2020 In Numbers: Mathematical Style, **Zenodo**,
December 29, 2019, pp. 1-27, http://doi.org/10.5281/zenodo.3594746

2020 In Numbers: Mathematical Style

Each day 20, 20h, 20m, 20s it will be
20.20.20.20.2020

Palindromic day on February 02
02.02.2020

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Abstract

*This short work brings representations of 2020 in different situations. These representations are of **crazy-type, running numbers, single digit, single letter, Triangular, Fibonacci, palindromic-type, prime numbers, embedded, repeated digits, magic squares**, etc..*

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1 Crazy Representations

$$
\begin{aligned}
\mathbf{2020} &:= 1^{23} \times 4 \times (-5+6+7\times 8\times 9) \\
&:= 9\times 8\times 7\times (6-5)\times 4+3+2-1.
\end{aligned}
$$

https://arxiv.org/abs/1302.1479
http://bit.ly/2AYFpoc

1.1 Pyramid Style: Ending in 0

$$
\begin{aligned}
\mathbf{2020} &:= -5+(43+2)^{(}1+0!) \\
&:= 6!-5!+\sqrt{4}\times 3!!-2\times 10 \\
&:= 7\times 6\times (5+43)+2+1+0! \\
&:= 8\times (-7+65\times 4)+3\times 2-10
\end{aligned}
$$

1.2 1 to 10 Numbers: Increasing and Decreasing

$$
\begin{aligned}
\mathbf{2020} &:= (123+4\times 5+6\times 7+8+9)\times 10. \\
&:= 10\times (98+7\times 6+5\times 4\times 3+2\times 1).
\end{aligned}
$$

2 Same Digits Power and Bases

2.1 Pyramid Style

$$\begin{aligned}
\mathbf{2020} &:= -1^3 + 3^6 - 4^1 + 6^4 \\
&:= -1^2 - 2^3 + 3^6 + 4^1 + 6^4 \\
&:= 1^3 - 2^7 + 3^6 - 4^5 + 5^1 + 6^2 + 7^4
\end{aligned}$$

$$\begin{aligned}
\mathbf{2020} &:= 0^1 + 1^3 - 2^5 + 3^6 + 4^0 + 5^2 + 6^4 \\
&:= 0^4 - 1^7 + 2^1 + 3^6 + 4^5 + 5^0 + 6^3 + 7^2 \\
&:= 0^7 + 1^8 + 2^4 + 3^6 + 4^5 + 5^2 + 6^3 + 7^0 + 8^1 \\
&:= 0^3 + 1^8 + 2^7 - 3^9 + 4^6 + 5^4 + 6^2 + 7^5 + 8^0 + 9^1
\end{aligned}$$

http://doi.org/10.5281/zenodo.2553326

2.2 Pattern in Power and Bases

$$\begin{aligned}
\mathbf{2020}\,0 &:= \mathbf{2020} \times 10 + 0 = 1^3 - 2^5 + 3^9 + 4^1 + 5^4 - 9^2 &&= 1^3 + 2^1 + 3^8 + 4^6 + 6^4 + 8^2 \\
\mathbf{2020}\,1 &:= \mathbf{2020} \times 10 + 1 = 1^8 - 2^2 + 3^9 + 8^3 + 9^1 &&= -1^1 + 2^4 + 3^2 + 4^6 + 5^3 + 6^5 \\
\mathbf{2020}\,2 &:= \mathbf{2020} \times 10 + 2 = -2^6 + 3^9 + 4^2 + 6^4 - 9^3 &&= -1^6 + 3^9 + 5^3 - 6^5 - 9^1 \\
\mathbf{2020}\,3 &:= \mathbf{2020} \times 10 + 3 = -1^8 + 3^9 + 8^3 + 9^1 &&= 1^1 + 2^4 + 3^2 + 4^6 + 5^3 + 6^5 \\
\mathbf{2020}\,4 &:= \mathbf{2020} \times 10 + 4 = 1^2 - 2^5 + 3^9 - 4^3 + 5^4 - 9^1 &&= -1^2 - 2^8 + 4^7 - 7^1 - 8^4 \\
\mathbf{2020}\,5 &:= \mathbf{2020} \times 10 + 5 = 1^8 + 3^9 + 8^3 + 9^1 &&= 2^3 + 3^8 + 4^6 + 6^4 + 8^2 \\
\mathbf{2020}\,6 &:= \mathbf{2020} \times 10 + 6 = -1^7 + 2^1 + 3^9 - 4^4 + 7^2 + 9^3 &&= 1^2 - 2^8 + 4^7 - 7^1 - 8^4 \\
\mathbf{2020}\,7 &:= \mathbf{2020} \times 10 + 7 = -1^8 + 2^2 + 3^9 + 8^3 + 9^1 &&= 1^7 - 3^9 + 5^6 + 6^1 + 7^5 - 9^3 \\
\mathbf{2020}\,8 &:= \mathbf{2020} \times 10 + 8 = 1^7 + 2^1 + 3^9 - 4^4 + 7^2 + 9^3 &&= 1^6 + 2^2 + 3^9 + 5^3 - 6^5 - 9^1 \\
\mathbf{2020}\,9 &:= \mathbf{2020} \times 10 + 9 = 1^8 + 2^2 + 3^9 + 8^3 + 9^1 &&= -1^3 - 2^8 - 3^2 + 4^7 + 7^1 - 8^4
\end{aligned}$$

