

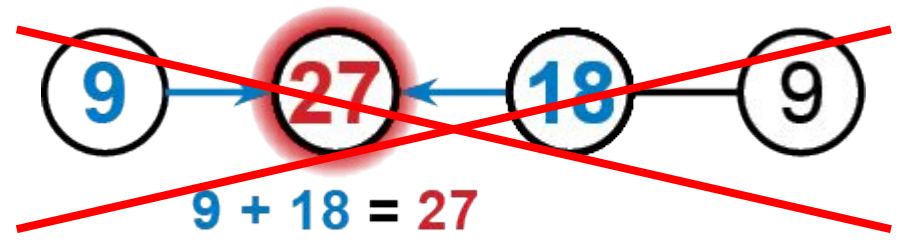
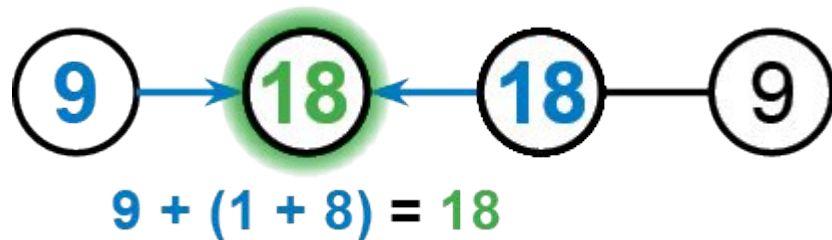


Digit Sums

Definition: The sum of the digits of a number is called its **digit sum**. For example, the digit sum of 17 is 8 because $1 + 7 = 8$.

Objective: Fill in each empty circle with a counting number (1, 2, 3, 4, 5,...) according to the following rule.

Rule: The number in each circle must be the total of the digit sums of the numbers in all of the circles connected to it. The example on the right is not correct, because 27 was derived by adding the number 18 rather than the digits of 18.

