricky to show. How did you think of a creative way to show them?

Patterns in the Unit's Place

Multiples of One and Nine

name: _____



Multiples of Nine Pattern in the Unit's Place

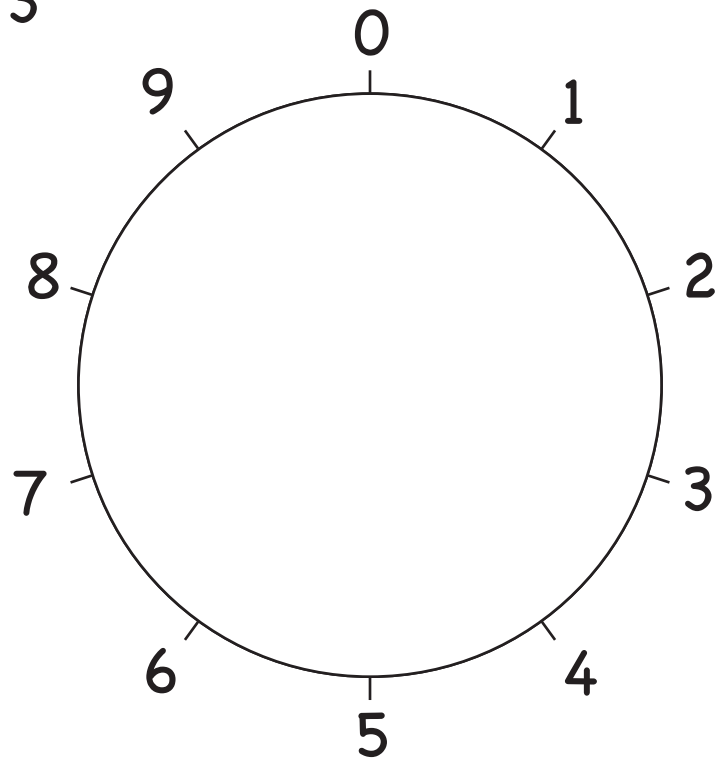
Imagine what the pattern in the unit's place of multiples of nine will look like. Then trace a path from zero to the numbers in the unit's place in sequential order.

Use a multiplication chart to help as needed.

Multiples of One Pattern in the Unit's Place

Imagine what the pattern in the unit's digits of multiples of one will look like.

Then trace a path from zero to the numbers in the unit's place in sequential order.



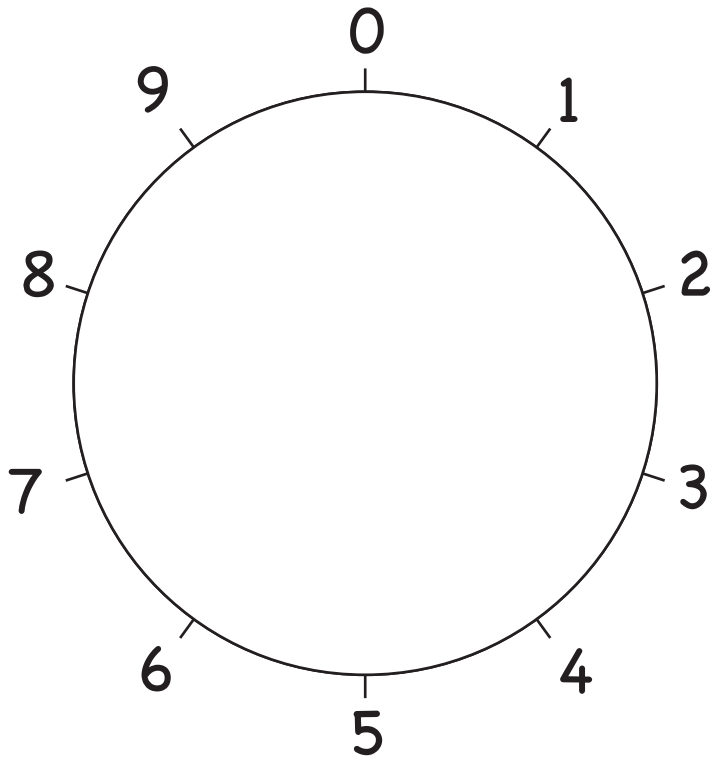
Thinking about Number Patterns: What do you notice about the patterns made by multiples of one and nine? How could this happen?