http://doi.org/10.5281/zenodo.2553326

$$20200 := 2020 \times 10 + 0 = 0^2 - 1^7 + 2^4 + 3^0 + 4^6 + 5^3 + 6^5 + 7^1 = 0^3 + 1^7 + 2^5 + 3^8 + 4^6 + 5^2 + 6^4 + 7^0 + 8^1$$
$$20201 := 2020 \times 10 + 1 = -0^0 + 1^1 - 2^2 + 3^7 + 4^6 + 5^5 + 6^3 + 7^4 = -0^0 + 1^5 - 2^7 + 3^8 + 4^6 + 5^3 + 6^4 + 7^1 + 8^2$$
$$20202 := 2020 \times 10 + 2 = 0^2 + 1^7 + 2^4 + 3^0 + 4^6 + 5^3 + 6^5 + 7^1 = 0^5 + 1^0 - 2^7 + 3^8 + 4^6 + 5^3 + 6^4 + 7^1 + 8^2$$
$$20203 := 2020 \times 10 + 3 = 0^0 + 1^1 - 2^2 + 3^7 + 4^6 + 5^5 + 6^3 + 7^4 = 0^0 + 1^5 - 2^7 + 3^8 + 4^6 + 5^3 + 6^4 + 7^1 + 8^2$$
$$20204 := 2020 \times 10 + 4 = 0^1 + 1^7 + 2^4 + 3^2 + 4^6 + 5^3 + 6^5 + 7^0 = 0^7 + 1^8 + 2^6 - 3^1 + 4^3 + 5^2 + 6^5 + 7^0 + 8^4$$
$$20205 := 2020 \times 10 + 5 = 0^1 - 1^2 + 2^0 + 3^7 + 4^6 + 5^5 + 6^3 + 7^4 = 0^2 + 1^8 - 2^1 + 3^7 + 4^6 + 5^5 + 6^3 + 7^4 + 8^0$$
$$20206 := 2020 \times 10 + 6 = 0^2 - 1^0 + 2^1 + 3^7 + 4^6 + 5^5 + 6^3 + 7^4 = 0^4 - 1^7 - 2^8 + 3^1 + 4^6 + 5^0 + 6^5 + 7^3 + 8^2$$
$$20207 := 2020 \times 10 + 7 = 0^1 + 1^2 + 2^0 + 3^7 + 4^6 + 5^5 + 6^3 + 7^4 = 0^2 - 1^8 + 2^1 + 3^7 + 4^6 + 5^5 + 6^3 + 7^4 + 8^0$$
$$20208 := 2020 \times 10 + 8 = 0^2 + 1^0 + 2^1 + 3^7 + 4^6 + 5^5 + 6^3 + 7^4 = 0^7 - 1^8 + 2^6 + 3^1 + 4^3 + 5^2 + 6^5 + 7^0 + 8^4$$
$$20209 := 2020 \times 10 + 9 = 0^0 + 1^2 + 2^1 + 3^7 + 4^6 + 5^5 + 6^3 + 7^4 = 0^2 + 1^8 + 2^1 + 3^7 + 4^6 + 5^5 + 6^3 + 7^4 + 8^0$$

http://doi.org/10.5281/zenodo.2553326

tcbsetcolframe=green!50!black,colback=white,colupper=blue!50!black, fonttitle=**,center title**

$$20200 := 2020 \times 10 + 0 = 0^1 + 1^7 - 2^9 + 3^8 - 4^6 + 5^5 + 6^2 + 7^3 + 8^0 + 9^4$$
$$20201 := 2020 \times 10 + 1 = 0^7 + 1^9 + 2^6 + 3^8 + 4^5 + 5^0 + 6^3 + 7^2 + 8^4 + 9^1$$
$$20202 := 2020 \times 10 + 2 = 0^6 - 1^9 + 2^7 + 3^8 + 4^5 + 5^3 + 6^0 + 7^1 + 8^4 + 9^2$$
$$20203 := 2020 \times 10 + 3 = 0^6 + 1^9 + 2^7 + 3^8 + 4^5 + 5^3 + 6^1 + 7^0 + 8^4 + 9^2$$
$$20204 := 2020 \times 10 + 4 = 0^6 + 1^9 + 2^7 + 3^8 + 4^5 + 5^3 + 6^0 + 7^1 + 8^4 + 9^2$$
$$20205 := 2020 \times 10 + 5 = 0^5 + 1^9 - 2^7 + 3^8 + 4^6 + 5^3 + 6^4 + 7^0 + 8^2 + 9^1$$
$$20206 := 2020 \times 10 + 6 = 0^7 + 1^9 - 2^6 - 3^8 + 4^0 + 5^2 + 6^4 + 7^5 + 8^3 + 9^1$$
$$20207 := 2020 \times 10 + 7 = 0^7 - 1^8 + 2^9 - 3^6 + 4^1 + 5^2 + 6^5 + 7^3 + 8^4 + 9^0$$
$$20208 := 2020 \times 10 + 8 = 0^6 - 1^9 - 2^8 + 3^7 + 4^1 + 5^5 + 6^0 + 7^3 + 8^2 + 9^4$$
$$20209 := 2020 \times 10 + 9 = 0^6 - 1^7 + 2^9 + 3^8 + 4^2 + 5^5 + 6^4 + 7^1 + 8^3 + 9^0$$

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3 Single Digit Representations

$$
\begin{aligned}
\mathbf{2020} &:= (1+1)\times(11111-1)/11\\
&:= 2\times(2\times(22^2+22)-2)\\
&:= 3+(3+3)\times(333+3)+3/3\\
&:= 4+(4+4)\times(4^4-4)\\
&:= 5^5+55\times(5-5\times5)-5\\
&:= (6-6/6)\times((6+6)/6+6\times66+6)\\
&:= 77/7+7\times(7\times(7\times7-7)-7)\\
&:= (8\times(8\times8\times8-8)+8)\times8/(8+8)\\
&:= (9+9)\times(99/9+999)/9
\end{aligned}
$$

https://arxiv.org/abs/1502.03501
http://bit.ly/2StN0CT

4 Single Letter Representation

$$\mathbf{2020} := \frac{(aaaaa-a)\times(a+a)}{aa\times a}$$

$$
\begin{aligned}
\text{where,}\quad aaaaa &= a10^4+a10^3+a10^2+a10+a,\\
aa &= a10+a,\ a\in\{1,2,3,4,5,6,7,8,9\}.
\end{aligned}
$$

http://doi.org/10.5281/zenodo.2556902
http://doi.org/10.5281/zenodo.2557025

5 Power Representations

5.1 Powers 2, 3 and 4

$$
\begin{aligned}
\mathbf{2020} &:= 16^2 + 42^2 \\
&:= 24^2 + 38^2 \\
&:= 1^2 + 13^2 + 25^2 + 35^2 \\
&:= 3^2 + 21^2 + 27^2 + 29^2 \\
&:= 1^2 + 17^2 + 23^2 + 24^2 + 25^2.
\end{aligned}
$$