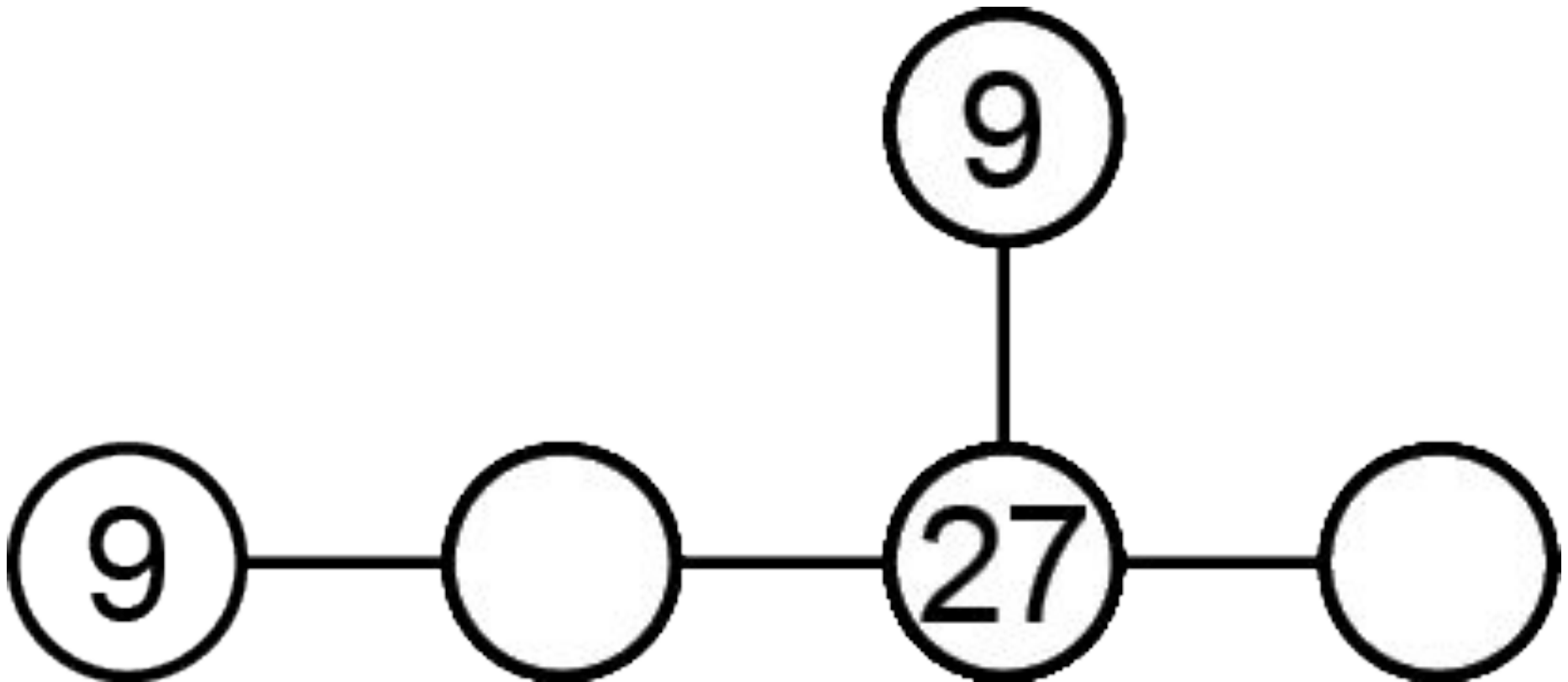




Digit Sums

Example:

1. Here is a Digit Sums puzzle with two empty circles that we need to fill in. Try filling in the empty circles before going to the next page.



Note: Double check to see that each circle represents the sum of the digits of all circles connected to it.

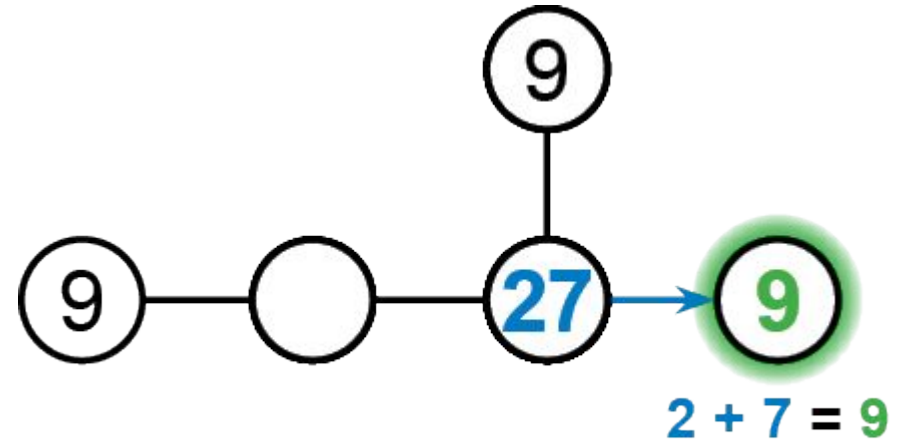


Digit Sums

Example:

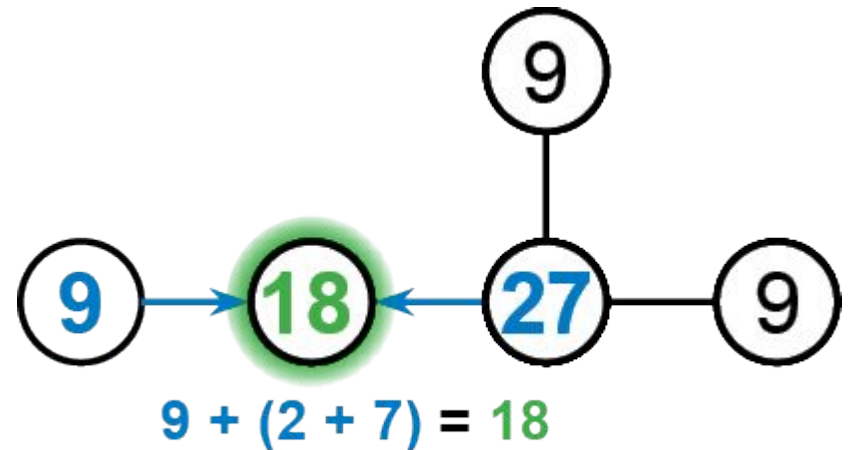
2. Filling in the Right Circle:

- The right empty circle is only connected to the blue 27.
- Add together **all** of the blue digits.
- Write the sum, the green 9, in the empty circle.