If you were given a list of the digits in the unit's place of these two numbers how could you tell which was which?

Patterns in the Unit's Place

Multiples of Two and Eight

name: _____

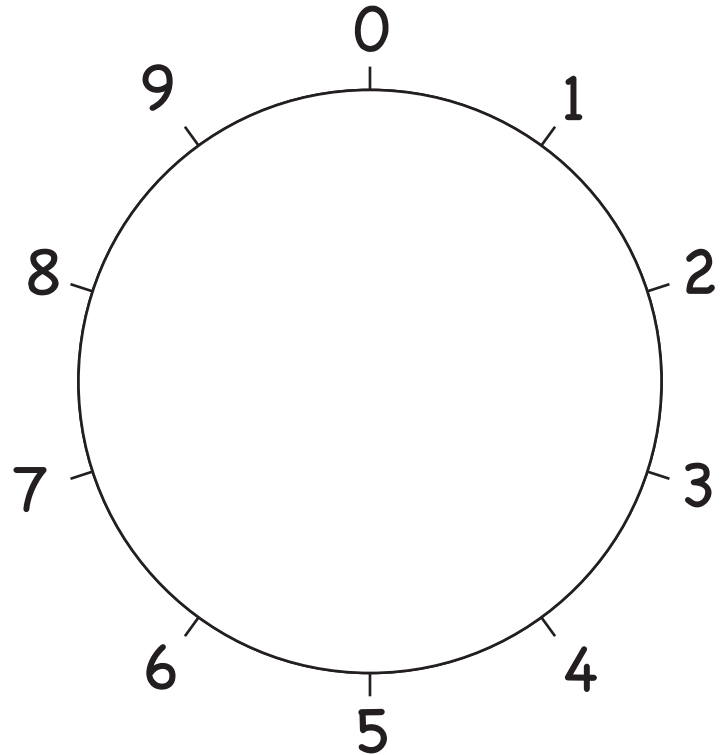


Multiples of Two Pattern in the Unit's Place

Imagine what the pattern in the unit's digits of multiples of two will look like.

Then trace a path from zero to the numbers in the unit's place in sequential order.

Use a multiplication table if needed.



Multiples of Eight Pattern in the Unit's Place

Imagine the pattern that multiples of eight will make. Then draw lines that connect each unit's digit in sequence.

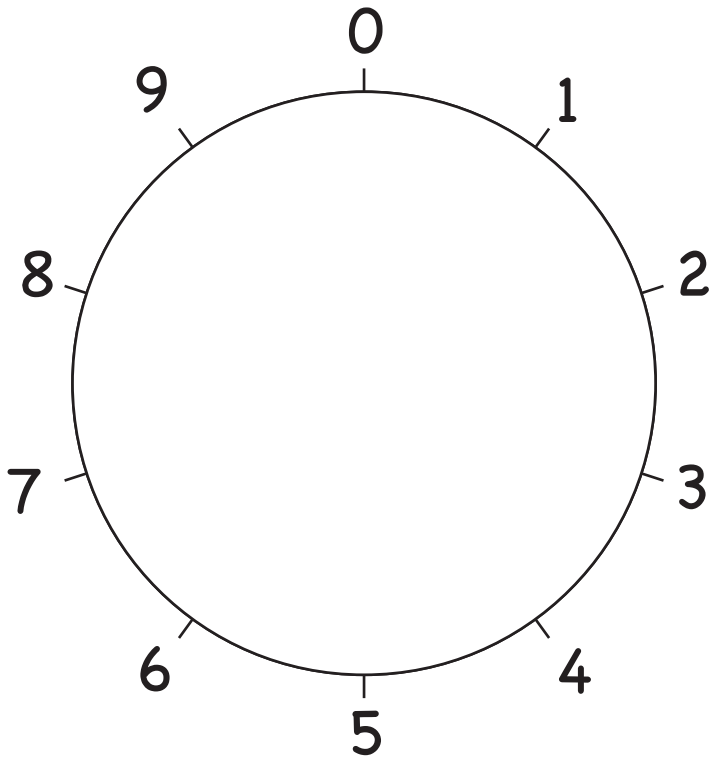
Thinking about Number Patterns: How did you make each pattern?