http://doi.org/10.5281/zenodo.2565729

$$
\begin{aligned}
\mathbf{2020} &:= 1^3 + 1^3 + 1^3 + 7^3 + 7^3 + 11^3 \\
&:= 13^3 - 5^3 - 4^3 + 3^3 - 2^3 - 2^3 + 1^3 \\
&:= 10^3 + 9^3 + 7^3 - 4^3 + 3^3 - 2^3 - 2^3 + 1^3 \\
&:= 1^3 + 7^3 + 12^3 - 4^3 + 3^3 - 2^3 - 2^3 + 1^3
\end{aligned}
$$

http://doi.org/10.5281/zenodo.2565729

$$\mathbf{2020} := 1^4 + 1^4 + 2^4 + 3^4 + 5^4 + 6^4.$$

http://doi.org/10.5281/zenodo.2565729

5.2 Pattern With Power 4

$$
\begin{aligned}
0\,\mathbf{2020} &:= 1^4+1^4+2^4+3^4+5^4+6^4\\
1\,\mathbf{2020} &:= 1^4+1^4+2^4+3^4+5^4+6^4+10^4\\
2\,\mathbf{2020} &:= 1^4+4^4+5^4+7^4+8^4+11^4\\
3\,\mathbf{2020} &:= 1^4+4^4+5^4+7^4+8^4+10^4+11^4\\
4\,\mathbf{2020} &:= 1^4+3^4+9^4+11^4+12^4\\
5\,\mathbf{2020} &:= 1^4+3^4+9^4+10^4+11^4+12^4\\
6\,\mathbf{2020} &:= 1^4+7^4+9^4+11^4+14^4\\
7\,\mathbf{2020} &:= 1^4+7^4+9^4+10^4+11^4+14^4\\
8\,\mathbf{2020} &:= 1^4+4^4+7^4+8^4+10^4+11^4+15^4\\
9\,\mathbf{2020} &:= 1^4+5^4+6^4+8^4+11^4+12^4+15^4\\
10\,\mathbf{2020} &:= 1^4+5^4+6^4+8^4+10^4+11^4+12^4+15^4
\end{aligned}
$$

http://doi.org/10.5281/zenodo.2565729

5.3 Powers of 2

$$
\begin{aligned}
\mathbf{2020} &:= 2^{11}-2^5+2^2\\
&:= 2^{10}+2^9+2^8+2^7+2^6+2^5+2^2\\
&:= 2^{10}+2^9+2^8+2^7+2^6+2^5+2^4-2^3-2^2
\end{aligned}
$$

http://doi.org/10.5281/zenodo.2565729

6 Palindromic Representations

$$
\begin{aligned}
\mathbf{2020} &:= 2\times 505\times 2\\
&:= 00020+02000
\end{aligned}
$$

7 Two Digits Representation: 0 and 2

$$\mathbf{2020} := 02 \times 02 \times 20 \times 20 + 20 \times 20 + 20.$$

- On Feb. 02, 2020, we can write

02.02.2020

- Each month, 20h 20m and 20s on day 20, we have

20.20.20.20.2020

This number will appear 12 times in a year.

8 Upside Down and Mirror Looking

8.1 Upside Down

$$\begin{aligned}\mathbf{2020} &:= 9 + 1001 + 1 + 1 + 1 + 1001 + 6\\ &:= 1 + 1 + 1 + 6 + 9 + 69 + 96 + 609 + 609 + 619\\ &:= 1 + 1 + 1 + 609 + (1 + 1) \times (1 + 6 + 9 + 69 + 619)\end{aligned}$$

9+|00|+|+|+|+|00|+6

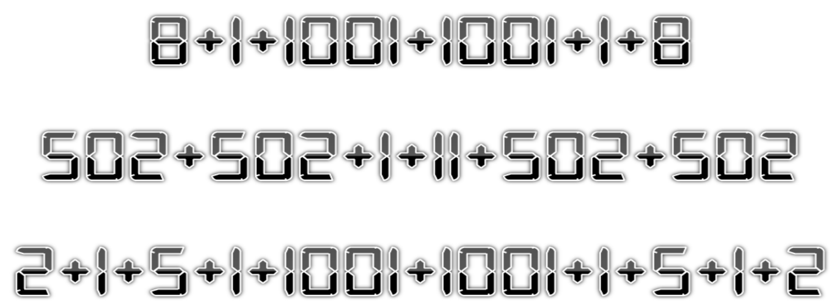
|+|+|+6+9+69+96+609+609+6|9

|+|+|+609+(|+|)x(|+6+9+69+6|9)

https://zenodo.org/record/2555741

8.2 Upside Down and Mirror Looking

$$\begin{aligned} \mathbf{2020} &:= 8+1+1001+1001+1+8 \\ &:= 502+502+502+502+11+1 \\ &:= 2+1+5+1+1001+1001+1+5+1+2. \end{aligned}$$



https://zenodo.org/record/2555741

9 Pythagorean Triples and Patterns

9.1 Pythagorean Triples

$$\begin{aligned} \mathbf{2020^2} &:= 400^2+1980^2 \\ &:= 868^2+1824^2 \\ &:= 1212^2+1616^2 \\ &:= 1344^2+1508^2. \end{aligned}$$

9.2 Patterns With Pythagorean Triples

$$\begin{aligned} \mathbf{2020^2} &:= 1212^2+1616^2 \\ \mathbf{20020^2} &:= 12012^2+16016^2 \\ \mathbf{200020^2} &:= 120012^2+160016^2 \\ \mathbf{2000020^2} &:= 1200012^2+1600016^2 \end{aligned}$$

http://doi.org/10.5281/zenodo.2544527
http://doi.org/10.5281/zenodo.2544551

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$$(\mathbf{220} \times 1 + 1)^2 - (\mathbf{220} \times 1 + 0)^2 = 21^2$$
$$(\mathbf{2020} \times 10 + 1)^2 - (\mathbf{2020} \times 10 + 0)^2 = 201^2$$
$$(\mathbf{20020} \times 100 + 1)^2 - (\mathbf{20020} \times 100 + 0)^2 = 2001^2$$
$$(\mathbf{200020} \times 1000 + 1)^2 - (\mathbf{200020} \times 1000 + 0)^2 = 20001^2$$

