Spotless Dice 0.1

This is a net for a standard die with some spots removed. What number was on each face originally?

Spotless Dice 0.2

This is a net for a standard die with some spots removed. What number was on each face originally?

Spotless Dice

How many spots can you remove from a standard die and still tell what number was on each face originally?
A standard six-sided die spontaneously starts to divide like a living cell. The spots on the die move during the process and spread across the faces of the resulting pair of dice. That is, the two daughter dice share between them the spots from the original parent die, but possibly in new locations. After a while the new spots are fixed in place.

It turns out that when the two new dice are rolled at the same time, the possible totals are still the numbers from 1 to 6, and they are all still equally likely. How could the spots be arranged on the two dice?
Defacing Dice

You cut the faces off a die and separate them into two piles, for example 1256 & 34. Now you choose one face randomly from each pile and add the numbers. What could be in each pile if the possible totals are equally likely?
Seven Sticks

I have seven sticks, all different lengths, all a whole number of centimetres long. I can tell the longest one is less than 30 cm long, because it’s shorter than a piece of paper, but other than that I have no way of measuring them. Whenever I pick three sticks from the pile, I find that I can’t ever make a triangle with them. How long is the shortest stick?
Only Ones

Using any or all of the operations of addition, subtraction, multiplication, division and exponentiation (and brackets), and as many of the number 1 as you need, produce each of the numbers from 2 to 20. For example, here is one way to make the number 17:

\[(1 + 1 + 1)^{(1+1)} \times (1 + 1) - 1 = 17\]

What is the smallest number of 1's needed to make each number from 2 to 20?

(Note you can't concatenate the 1's to make numbers like 11 – each 1 must stand alone as its own number.)
Pi on the Floor

Using any of the operations of addition, subtraction, multiplication and division (and brackets), and as many of the number $\pi$ as you need, and also as many of the floor function $\lfloor \cdot \rfloor$ as you need, make each of the whole numbers from 1 to 20.

For example, here is one way to make the number 17:

$$\left[ (\pi + \pi) \times \lfloor \pi \rfloor \right] - \frac{\pi}{\pi} = 17$$

What is the least number of $\pi$’s required to make each number?
The Number Dress-Up Party

All the numbers have come to a dress-up party in full costume. They all know themselves which costume everyone else is wearing, but you don’t know. If you pick any two of them and ask them to combine with +, -, × or ÷, they will point out which costume is the correct answer, and they’ll happily do it as often as you want. (They’ll also tell you if the answer isn’t anywhere.)

How do you correctly identify the numbers 0, 1, 2 and 3? How do you do it in as few steps as possible?
Five-part triangle

Find five congruent triangles that will fit together without gaps to form one bigger triangle.