How are these two patterns alike and different?

Patterns in the Unit's Place

Multiples of Three and Seven

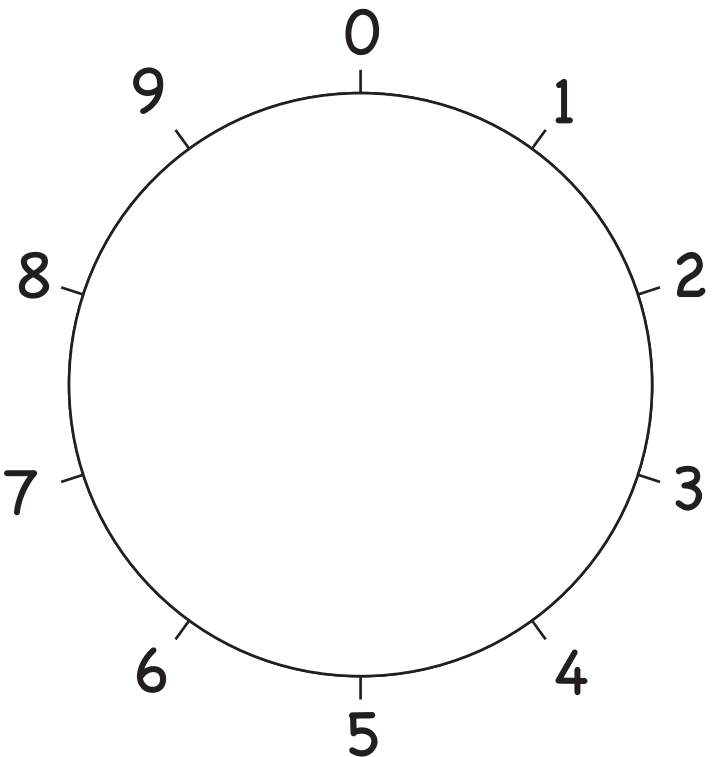
name: _____



Multiples of Three Pattern in the Unit's Place

Imagine what the pattern in the unit's digits of multiples of three will look like.

Then trace a path from zero to the numbers in the unit's place in sequential order.



Multiples of Seven Pattern in the Unit's Place

Imagine what the pattern in the unit's digits of multiples of seven will look like.

Then trace a path from zero to the numbers in the unit's place in sequential order.

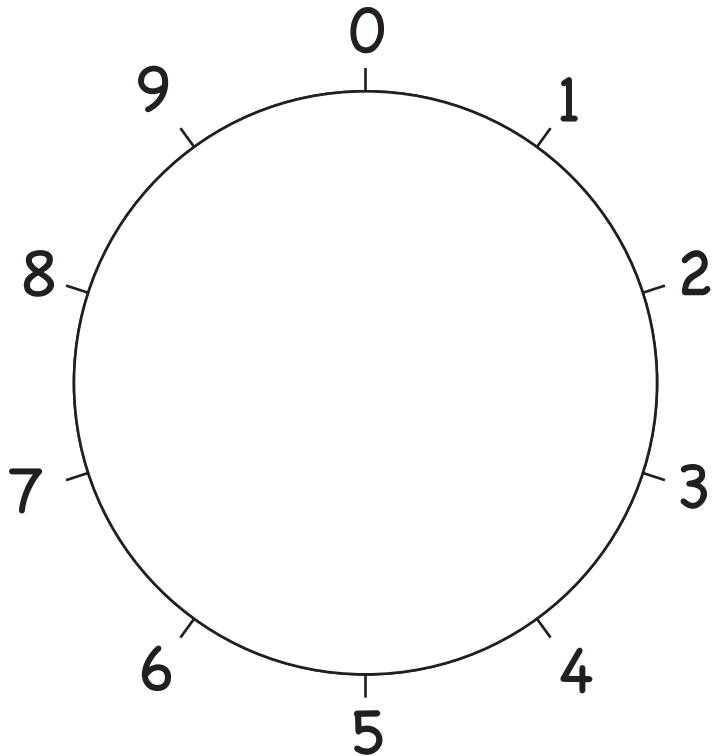
Thinking about Number Patterns: Describe the patterns above.