Equivalently,

$$220^2 + 21^2 = 221^2 := 48841$$
$$20200^2 + 201^2 = 20201^2 := 408080401$$
$$2002000^2 + 2001^2 = 2002001^2 := 4008008004001$$
$$200020000^2 + 20001^2 = 200020001^2 := 40008000800040001$$

http://doi.org/10.5281/zenodo.2544527
http://doi.org/10.5281/zenodo.2544551

9.3 Patterns With Pythagorean Triples: Pandigital Type

$$0099^2 + 20^2 = \mathbf{1}\,01^2$$
$$\mathbf{102}\,0099^2 + \mathbf{2020}^2 = \mathbf{10201}\,01^2$$
$$\mathbf{1020302}\,0099^2 + 202020^2 = \mathbf{102030201}\,01^2$$
$$\mathbf{10203040302}\,0099^2 + 20202020^2 = \mathbf{1020304030201}\,01^2$$
$$\mathbf{102030405040302}\,0099^2 + 2020202020^2 = \mathbf{10203040504030201}\,01^2$$
$$\mathbf{1020304050605040302}\,0099^2 + 202020202020^2 = \mathbf{102030405060504030201}\,01^2$$
$$\mathbf{10203040506070605040302}\,0099^2 + 20202020202020^2 = \mathbf{1020304050607060504030201}\,01^2$$
$$\mathbf{102030405060708070605040302}\,0099^2 + 2020202020202020^2 = \mathbf{10203040506070807060504030201}\,01^2$$
$$\mathbf{1020304050607080908070605040302}\,0099^2 + 202020202020202020^2 = \mathbf{102030405060708090807060504030201}\,01^2$$

http://doi.org/10.5281/zenodo.2544555

10 Equality Expression with Same Digits

10.1 Powers and Sums

$$\mathbf{2020} := 1^7 + 44^2 + 74^0 + 82^1 = 17 + 442 + 740 + 821.$$

http://doi.org/10.5281/zenodo.2573194

10.2 Factorial and Powers

$$\begin{aligned}
\mathbf{2020} \times 10 + 7 &:= -1! + (2! + 5! + 6!) \times 4! = -1^6 + 2^5 \times (5^4 + 6^1) + 4^2 \\
\mathbf{2020} \times 10 + 8 &:= (1! \times 2! + 5! + 6!) \times 4! \quad = 1^6 \times 2^5 \times (5^4 + 6^1) + 4^2 \\
\mathbf{2020} \times 10 + 9 &:= 1! + (2! + 5! + 6!) \times 4! \quad = 1^6 + 2^5 \times (5^4 + 6^1) + 4^2
\end{aligned}$$

http://doi.org/10.5281/zenodo.2573569

10.3 Semi-Selfie Expressions

$$\begin{aligned}
\mathbf{2020}^3 &:= 8242408 \times 1000 \qquad = ((8 + 242 - 40 - 8) \times 10 + 00)^3 \\
\mathbf{2020}^4 &:= 1664966416 \times 10000 = ((16 + 6 + 4 + 96 + 64 + 16) \times 10 + 000)^4.
\end{aligned}$$

http://doi.org/10.5281/zenodo.2562390
http://doi.org/10.5281/zenodo.3338366

11 Selfie and Equivalent Fractions

11.1 Patterns in Selfie Fractions

$$\frac{101}{\mathbf{2020}} := \frac{1+01}{2\times 020} \qquad \frac{202}{\mathbf{2020}} := \frac{2+02}{2\times 020}$$

$$\frac{303}{\mathbf{2020}} := \frac{3+03}{2\times 020} \qquad \frac{404}{\mathbf{2020}} := \frac{4+04}{2\times 020}$$

$$\frac{505}{\mathbf{2020}} := \frac{5+05}{2\times 020} \qquad \frac{606}{\mathbf{2020}} := \frac{6+06}{2\times 020}$$

$$\frac{707}{\mathbf{2020}} := \frac{7+07}{2\times 020} \qquad \frac{808}{\mathbf{2020}} := \frac{8+08}{2\times 020}$$

$$\frac{909}{\mathbf{2020}} := \frac{9+09}{2\times 020}$$

http://doi.org/10.5281/zenodo.3474091
http://doi.org/10.5281/zenodo.3520096

$$\frac{101}{202} := \frac{1+01}{2\times 02}$$
$$\frac{101}{\mathbf{2020}} := \frac{1+01}{2\times 020}$$
$$\frac{101}{20200} := \frac{1+01}{2\times 0200}$$
$$\frac{101}{202000} := \frac{1+01}{2\times 02000}$$

http://doi.org/10.5281/zenodo.3474091
http://doi.org/10.5281/zenodo.3520096

$$\frac{202}{\mathbf{2020}} := \frac{2+02}{2\times 020}$$
$$\frac{202}{20200} := \frac{2+02}{2\times 0200}$$
$$\frac{202}{202000} := \frac{2+02}{2\times 02000}$$
$$\frac{202}{2020000} := \frac{2+02}{2\times 020000}$$

http://doi.org/10.5281/zenodo.3474091
http://doi.org/10.5281/zenodo.3520096

12 Functional Representations

12.1 Fibonacci Sequences

$$F(0)=F(1)=1,\ F(n)=F(n-1)+F(n-2),\ \ n\geq 2,$$
$$0,1,1,2,3,5,8,13,..$$

Then,

$$\mathbf{2020} := F(2)+F(4)+F(6)+F(9)+F(14)+F(17)$$

http://doi.org/10.5281/zenodo.2575093

12.2 Fibonacci Sequences Pattern

$$1\,\mathbf{2020}+0:=F(4)+F(6)+F(8)+F(10)+F(16)+F(21)$$
$$1\,\mathbf{2020}+1:=F(2)+F(4)+F(6)+F(8)+F(10)+F(16)+F(21)$$
$$1\,\mathbf{2020}+2:=F(11)+F(16)+F(21)$$
$$1\,\mathbf{2020}+3:=F(2)+F(11)+F(16)+F(21)$$
$$1\,\mathbf{2020}+4:=F(3)+F(11)+F(16)+F(21)$$
$$1\,\mathbf{2020}+5:=F(4)+F(11)+F(16)+F(21)$$
$$1\,\mathbf{2020}+6:=F(2)+F(4)+F(11)+F(16)+F(21)$$
$$1\,\mathbf{2020}+7:=F(5)+F(11)+F(16)+F(21)$$
$$1\,\mathbf{2020}+8:=F(2)+F(5)+F(11)+F(16)+F(21)$$
$$1\,\mathbf{2020}+9:=F(3)+F(5)+F(11)+F(16)+F(21)$$

