Math Kangaroo Class Level 3-4

Lesson 3:

Making an Organized List

Warm Up

Instruction

Making an Organized List

Exit Ticket

Bonus Slides

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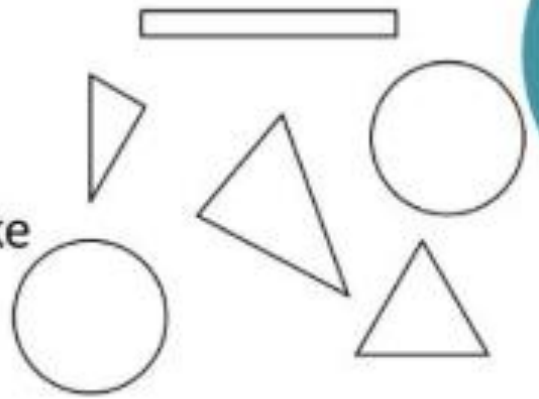
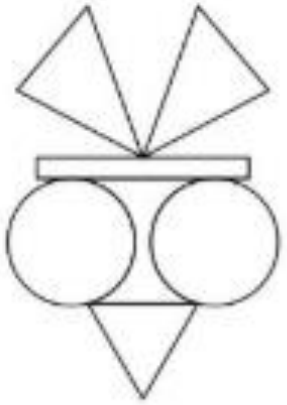
Warm up

MK 2020 # 5

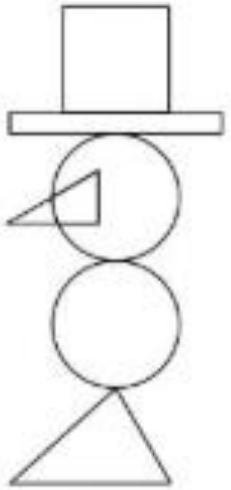
Which one of the figures on the bottom of the picture can you make using only the shapes shown in Picture 1?



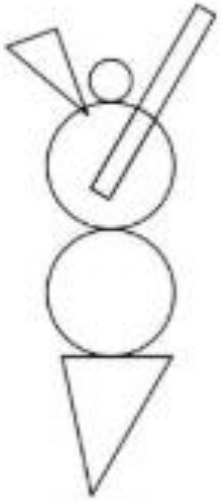
Picture 1



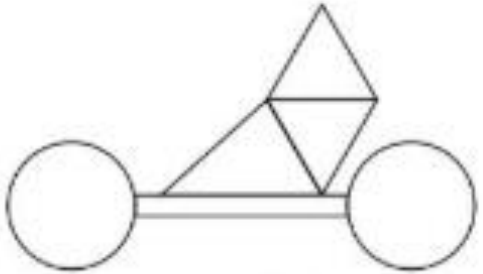
(A)



(B)



(C)



(D)

(E)

Lesson 3: Making an organized list

Organizing information into some type of list may serve a variety of purposes. When a problem requires you to generate a large amount of data, a list may help you account for all possibilities and avoid repetitions.

This strategy is often used in "casework." Casework is **the process of splitting up a problem into a finite number of cases** and then determining mathematical results for each respective case. Once all cases are "solved," the solution to the underlying problem becomes clear. Casework is used in nearly all areas of mathematics. We will see later in our examples how to make a list by case to keep track of counts.

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MK 1998 # 6

1. How many three-digit numbers can you create using the digits 3, 0, and 7, and using each digit only once?

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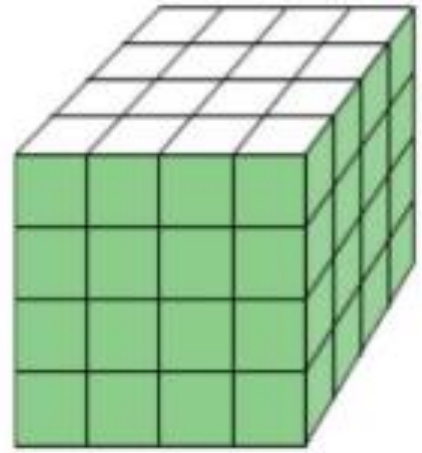
MK 2010 # 12

2. We made a big cube using 64 small white cubes, and then we painted five of the sides of the big cube. How many of the small cubes have exactly two sides painted?



MK 2015 # 14

3. Josip has 4 toys: a car, an airplane, a ball, and a ship. He wants to put them all in a row on a shelf. Both the ship and the airplane have to be next to the car. In how many ways can he arrange the toys so that this condition is fulfilled?

MK 2019 # 19

4. The pages of a book are numbered 1, 2, 3, 4, 5, and so on. The digit 5 appears exactly 16 times. What is the maximum number of pages this book could have?

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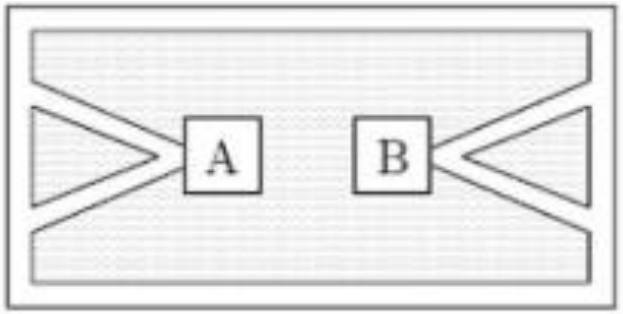
MK 2008 # 23

5. In the botanical garden shown in the picture, visitors walk only on the marked paths. In how many different ways can one go from greenhouse A to greenhouse B if you only walk on a given path once?



Bonus Question

MK 2005 # 20

6. In a certain trunk there are 5 chests. In each chest there are 3 boxes, and in each box there are 10 gold coins. The trunk, the chests, and the boxes are locked. At least how many locks need to be opened in order to take out 50 coins?