Were you surprised when you made these patterns? Why or why not?

Patterns in the Unit's Place

Multiples of Four and Six

name: _____

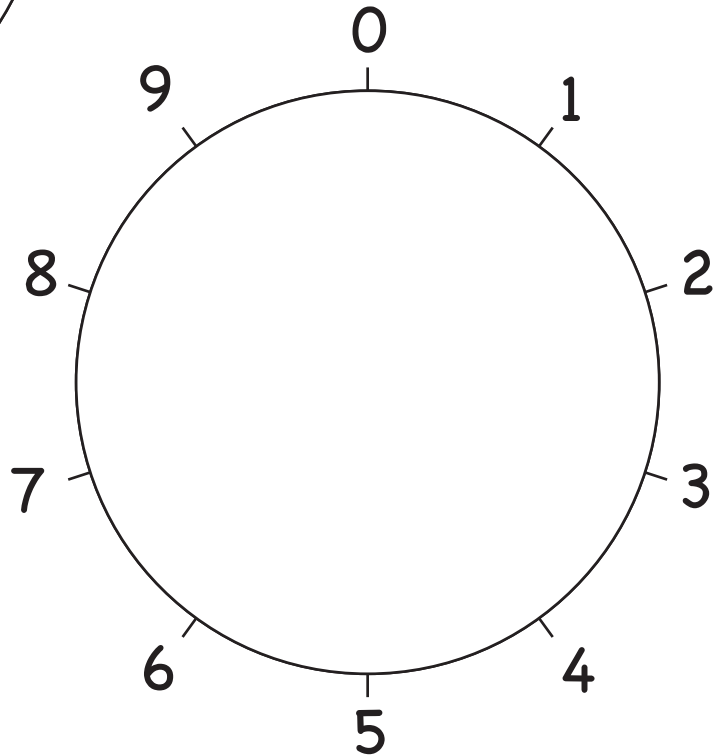


Multiples of Four Pattern in the Unit's Place

Imagine what the pattern in the unit's digits of multiples of four will look like.

Then trace a path from zero to the numbers in the unit's place in sequential order.

Use a multiplication table if needed.



Multiples of Six Pattern in the Unit's Place

Imagine what the pattern in the unit's digits of multiples of six will look like.

Then trace a path from zero to the numbers in the unit's place in sequential order.

Thinking about Number Patterns: Describe the circular patterns made by connecting the numbers in the unit's place of multiples of four and six.

Do you like exploring number patterns in math? Why or why not?