http://doi.org/10.5281/zenodo.2575093

12.3 Triangular Number

$$T(n):=\frac{n\times(n+1)}{2}, n\geq 0.$$

Then,

$$\mathbf{2020}:=T(19)+T(60)$$

http://doi.org/10.5281/zenodo.2575093

12.4 Triangular Number Pattern

$$1\,\mathbf{2020}+0 := T(2)+T(73)+T(136)$$
$$1\,\mathbf{2020}+1 := T(2)+T(80)+T(132)$$
$$1\,\mathbf{2020}+2 := T(3)+T(44)+T(148)$$
$$1\,\mathbf{2020}+3 := T(3)+T(73)+T(136)$$
$$1\,\mathbf{2020}+4 := T(3)+T(80)+T(132)$$
$$1\,\mathbf{2020}+5 := T(4)+T(65)+T(140)$$
$$1\,\mathbf{2020}+6 := T(13)+T(154)$$
$$1\,\mathbf{2020}+7 := T(63)+T(141)$$
$$1\,\mathbf{2020}+8 := T(37)+T(150)$$
$$1\,\mathbf{2020}+9 := T(1)+T(37)+T(150)$$

http://doi.org/10.5281/zenodo.2575093

13 Fixed Digits Repetitions Prime Patterns

13.1 Lenght 6

▶ **2020** 01
2020 4578 01
2020 4578 4578 01
2020 4578 4578 4578 01
2020 4578 4578 4578 4578 01
2020 4578 4578 4578 4578 4578 01

http://doi.org/10.5281/zenodo.2561096

▶ **2020** 21
2020 7611 21
2020 7611 7611 21
2020 7611 7611 7611 21
2020 7611 7611 7611 7611 21
2020 7611 7611 7611 7611 7611 21

http://doi.org/10.5281/zenodo.2561096

▶ **2020** 423
2020 162 423
2020 162 162 423
2020 162 162 162 423
2020 162 162 162 162 423
2020 162 162 162 162 162 423

http://doi.org/10.5281/zenodo.2561096

▶ **2020** 831
2020 558 831
2020 558 558 831
2020 558 558 558 831
2020 558 558 558 558 831
2020 558 558 558 558 558 831

http://doi.org/10.5281/zenodo.2561096

13.2 Lenght 7

▶ 1 **2020** 8 1
1 **2020** 8 96 1
1 **2020** 8 96 96 1
1 **2020** 8 96 96 96 1
1 **2020** 8 96 96 96 96 1
1 **2020** 8 96 96 96 96 96 1
1 **2020** 8 96 96 96 96 96 96 1

http://doi.org/10.5281/zenodo.2560668

▶ 129 **2020** 3
129 **2020** 66 3
129 **2020** 66 66 3
129 **2020** 66 66 66 3
129 **2020** 66 66 66 66 3
129 **2020** 66 66 66 66 66 3
129 **2020** 66 66 66 66 66 66 3

http://doi.org/10.5281/zenodo.2560668

▶ 8 **2020** 8 21
8 **2020** 8 6 21
8 **2020** 8 6 6 21
8 **2020** 8 6 6 6 21
8 **2020** 8 6 6 6 6 21
8 **2020** 8 6 6 6 6 6 21
8 **2020** 8 6 6 6 6 6 6 21

http://doi.org/10.5281/zenodo.2560668

13.3 Lenght 8

▶ **2020** 1231
2020 252 1231
2020 252 252 1231
2020 252 252 252 1231
2020 252 252 252 252 1231
2020 252 252 252 252 252 1231
2020 252 252 252 252 252 252 1231
2020 252 252 252 252 252 252 252 1231

http://doi.org/10.5281/zenodo.2560640

▶ 3 **2020** 4 63
3 **2020** 4 648 63
3 **2020** 4 648 648 63
3 **2020** 4 648 648 648 63
3 **2020** 4 648 648 648 648 63
3 **2020** 4 648 648 648 648 648 63
3 **2020** 4 648 648 648 648 648 648 63
3 **2020** 4 648 648 648 648 648 648 648 63

http://doi.org/10.5281/zenodo.2560640

▶ 883 **2020** 3
883 **2020** 3 567
883 **2020** 3 567 567
883 **2020** 3 567 567 567
883 **2020** 3 567 567 567 567
883 **2020** 3 567 567 567 567 567
883 **2020** 3 567 567 567 567 567 567
883 **2020** 3 567 567 567 567 567 567 567

http://doi.org/10.5281/zenodo.2560640

14 Embedded Prime Numbers Patterns

14.1 Palindromic Prime Numbers

11101 **2020** 1 **0202**10111
101111101 **2020** 1 **0202**101111101
102101111101 **2020** 1 **0202**101111101201
1102101111101 **2020** 1 **0202**1011111012011
10021102101111101 **2020** 1 **0202**10111110120112001
120211002110210111101 **2020** 1 **0202**101111101201120011 2021
10011202110021102101111101 **2020** 1 **0202**10111110120112001120211001
12110110011202110021102101111101 **2020** 1 **0202**10111110120112001120211001101121
110101121101100112021100211021011111 01 **2020** 1 **0202**10111110120112001120211001101121101011
10210111010112110110011202110021102101111101 **2020** 1 **0202**10111110120112001120211001101121101011101201
1102210210111010112110110011202110021102101111101 **2020** 1 **0202**1011111012011200112021100110112110101110120122011

