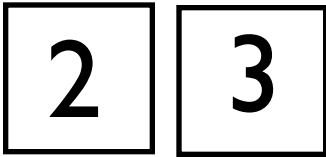


Calendar Dice

Can you put 6 one digit numbers on each of 2 die so that they can be moved and/or turned so that the the 2 top numbers display all possible 31 days of the month. Any number from 1 to 31 must be able to be displayed.

Examples:

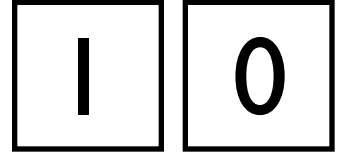
The date is the twenty third



The date is the third

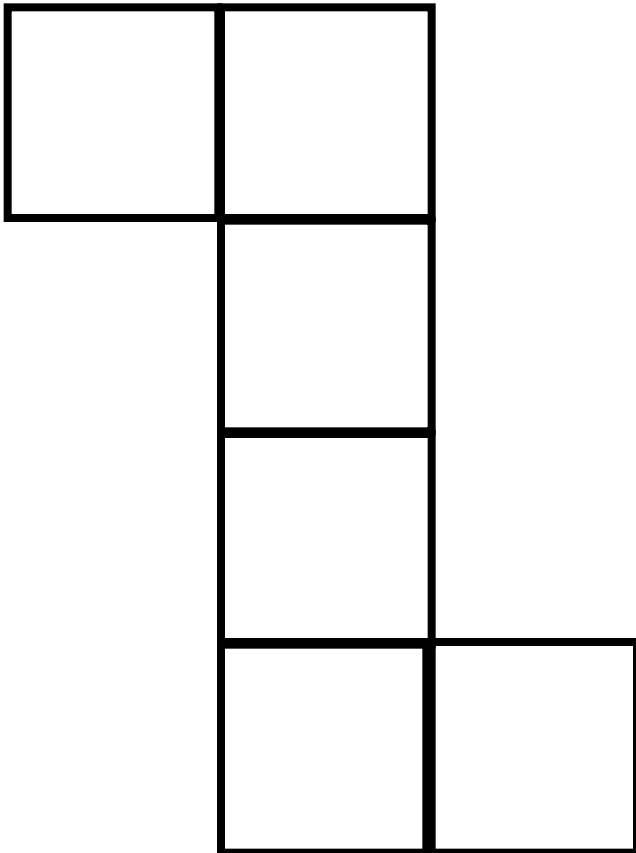


The date is the tenth

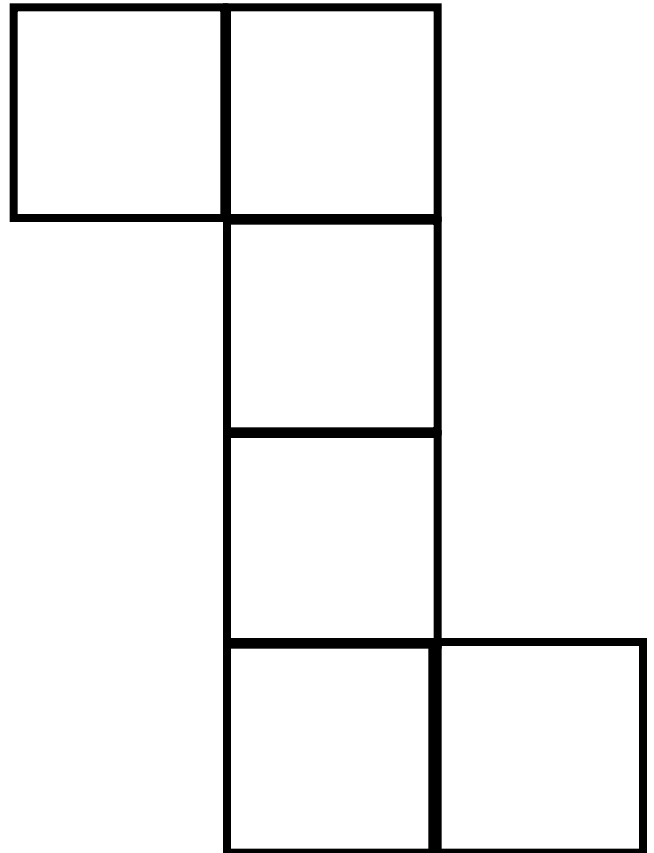


Write the 6 digits you determine are needed on each of the die below. When you have done this cut out the two die and then fold and tape them together to make two cubes. Test the die to see if all possible 31 dates can be displayed

Die 1



Die 2



Worksheet

Use as many of the blank die below as needed to try and solve the problem. When you have solved the problem write the digits on the two die on page 1. Cut out the two die and then fold and tape them together to make two cubes. Test the die to see if all possible 31 dates can be displayed