Patterns in the Unit's Place

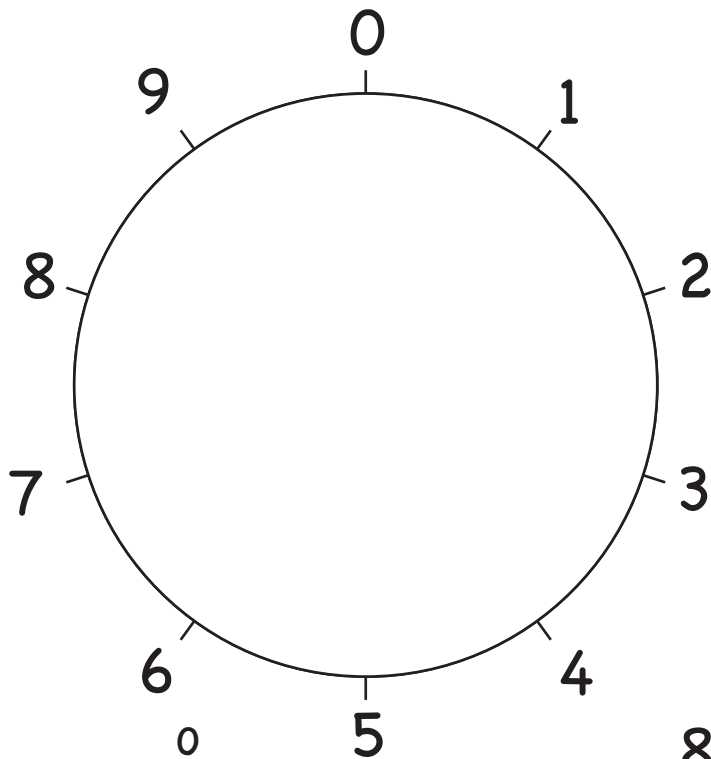
Multiples of Five and Twenty-five

name: _____

Multiples of Five Pattern in the Unit's Place

Zero is always the first number in the unit's place for multiples of any number.

Imagine what the pattern in the unit's digits of multiples of five will look like. Then trace a path from zero to the numbers in the unit's place in sequential order.

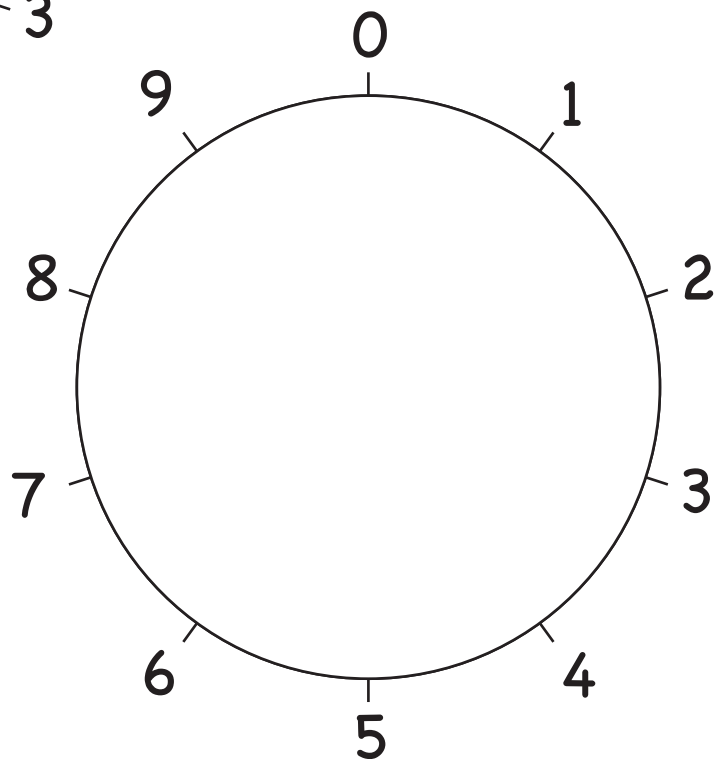


Multiples of Twenty-five

0
25
50
75
100
125
150
175
200
225
250
275

Multiples of Twenty-five Unit's Place Pattern

Draw the pattern found in the unit's place of multiples of twenty-five.