http://bit.ly/2LNE63H
http://bit.ly/2KzKHcJ

2020 In Numbers: Mathematical Style, **Zenodo**,
December 29, 2019, pp. 1-27, http://doi.org/10.5281/zenodo.3594746

122 **2020** 2 **0202**221
11002122 **2020** 2 **0202**22120011
1202111002122 **2020** 2 **0202**2212001112021
111211202111002122 **2020** 2 **0202**221200111202112111
1011111211202111002122 **2020** 2 **0202**2212001112021121111101
11211011111211202111002122 **2020** 2 **0202**22120011120211211111011211
111211011111211202111002122 **2020** 2 **0202**221200111202112111110112111
110012111211011111211202111002122 **2020** 2 **0202**221200111202112111110112111210011
120001110012111211011111211202111002122 **2020** 2 **0202**221200111202112111110112111210011100021
10211120001110012111211011111211202111002122 **2020** 2 **0202**22120011120211211111011211121001110002111201

http://bit.ly/2LNE63H
http://bit.ly/2KzKHcJ

1221 **2020202** 1221
11111221 **2020202** 12211111
10021111111221 **2020202** 12211111112001
100210021111111221 **2020202** 122111111120012001
1012100210021111111221 **2020202** 1221111111200120012101
1010011012100210021111111221 **2020202** 1221111111200120012101100101
102211010011012100210021111111221 **2020202** 122111111120012001210110010112201
101201102211010011012100210021111111221 **2020202** 122111111120012001210110010112201102101
1212101201102211010011012100210021111111221 **2020202** 1221111111200120012101100101122011021012121
1111111212101201102211010011012100210021111111221 **2020202** 1221111111200120012101100101122011021012121111111

http://bit.ly/2LNE63H
http://bit.ly/2KzKHcJ

14.2 Non Palindromic Prime Numbers

102 **2020** 201
1112102 **2020** 2012111
1211112102 **2020** 2012111121
12211211112102 **2020** 20121111211221
1010112211211112102 **2020** 2012111121122110101
12021010112211211112102 **2020** 20121111211221101012021
112021010112211211112102 **2020** 201211112112211010120211
11201112021010112211211112102 **2020** 20121111211221101012021110211
1202211201112021010112211211112102 **2020** 2012111121122110101202111021122021
122211202211201112021010112211211112102 **2020** 201211112112211010120211102112202112221
10021122211202211201112021010112211211112102 **2020** 20121111211221101012021110211220211222112001
101110021122211202211201112021010112211211112102 **2020** 201211112112211010120211102112202112221120011101

http://bit.ly/2LNE63H
http://bit.ly/2KzKHcJ

2020 In Numbers: Mathematical Style, **Zenodo**,
December 29, 2019, pp. 1-27, http://doi.org/10.5281/zenodo.3594746

15 Magic Square Type Embedded Palindromic Prime Numbers

Palindromic prime numbers (palprimes) in rows, columns and principal diagonals. Also embedded rows are palprimes.

- **Magic Square Type Properties**

▶1	7	3	3	7	3	3	7	1
7	9	8	3	8	3	8	9	7
3	8	0	**2**	**0**	**2**	**0**	8	3
3	3	2	1	7	1	2	3	3
7	8	0	7	0	7	0	8	7
3	3	2	1	7	1	2	3	3
3	8	0	**2**	**0**	**2**	**0**	8	3
7	9	8	3	8	3	8	9	7
1	7	3	3	7	3	3	7	1

- **Embedded Type Properties**

780707087
332171233780707087332171233
380 **2020** 833321712337807070873321712333380 **2020** 83
17337337179838389738 0 **2020** 833321712337807070873321712333380 **2020** 8379838389717337337 1

http://doi.org/10.5281/zenodo.25784

2020 In Numbers: Mathematical Style, **Zenodo**,
December 29, 2019, pp. 1-27, http://doi.org/10.5281/zenodo.3594746

• Magic Square Type Properties

▶	1	9	7	9	1	9	7	9	1
	9	5	**2**	**0**	**2**	**0**	2	5	9
	7	2	1	3	6	3	1	2	7
	9	0	3	5	6	5	3	0	9
	1	2	6	6	8	6	6	2	1
	9	0	3	5	6	5	3	0	9
	7	2	1	3	6	3	1	2	7
	9	5	**2**	**0**	**2**	**0**	2	5	9
	1	9	7	9	1	9	7	9	1

• Embedded Type Properties

126686621
903565309126686621903565309
721363127903565309126686621903565309721363127
19791979195 **2020** 25972136312790356530912668662190356530972136312795 **2020** 259197919791

http://doi.org/10.5281/zenodo.25784

16 Palindromic-Type Expressions and Patterns

16.1 Palindromic-Type Expressions

$$\mathbf{2020}\,3 \times 11 + 11 \times 3\,\mathbf{0202} = 222233 + 332222$$
$$\mathbf{2020}\,3 \times 12 + 21 \times 3\,\mathbf{0202} = 242436 + 634242$$
$$\mathbf{2020}\,3 \times 13 + 31 \times 3\,\mathbf{0202} = 262639 + 936262$$
$$\mathbf{2020}\,3 \times 21 + 12 \times 3\,\mathbf{0202} = 424263 + 362424$$
$$\mathbf{2020}\,3 \times 22 + 22 \times 3\,\mathbf{0202} = 444466 + 664444$$
$$\mathbf{2020}\,3 \times 23 + 32 \times 3\,\mathbf{0202} = 464669 + 966464$$
$$\mathbf{2020}\,3 \times 31 + 13 \times 3\,\mathbf{0202} = 626293 + 392626$$
$$\mathbf{2020}\,3 \times 32 + 23 \times 3\,\mathbf{0202} = 646496 + 694646$$
$$\mathbf{2020}\,3 \times 33 + 33 \times 3\,\mathbf{0202} = 666699 + 996666$$