3. Filling in the Left Middle Circle:

- The left empty circle is connect to the blue 9 and blue 27.
- Add together **all** of the blue digits. Watch out: This is different than adding together 9 and 27!
- Write the sum, the green 18, in the empty circle.

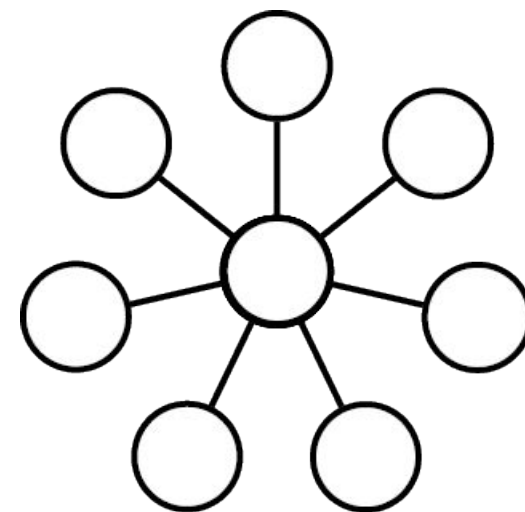
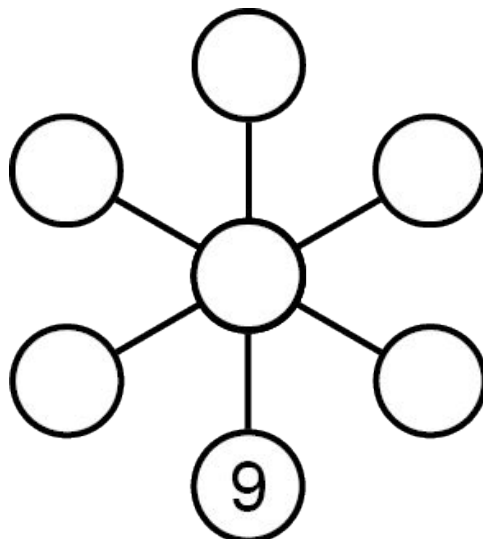
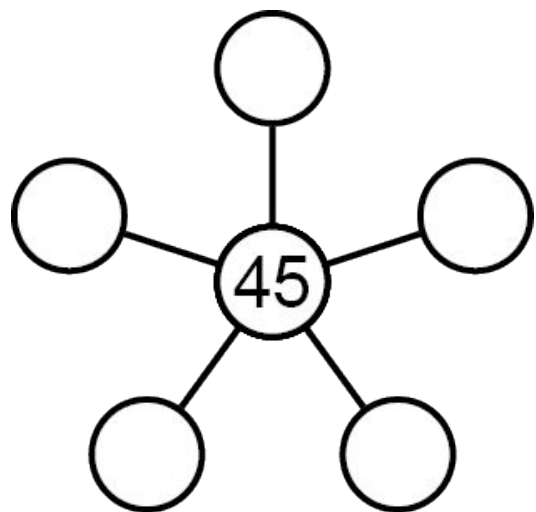
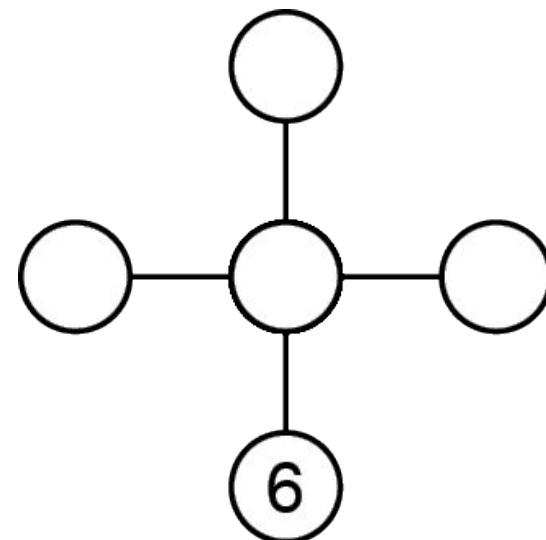
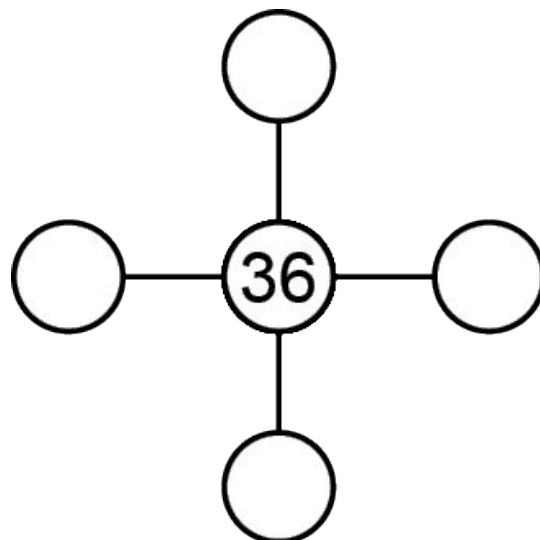
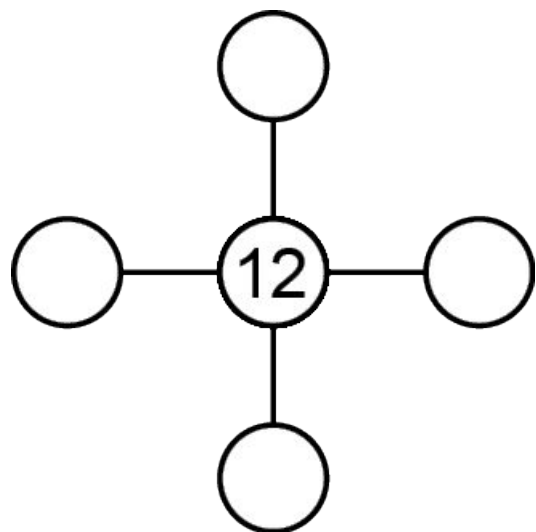