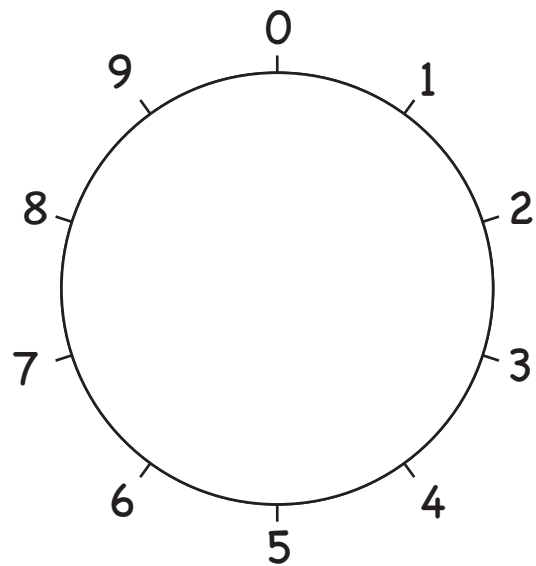
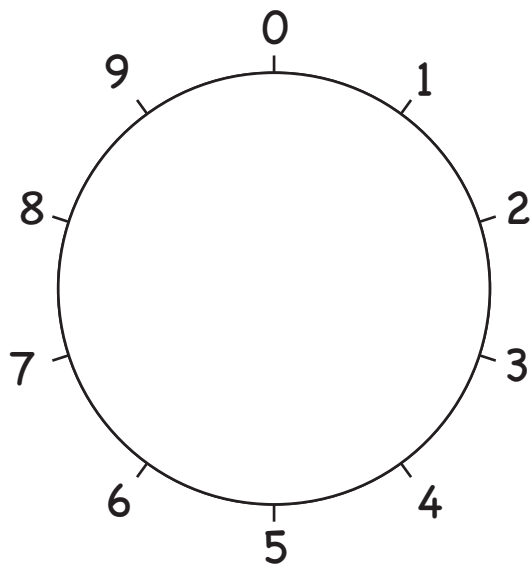
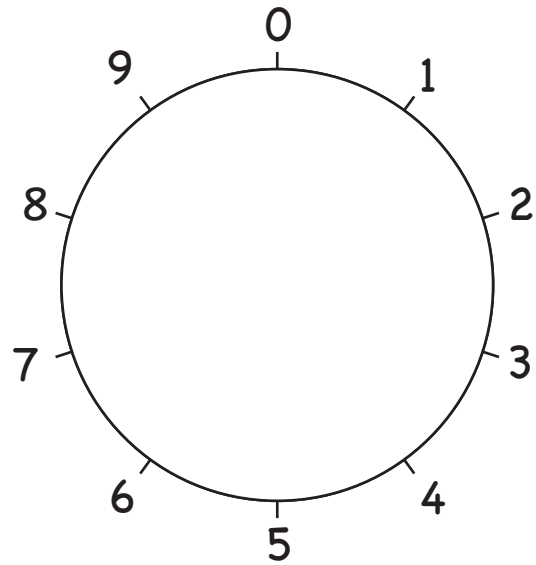
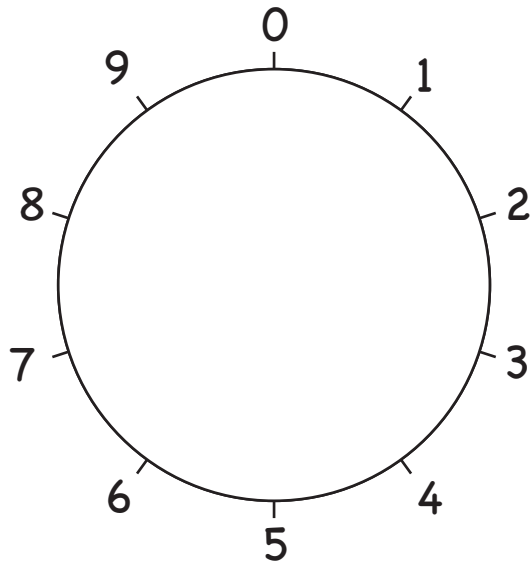
Thinking about Number Patterns: Is there any difference at all in these patterns? Why or why not?

If you were given a list of the digits in the unit's place of these two numbers how could you tell which was which?

Patterns in the Unit's Place

name: _____

There are many numerical patterns worth exploring. This activity gives you a taste of what is available. Use an arrow to show the direction of the pattern. Write the factor that goes with each pattern in the center of the circle.



