

## Single digitization and the almost forgotten “casting out 9’s”

**Single-digitization** is exactly what the name implies, converting any number into a single digit. For those of you who enjoy challenges, cover the right-hand side of the explanation below and try to figure out how the following numbers convert into a specific single digit:

-----Explanation-----

a) 3.14	=	8		( 3 + 1 + 4 = 8 )
b) 1117	=	1		( 1 + 1 + 1 + 7 = 10 = 1 + 0 = 1 )
c) 1957	=	4		( 1 + 9 + 5 + 7 = 22 = 2 + 2 = 4 )

To **single-digitize** any number, simply add all the digits in that number together, if they add up to more than a single digit, repeat the process until you end up with one single digit!

Now try these:

d) 22	=	4		
e) 55	=	1		(because 10 = 1 + 0 = 1)
f) 66	=	3		( 12 = 1 + 2 = 3 )
g) 747	=	9		( 18 = 1 + 8 = 9 )
h) 2256863173	=	7		( 43 = 4 + 3 = 7 )

So that is how you **single-digitize** any number!

### Single-digitization and geometric shapes

The following exercise will provide more practice with **single-digitization** and to see sequences/patterns in a very innovative and unique way! (I was very fortunate to have learned this from Cal-State Fullerton mathematics professor **Gerald Gannon** many years ago.)

Pick any **single-digit** number (1,2,3,4,5,6,7,8 or 9). Ex: 4

Write out the first 10 **multiples** of the number you chose. 4,8,12,16,20,24,28,32,36,40

Convert each “multiple of 4” into a **single-digit**. 4, 8, 3, 7, 2, 6, 1, 5, 9, 4

Imagine what kind of pattern that **sequence of 10 single digits** make up on a 9-digit clock face?

Using straight lines connect the digits in the order they appear in the above sequence on the “clock-face” template provided. Go from 4 to 8, 8 to 3, 3 to 7, 7 to 2, 2 to 6, and so on...

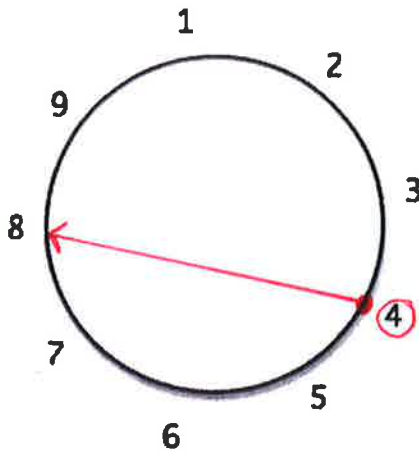
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<sup>1</sup> LIGO-SEC/ T. Huynh-Dinh 2009 (Modified 2015) Questions/comments: [tien@ligo-la.caltech.edu](mailto:tien@ligo-la.caltech.edu)

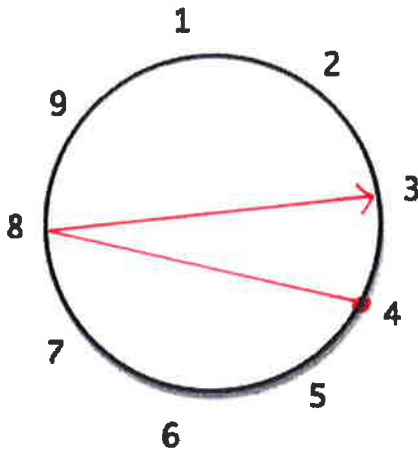
\*\*\* For an electronic copy of the rest of this handout email: [tien@ligo-la.caltech.edu](mailto:tien@ligo-la.caltech.edu)