Digit Sums

Star Puzzles

A **star** has one circle in the middle that is connected to many outside circles. Can you solve the 4-point, 5-point, 6-point, and 7-point star puzzles below? Do any of the puzzles have more than one solution?

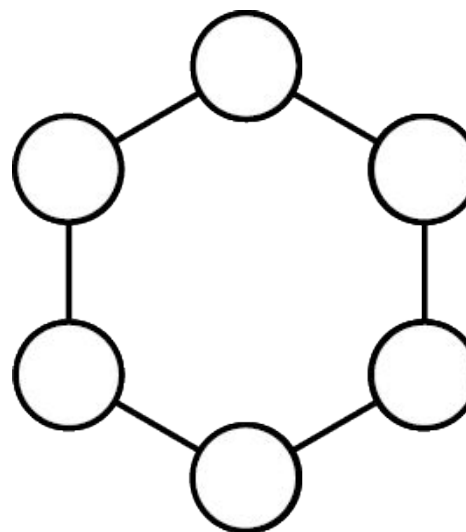
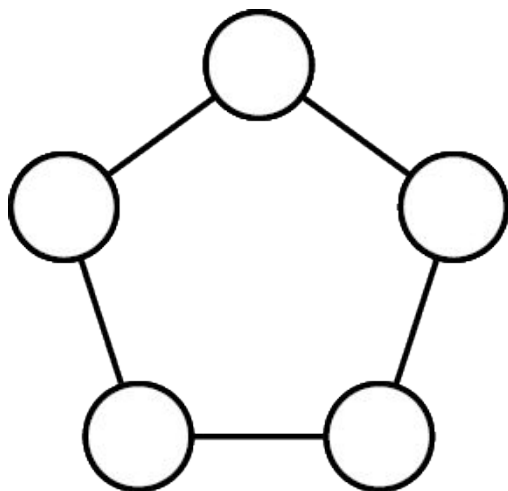
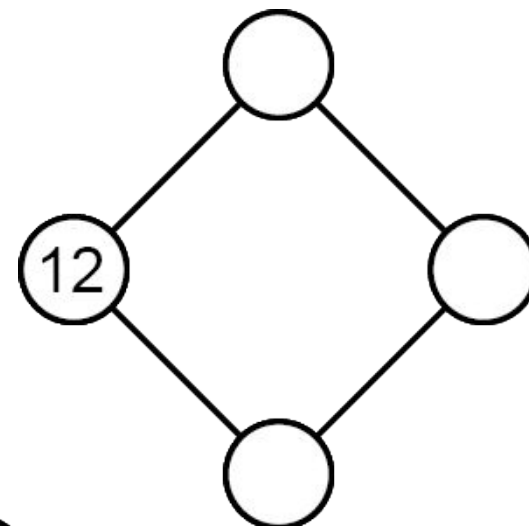
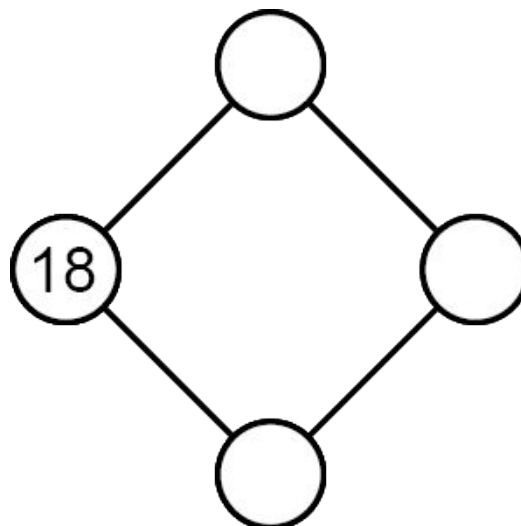
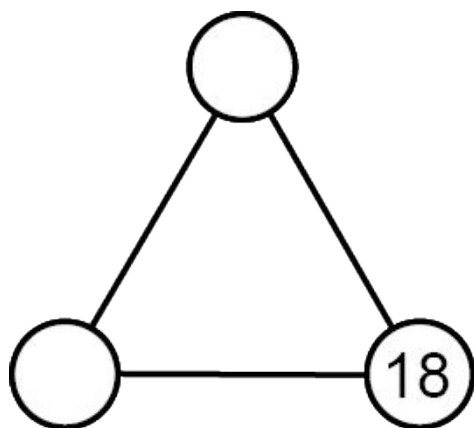