Finding the Unit's Place

name: _____

10,000's Place	1,000's Place	100's Place	10's Place	Unit's Place
	1	7	2	9
	1,000x1= 1,000	100x7= 700	10x2= 20	1x9= 9
one thousand, seven hundred and twenty-nine				
4	3	8	0	5
10,000x4= 40,000	1,000x3= 3,000	100x8= 800	10x0= 0	1x5= 5
forty-three thousand, eight hundred and five				

Thinking about the unit's place:

Circle the digit in the unit's place in each number:

1,729

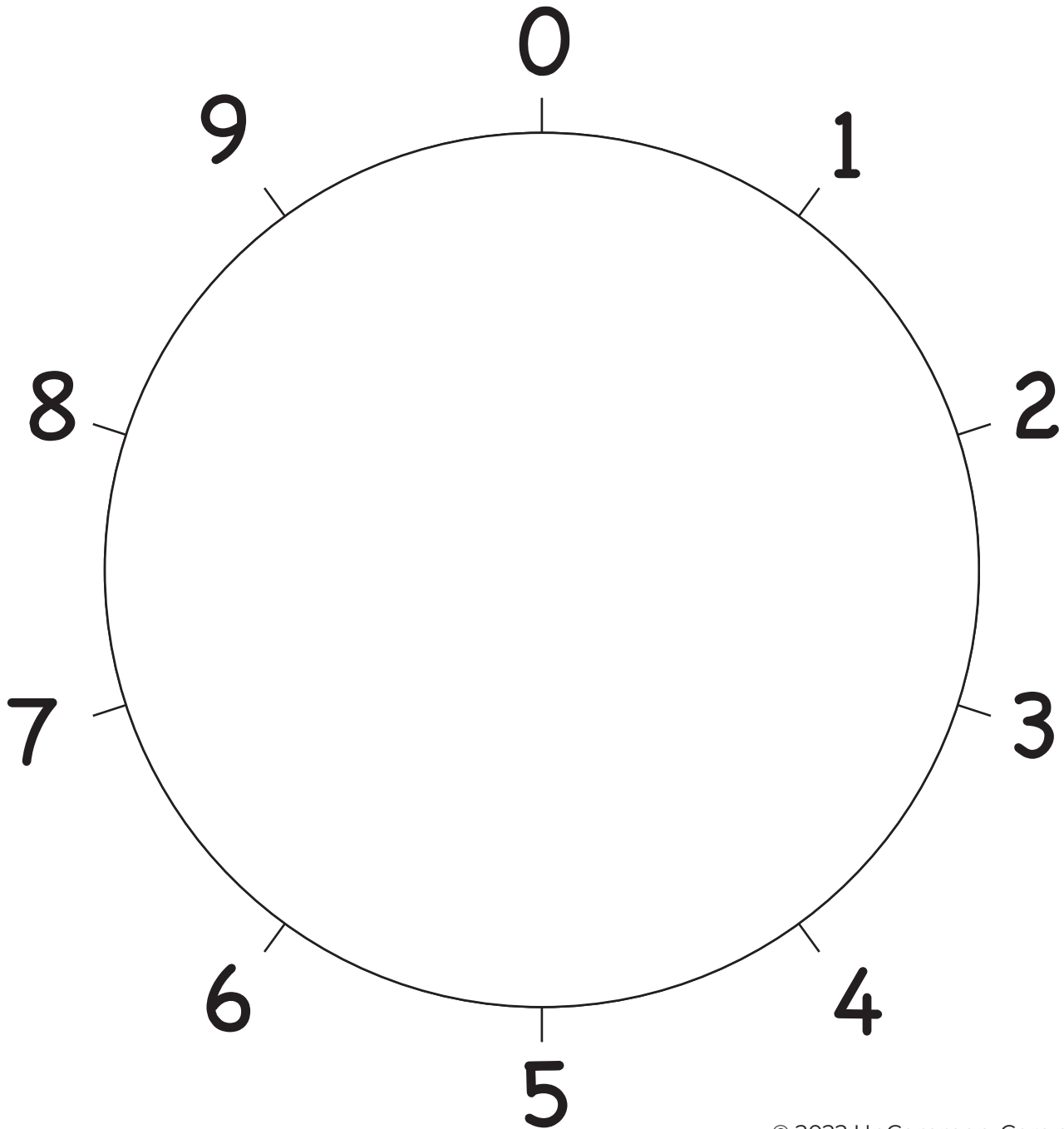
43,805

Explain how the value given to digits changes, based on their place in the number.

Patterns in the Unit's Place

name: _____

First: Choose a factor to use in your design. Next: Think of or list the multiples of that factor. Then, starting with zero, draw lines between the digits in the units place in sequential order. Use an arrow to show the direction of the pattern if needed. Write the factor that goes with the pattern in the center of the circle.