# "FOUR"

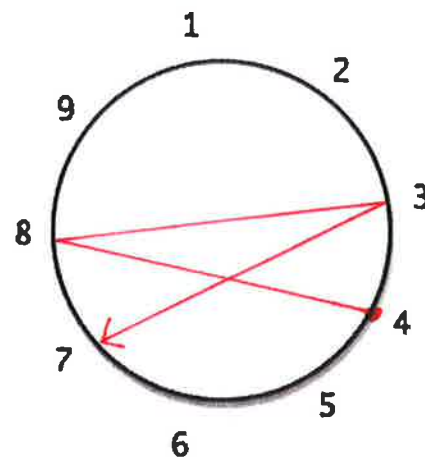
4 → 8



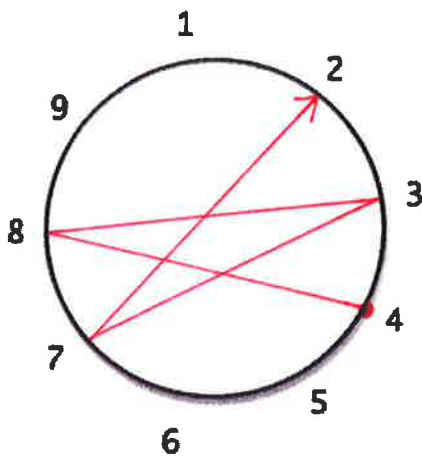
8 → 3



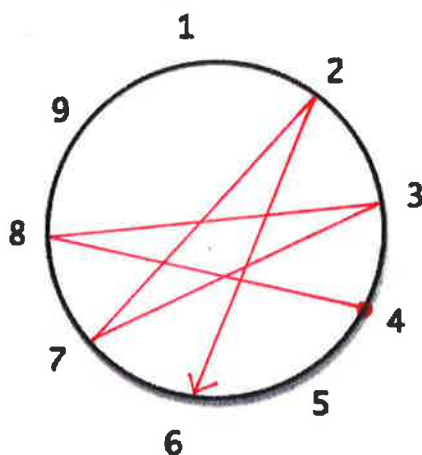
3 → 7



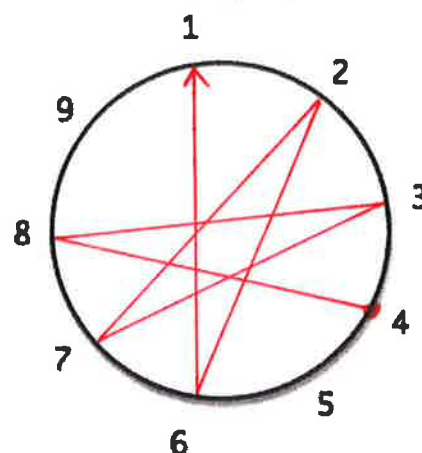
7 → 2



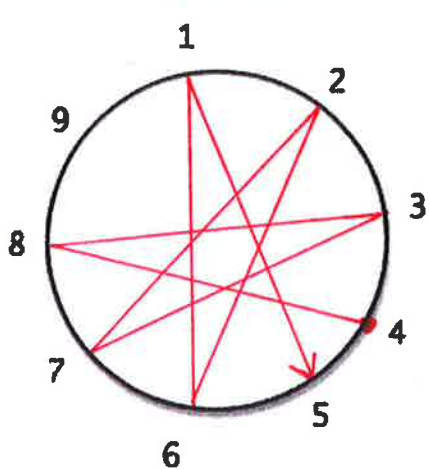
2 → 6



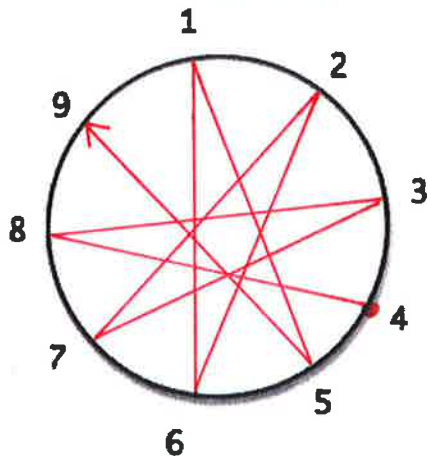
6 → 1



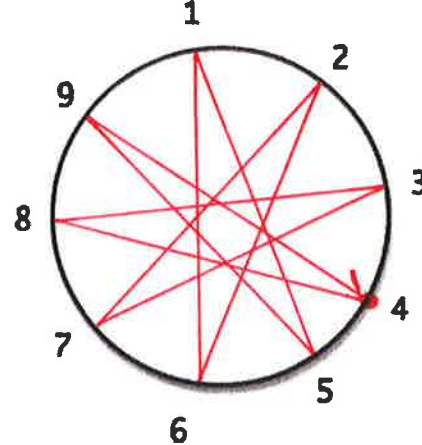
1 → 5



5 → 9

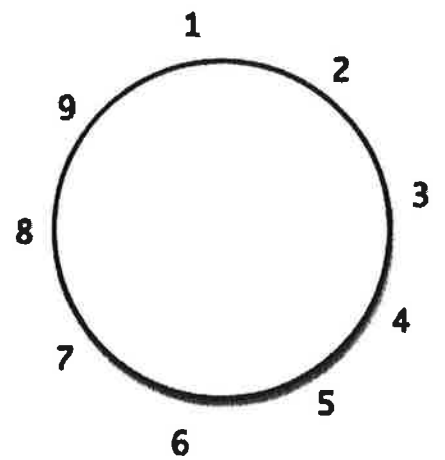
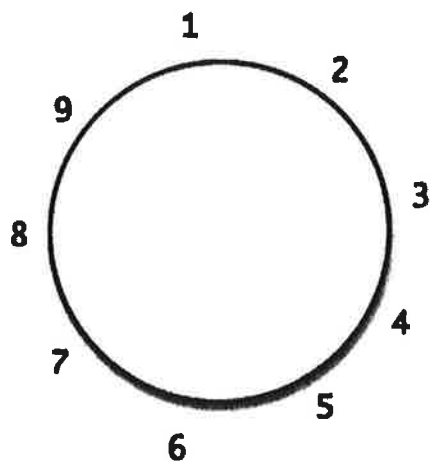