Digit Sums

Cycle Puzzles

A **cycle** is a closed path of circles in which each circle is connected to exactly two circles. Can you solve the 3-cycle, 4-cycle, 5-cycle, and 6-cycle puzzles below? Do any of the puzzles have more than one solution?

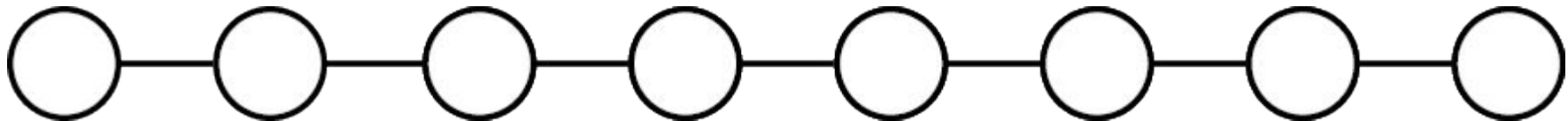
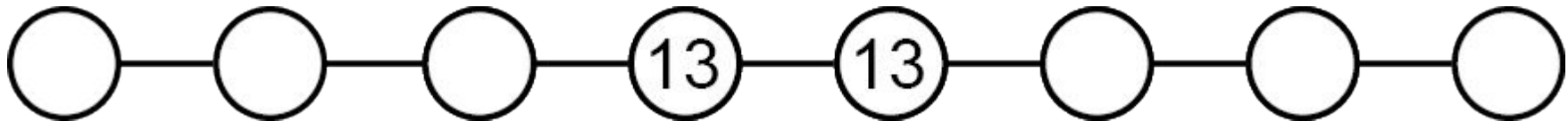
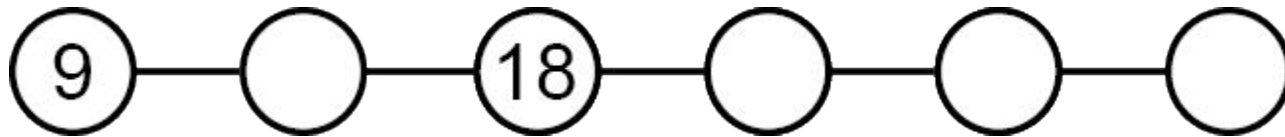




Digit Sums

Path Puzzles

A **path** is a line of circles with a starting and ending circle. Can you solve the 5-path, 6-path, and 8-path puzzles below? Do any of the puzzles have more than one solution?





Digit Sums

Bonus Puzzles

If you finished all of the other puzzles, try some of these. Do any of the puzzles have more than one solution?