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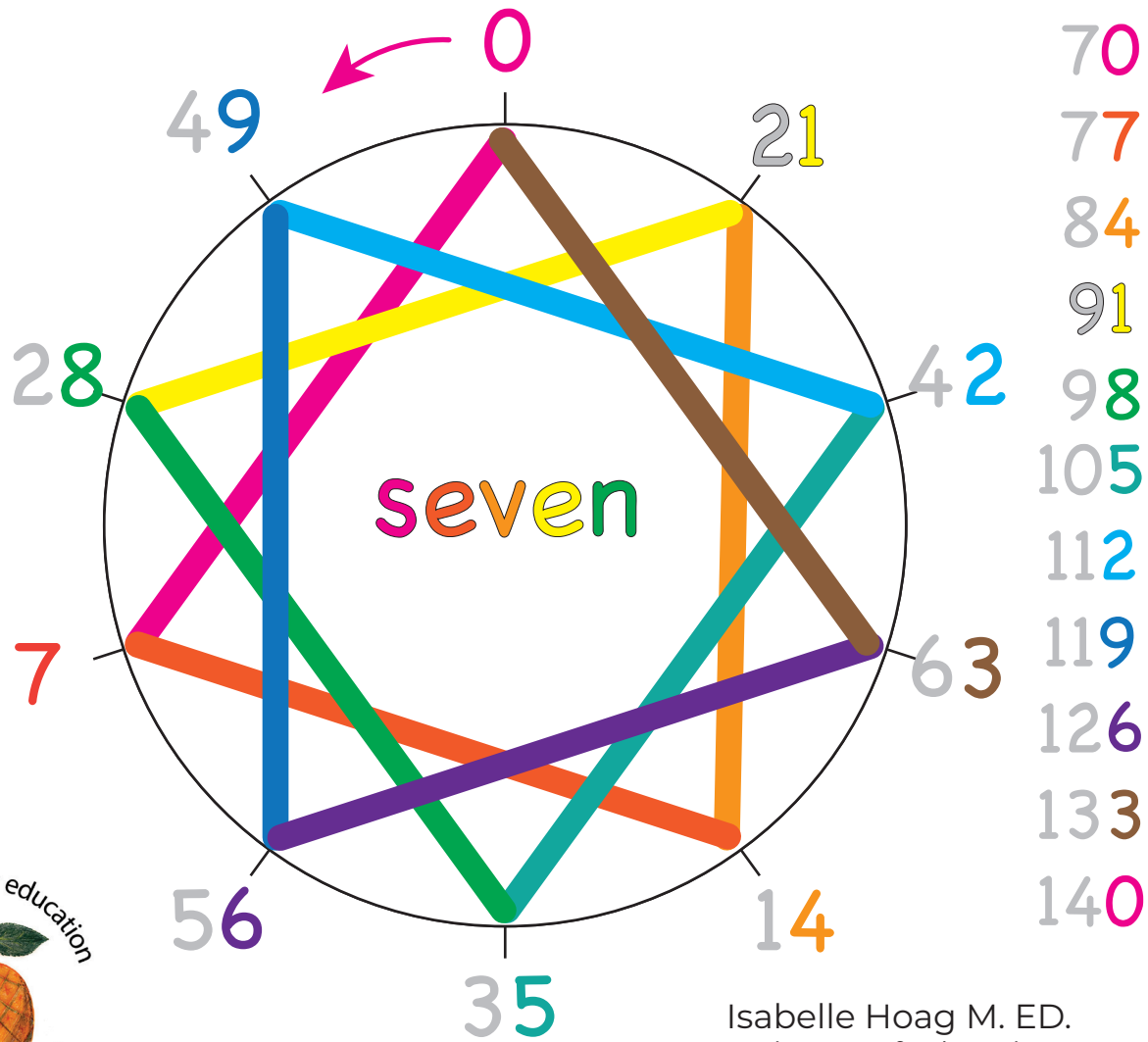
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