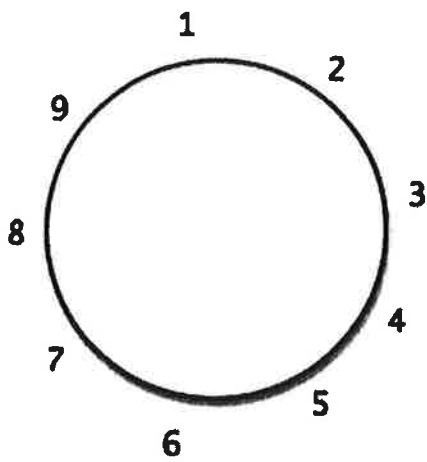
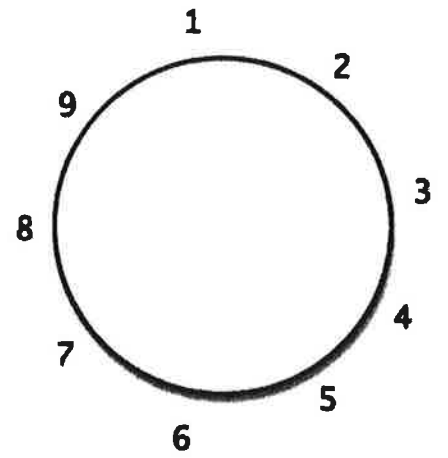
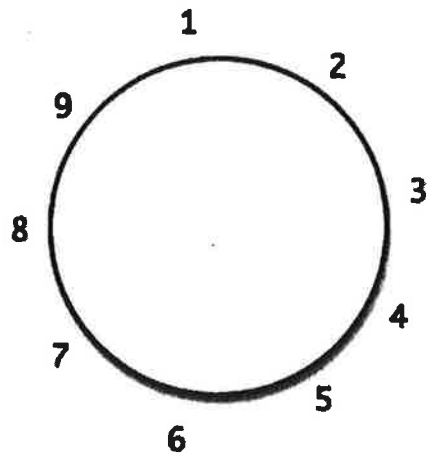
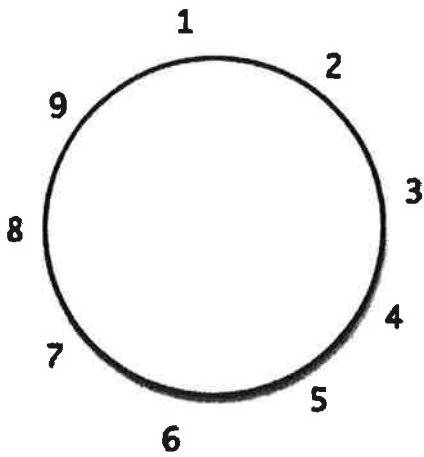
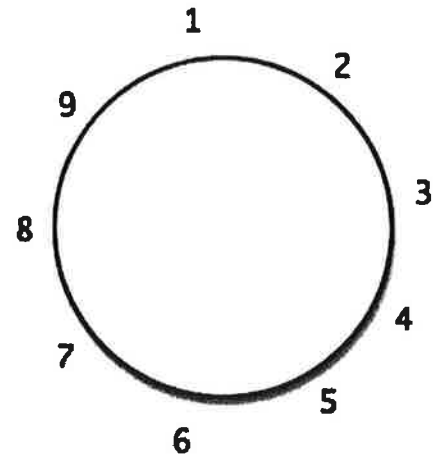
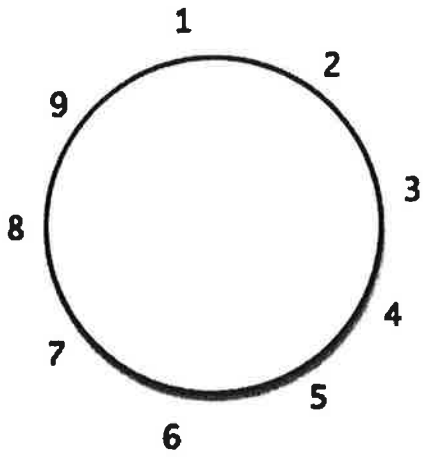
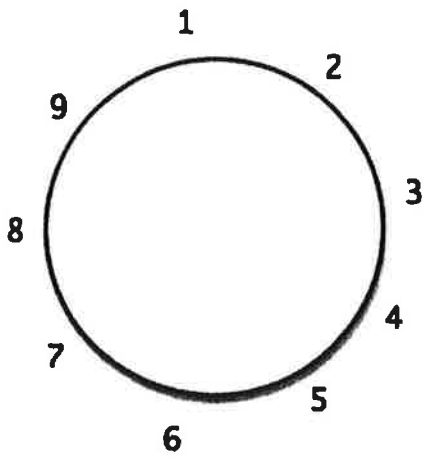


9 back to 4 !! 😊



Student<sup>^</sup> worksheet

Name: \_\_\_\_\_



Student<sup>^</sup> worksheet

Name: \_\_\_\_\_

