

SPIRE MATHS

Stimulating, Practical, Interesting, Relevant, Enjoyable Maths For All
2021

Download ActivInspire, PowerPoint and Teacher Notes from:

<https://spiremaths.co.uk/yr2021/>

It is good if you can keep the digits in the order 2021, but you don't have to

2 + 0 - 2 + 1 = 1

2 0 + 2 1 = 4 1

Make numbers using the four digits of 2021

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Digit Cards: Making Numbers

Click any pink rectangle to Show what's underneath it. Click object to hide it again.

Use each of the four digits from 2021 exactly once. What is the lowest integer that you cannot make? The highest that you can make?

$$1 = 2 + 0 - 2 + 1$$

It is good if you can keep the digits in the order 2021, but you don't have to do this.

These things are allowed:

Juxtaposition: so

$$20 + 21 = 41$$

Powers

$$20^2 + 1 = 401$$

A convention is that:

$$2^0 = 1$$

In fact any number to the power 0 is equal to 1.

$$2021$$

Digit Cards: Making Numbers

Click any pink rectangle to Show what's underneath it. Click object to hide it again.

Use each of the four digits from 2021 exactly once. What is the lowest integer that you cannot make? The highest that you can make?

These things are allowed:

Factorials

$$(2 + 0 + 2 + 1)! = 120$$

Factorial 5 is written as 5! etc.

$$5! = 5 \times 4 \times 3 \times 2 \times 1 = 120$$

A convention is that

$$0! = 1$$

$$2021$$

$$2021 \text{ Use these for powers } = + - \times \div () [] ^ !$$

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Using these rules you can get to 27.

Click pink rectangle to Show answer; click answer to Hide it.

1	=
2	=
3	=
4	=
5	=
6	=
7	=
8	=
9	=
1 0	=

2021

2021

Use these for powers

= + - x ÷ () [] ^ !

Digits in year order 2021
Digits not in year order

Using these rules you can get to 27.

Click pink rectangle to Show answer; click answer to Hide it.

1	1	=
1	2	=
1	3	=
1	4	=
1	5	=
1	6	=
1	7	=
1	8	=
1	9	=
2	0	=

2021

2021

Use these for powers

= + - x ÷ () [] ^ !

Digits in year order 2021
Digits not in year order

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Using these rules you can get to 27.

Click pink rectangle to Show answer; click answer to Hide it.

2	1	=
2	2	=
2	3	=
2	4	=
2	5	=
2	6	=
2	7	=
2	8	=
2	9	=
3	0	=

2 0 2 1

Use these for powers

= + - x ÷ () [] ^ !

Digits in year order 2021

Digits not in year order

What numbers can be made over 30?

Up to 100

Over 100

Click pink rectangle to Show answer; click answer to Hide it.

Digits in year order 2021

Digits not in year order

2 0 2 1

Use these for powers

= + - x ÷ () [] ^ !

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What about very large numbers?

Click pink rectangle to Show answer; click answer to Hide it.

Can you make over 1 million?

Which of these will be largest?

$201^{(2)}$
$20^{(21)}$
$2^{(210)}$
$2021!$
$10^{(2+2)}$
$20^{(2+1)}$

2 0 2 1

2 0 2 1

Use these for powers

= + - x ÷ () [] ^ !

1	$2 \times 0 + 2 - 1$
2	$2 \times 0 + 2 \times 1$
3	$2 \times 0 + 2 + 1$
4	$2 + 0 + 2 \times 1$
5	$2 + 0 + 2 + 1$
6	$(2 + 0) \times (2 + 1)$
7	$(10 \div 2) + 2$
8	$(2 + 0)^{(2 + 1)}$
9	$(2 + 1)^2 + 0$
10	$10 + 2 - 2$
11	$10 + (2 \div 2)$
12	$2 \times 0 + 12$
13	$12 + 2^0$
14	$2 + 0 + 12$

15	$2 + 0! + 12$
16	$2^{(0! + 2 + 1)}$
17	$20 - 2 - 1$
18	$20 - (2 \times 1)$
19	$20 - 2 + 1$
20	$20 \div (2 - 1)$
21	$20 + 2 - 1$
22	$20 + (2 \times 1)$
23	$20 + 2 + 1$
24	$(2 + 0 + 2)! \times 1$
25	$(2 + 0 + 2)! + 1$
26	$(2 + 2)! + 1 + 0!$
27	$(2 + 0!)^{(2 + 1)}$

32	$20 + 12$
39	$(20 \times 2) - 1$
40	$(20 \times 2) \times 1$
41	$(20 \times 2) + 1$
42	$(20 + 1) \times 2$
43	$21 \times 2 + 0!$
44	$22 \times (1 + 0!)$
48	$(2 + 2)! \times (1 + 0!)$
50	$10^2 \div 2$
51	$102 \div 2$
60	$20 \times (2 + 1)$
64	$(10 - 2)^2$
98	$10^2 - 2$

105	$210 \div 2$
118	$120 - 2$
120	$20 \times ((2 + 1)!)$
121	$(2 + 2 + 1)! + 0!$
122	$120 + 2$
199	$201 - 2$
201	$202 - 1$
202	202×1
203	$202 + 1$
204	102×2
208	$210 - 2$
211	$212 - 0!$
212	$210 + 2$

213	$212 + 0!$
219	$220 - 1$
220	220×1
221	$220 + 1$
222	$221 + 0!$
240	20×12
399	$20^2 - 1$
400	$20^2 \times 1$
401	$20^2 + 1$
402	201×2
420	20×21
441	$(20 + 1)^2$

Digits in year order 2021
Digits not in year order

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Resource Sheet

Add additional numbers that you can make in the fourth column

No.	Expression	No.	Expression	No.	Expression	No.	Expression
1		26		105			
2		27		118			
3				120			
4		32		121			
5		39		122			
6		40		199			
7		41		201			
8		42		202			
9		43		203			
10		44		204			
11		48		208			
12		50		211			
13		51		212			
14		60		213			
15		64		219			
16		98		220			
17				221			
18				222			
19				240			
20				399			
21				400			
22				401			
23				402			
24				420			
25				441			