Die 1

--	--	--	--	--	--

Die 2

--	--	--	--	--	--

Die 1

--	--	--	--	--	--

Die 2

--	--	--	--	--	--

Die 1

--	--	--	--	--	--

Die 2

--	--	--	--	--	--

Die 1

--	--	--	--	--	--

Die 2

--	--	--	--	--	--

Die 1

--	--	--	--	--	--

Die 2

--	--	--	--	--	--

Die 1

--	--	--	--	--	--

Die 2

--	--	--	--	--	--

Solution:

There are 10 digits: 0, 1,2,3,4,5,6,7,8 and 9. There are 6 possible numbers on each die for a total of 12 positions to place the 10 digits. This means that some of the digits are used on both die. Start with determining which digits must be used on both die.

The dates 11 and 22 require that both die have a 1 and a 2 them. There are no 33 or 44 dates so only the 1 and the 2 need to be repeated. That leaves 4 open positions on each die.



There needs to be at least 1 zero so put it on Die 1.



The dates 03, 04, 05 06, 07 08 and 09 require the use of a zero paired with each of the seven digits 3,4,5,6,7,8 and 9. If you try to pair the zero on Die 1 with each of these seven digits you see that all seven digits 3,4,5,6,7,8 and 9 cannot be placed in the 4 open faces on Die 2. This means some of the seven digits must be placed on Die 2 and the rest on Die 1. Since the seven dates 03, 04, 05 06, 07 08 and 09 require the use of a zero, the digits placed on Die 1 require that a zero also be on Die 2.

This requires that a zero be placed on each die.

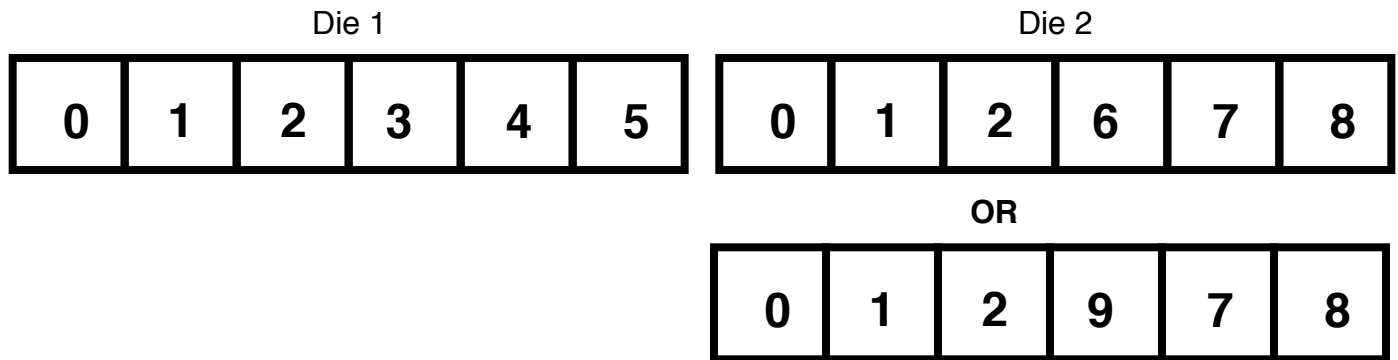


The digits seven 3,4,5,6,7,8 and 9 now need to be placed on the remaining 6 places.

How can 7 different digits be placed in the 6 remaining places?

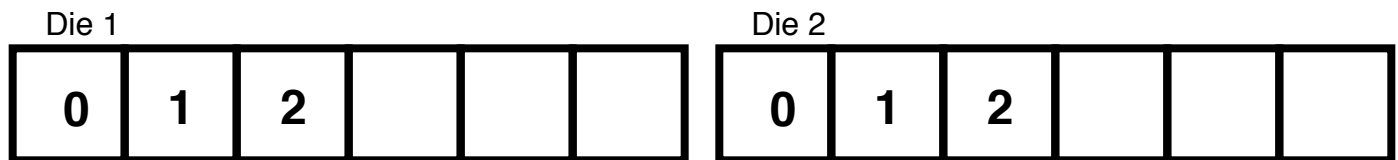
We have problem !!!!

The final part of the solution is to see that the digit 6 can be rotated to be the digit 9. Only one of these digits needs to be used. Place the five digits 3,4,5,7,8 in any of the six open places on the two die and then place a 6 (or 9) in the remaining open space.



NOTE: There are more than one set of die that solve the problem but a single solution can be written that fits all possible cases.

Step 1. Place a 0, 1 and 2 on each die.



Step 2: Place any 3 of the five digits 3,4,5,7,8 on Die1

Step 3: Place the remaining 2 digits on Die 2 along with a 6 or a 9.