http://doi.org/10.5281/zenodo.2541174
http://doi.org/10.5281/zenodo.2541187

$$1\,\mathbf{0202} \times 11 + 11 \times \mathbf{2020}\,1 = 112222 + 222211$$
$$1\,\mathbf{0202} \times 12 + 21 \times \mathbf{2020}\,1 = 122424 + 424221$$
$$1\,\mathbf{0202} \times 13 + 31 \times \mathbf{2020}\,1 = 132626 + 626231$$
$$1\,\mathbf{0202} \times 14 + 41 \times \mathbf{2020}\,1 = 142828 + 828241$$
$$1\,\mathbf{0202} \times 21 + 12 \times \mathbf{2020}\,1 = 214242 + 242412$$
$$1\,\mathbf{0202} \times 22 + 22 \times \mathbf{2020}\,1 = 224444 + 444422$$
$$1\,\mathbf{0202} \times 23 + 32 \times \mathbf{2020}\,1 = 234646 + 646432$$
$$1\,\mathbf{0202} \times 24 + 42 \times \mathbf{2020}\,1 = 244848 + 848442$$
$$1\,\mathbf{0202} \times 31 + 13 \times \mathbf{2020}\,1 = 316262 + 262613$$
$$1\,\mathbf{0202} \times 32 + 23 \times \mathbf{2020}\,1 = 326464 + 464623$$
$$1\,\mathbf{0202} \times 33 + 33 \times \mathbf{2020}\,1 = 336666 + 666633$$
$$1\,\mathbf{0202} \times 34 + 43 \times \mathbf{2020}\,1 = 346868 + 868643$$
$$1\,\mathbf{0202} \times 41 + 14 \times \mathbf{2020}\,1 = 418282 + 282814$$
$$1\,\mathbf{0202} \times 42 + 24 \times \mathbf{2020}\,1 = 428484 + 484824$$
$$1\,\mathbf{0202} \times 43 + 34 \times \mathbf{2020}\,1 = 438686 + 686834$$
$$1\,\mathbf{0202} \times 44 + 44 \times \mathbf{2020}\,1 = 448888 + 888844$$

http://doi.org/10.5281/zenodo.2541174
http://doi.org/10.5281/zenodo.2541187

$$\mathbf{2020}\,0 \times 11 + 11 \times 0\,\mathbf{0202} = 222200 + 002222$$
$$\mathbf{2020}\,1 \times 11 + 11 \times 1\,\mathbf{0202} = 222211 + 112222$$
$$\mathbf{2020}\,2 \times 11 + 11 \times 2\,\mathbf{0202} = 222222 + 222222$$
$$\mathbf{2020}\,3 \times 11 + 11 \times 3\,\mathbf{0202} = 222233 + 332222$$
$$\mathbf{2020}\,4 \times 11 + 11 \times 4\,\mathbf{0202} = 222244 + 442222$$
$$\mathbf{2020}\,5 \times 11 + 11 \times 5\,\mathbf{0202} = 222255 + 552222$$
$$\mathbf{2020}\,6 \times 11 + 11 \times 6\,\mathbf{0202} = 222266 + 662222$$
$$\mathbf{2020}\,7 \times 11 + 11 \times 7\,\mathbf{0202} = 222277 + 772222$$
$$\mathbf{2020}\,8 \times 11 + 11 \times 8\,\mathbf{0202} = 222288 + 882222$$
$$\mathbf{2020}\,9 \times 11 + 11 \times 9\,\mathbf{0202} = 222299 + 992222$$

http://doi.org/10.5281/zenodo.2541174
http://doi.org/10.5281/zenodo.2541187

$$1\,\mathbf{0202} \times 1001 + 1001 \times \mathbf{2020}\,1 = 10212202 + 20221201$$
$$1\,\mathbf{0202} \times 1002 + 2001 \times \mathbf{2020}\,1 = 10222404 + 40422201$$
$$1\,\mathbf{0202} \times 1003 + 3001 \times \mathbf{2020}\,1 = 10232606 + 60623201$$
$$1\,\mathbf{0202} \times 1004 + 4001 \times \mathbf{2020}\,1 = 10242808 + 80824201$$
$$1\,\mathbf{0202} \times 1011 + 1101 \times \mathbf{2020}\,1 = 10314222 + 22241301$$
$$1\,\mathbf{0202} \times 1012 + 2101 \times \mathbf{2020}\,1 = 10324424 + 42442301$$
$$1\,\mathbf{0202} \times 1013 + 3101 \times \mathbf{2020}\,1 = 10334626 + 62643301$$
$$1\,\mathbf{0202} \times 1014 + 4101 \times \mathbf{2020}\,1 = 10344828 + 82844301$$
$$1\,\mathbf{0202} \times 1021 + 1201 \times \mathbf{2020}\,1 = 10416242 + 24261401$$
$$1\,\mathbf{0202} \times 1022 + 2201 \times \mathbf{2020}\,1 = 10426444 + 44462401$$
$$1\,\mathbf{0202} \times 1023 + 3201 \times \mathbf{2020}\,1 = 10436646 + 64663401$$
$$1\,\mathbf{0202} \times 1024 + 4201 \times \mathbf{2020}\,1 = 10446848 + 84864401$$
$$1\,\mathbf{0202} \times 1031 + 1301 \times \mathbf{2020}\,1 = 10518262 + 26281501$$
$$1\,\mathbf{0202} \times 1032 + 2301 \times \mathbf{2020}\,1 = 10528464 + 46482501$$
$$1\,\mathbf{0202} \times 1033 + 3301 \times \mathbf{2020}\,1 = 10538666 + 66683501$$
$$1\,\mathbf{0202} \times 1034 + 4301 \times \mathbf{2020}\,1 = 10548868 + 86884501$$

http://doi.org/10.5281/zenodo.2541174
http://doi.org/10.5281/zenodo.2541187

$$
\begin{aligned}
1\,\mathbf{0202} \times 101 + 101 \times \mathbf{2020}\,1 &= 1030402 + 2040301 \\
1\,\mathbf{0202} \times 102 + 201 \times \mathbf{2020}\,1 &= 1040604 + 4060401 \\
1\,\mathbf{0202} \times 103 + 301 \times \mathbf{2020}\,1 &= 1050806 + 6080501 \\
1\,\mathbf{0202} \times 111 + 111 \times \mathbf{2020}\,1 &= 1132422 + 2242311 \\
1\,\mathbf{0202} \times 112 + 211 \times \mathbf{2020}\,1 &= 1142624 + 4262411 \\
1\,\mathbf{0202} \times 113 + 311 \times \mathbf{2020}\,1 &= 1152826 + 6282511 \\
1\,\mathbf{0202} \times 121 + 121 \times \mathbf{2020}\,1 &= 1234442 + 2444321 \\
1\,\mathbf{0202} \times 122 + 221 \times \mathbf{2020}\,1 &= 1244644 + 4464421 \\
1\,\mathbf{0202} \times 123 + 321 \times \mathbf{2020}\,1 &= 1254846 + 6484521 \\
1\,\mathbf{0202} \times 131 + 131 \times \mathbf{2020}\,1 &= 1336462 + 2646331 \\
1\,\mathbf{0202} \times 132 + 231 \times \mathbf{2020}\,1 &= 1346664 + 4666431 \\
1\,\mathbf{0202} \times 133 + 331 \times \mathbf{2020}\,1 &= 1356866 + 6686531 \\
1\,\mathbf{0202} \times 141 + 141 \times \mathbf{2020}\,1 &= 1438482 + 2848341 \\
1\,\mathbf{0202} \times 142 + 241 \times \mathbf{2020}\,1 &= 1448684 + 4868441 \\
1\,\mathbf{0202} \times 143 + 341 \times \mathbf{2020}\,1 &= 1458886 + 6888541
\end{aligned}
$$

$$
\begin{aligned}
1\,\mathbf{0202} \times 201 + 102 \times \mathbf{2020}\,1 &= 2050602 + 2060502 \\
1\,\mathbf{0202} \times 202 + 202 \times \mathbf{2020}\,1 &= 2060804 + 4080602 \\
1\,\mathbf{0202} \times 211 + 112 \times \mathbf{2020}\,1 &= 2152622 + 2262512 \\
1\,\mathbf{0202} \times 212 + 212 \times \mathbf{2020}\,1 &= 2162824 + 4282612 \\
1\,\mathbf{0202} \times 221 + 122 \times \mathbf{2020}\,1 &= 2254642 + 2464522 \\
1\,\mathbf{0202} \times 222 + 222 \times \mathbf{2020}\,1 &= 2264844 + 4484622 \\
1\,\mathbf{0202} \times 231 + 132 \times \mathbf{2020}\,1 &= 2356662 + 2666532 \\
1\,\mathbf{0202} \times 232 + 232 \times \mathbf{2020}\,1 &= 2366864 + 4686632 \\
1\,\mathbf{0202} \times 241 + 142 \times \mathbf{2020}\,1 &= 2458682 + 2868542 \\
1\,\mathbf{0202} \times 242 + 242 \times \mathbf{2020}\,1 &= 2468884 + 4888642 \\
1\,\mathbf{0202} \times 301 + 103 \times \mathbf{2020}\,1 &= 3070802 + 2080703 \\
1\,\mathbf{0202} \times 311 + 113 \times \mathbf{2020}\,1 &= 3172822 + 2282713 \\
1\,\mathbf{0202} \times 321 + 123 \times \mathbf{2020}\,1 &= 3274842 + 2484723 \\
1\,\mathbf{0202} \times 331 + 133 \times \mathbf{2020}\,1 &= 3376862 + 2686733 \\
1\,\mathbf{0202} \times 341 + 143 \times \mathbf{2020}\,1 &= 3478882 + 2888743
\end{aligned}
$$

http://doi.org/10.5281/zenodo.2541174
http://doi.org/10.5281/zenodo.2541187

$$
\begin{aligned}
\mathbf{2020}\,1 \times 10001 + 10001 \times 1\,\mathbf{0202} &= \mathbf{2020}\,30201 + 10203\,\mathbf{0202} \\
\mathbf{2020}\,2 \times 10001 + 10001 \times 2\,\mathbf{0202} &= \mathbf{2020}\,40202 + 20204\,\mathbf{0202} \\
\mathbf{2020}\,3 \times 10001 + 10001 \times 3\,\mathbf{0202} &= \mathbf{2020}\,50203 + 30205\,\mathbf{0202} \\
\mathbf{2020}\,4 \times 10001 + 10001 \times 4\,\mathbf{0202} &= \mathbf{2020}\,60204 + 40206\,\mathbf{0202} \\
\mathbf{2020}\,5 \times 10001 + 10001 \times 5\,\mathbf{0202} &= \mathbf{2020}\,70205 + 50207\,\mathbf{0202} \\
\mathbf{2020}\,6 \times 10001 + 10001 \times 6\,\mathbf{0202} &= \mathbf{2020}\,80206 + 60208\,\mathbf{0202} \\
\mathbf{2020}\,7 \times 10001 + 10001 \times 7\,\mathbf{0202} &= \mathbf{2020}\,90207 + 70209\,\mathbf{0202}
\end{aligned}
$$

http://doi.org/10.5281/zenodo.2541174
http://doi.org/10.5281/zenodo.2541187

16.2 Palindromic-Type Patterns

$$\begin{aligned}
\mathbf{2020}\,1\times 11+11\times 1\,\mathbf{0202} &= 222211+112222 &&:= 334433\\
\mathbf{2020}\,1\times 1001+1001\times 1\,\mathbf{0202} &= 20221201+10212202 &&:= 30433403\\
\mathbf{2020}\,1\times 100001+100001\times 1\,\mathbf{0202} &= 2020120201+1020210202 &&:= 3040330403\\
\mathbf{2020}\,1\times 10000001+10000001\times 1\,\mathbf{0202} &= 202010020201+102020010202 &&:= 304030030403
\end{aligned}$$

http://doi.org/10.5281/zenodo.2541174
http://doi.org/10.5281/zenodo.2541187

$$\begin{aligned}
\mathbf{2020}\times 10001+10001\times \mathbf{0202} &= \mathbf{2020}\,\mathbf{2020}+\mathbf{0202}\,\mathbf{0202} &&:= 22222222\\
\mathbf{2020}\times 100001+100001\times \mathbf{0202} &= \mathbf{2020}\,0\,\mathbf{2020}+\mathbf{0202}\,0\,\mathbf{0202} &&:= 222202222\\
\mathbf{2020}\times 1000001+1000001\times \mathbf{0202} &= \mathbf{2020}\,00\,\mathbf{2020}+\mathbf{0202}\,00\,\mathbf{0202} &&:= 2222002222\\
\mathbf{2020}\times 10000001+10000001\times \mathbf{0202} &= \mathbf{2020}\,000\,\mathbf{2020}+\mathbf{0202}\,000\,\mathbf{0202} &&:= 22220002222
\end{aligned}$$

http://doi.org/10.5281/zenodo.2541174
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