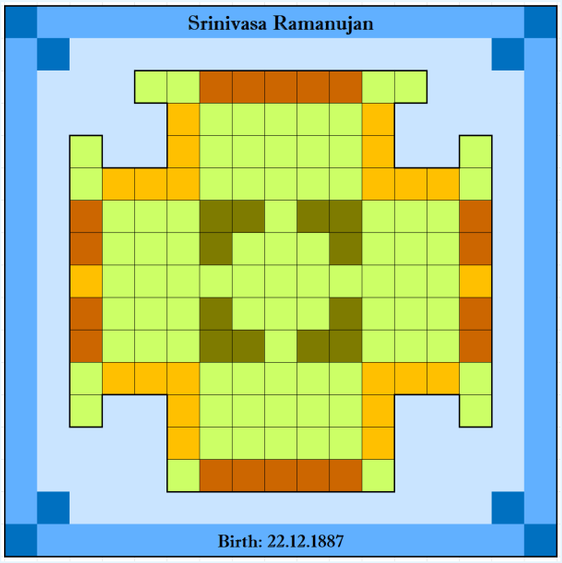
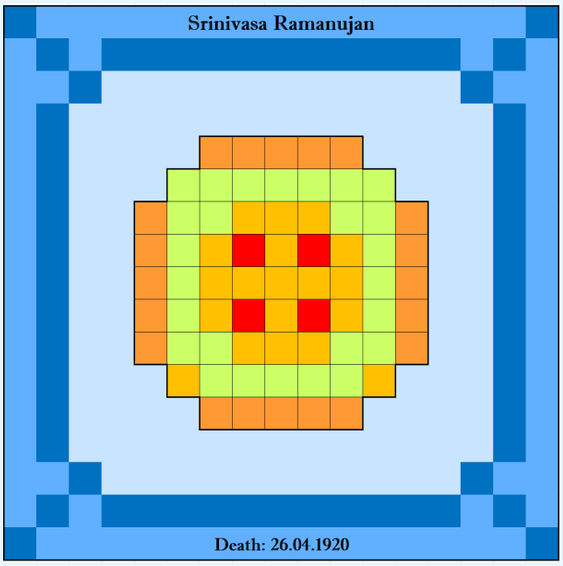
On a Special Day: 134th Birth Anniversary of S. Ramanujan
National Mathematics Day (India) - December 22, 2021

22 December 1887-26 April 1920





An equation means nothing to me unless it expresses a thought of God.
- S. Ramanujan

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

• Magic Square of Order 4

The first magic square is constructed by **S. Ramanujan**. The second one we constructed including the number 17-29.

				139
22	**12**	**18**	**87**	*139*
88	17	9	25	*139*
10	24	89	16	*139*
19	86	23	11	*139*
139	*139*	*139*	*139*	*139*

				139
22	**12**	**18**	**87**	*139*
88	**17**	**29**	5	*139*
20	14	79	26	*139*
9	96	13	21	*139*
139	*139*	*139*	*139*	*139*

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

• Magic Square of Order 4

Date of Birth : 22.12.1887
Date of Death : 26.04.1920
Servived from Smallpox : 1889
Got Job at Madras Port Trust : 1912
Year of Entering England : 1914
Fellow Royal Society, London : 1918
Hardy-Ramanujan Number : 1729.

				8623
2212	**1887**	**2604**	**1920**	*8623*
1914	2610	**1729**	2370	*8623*
1918	2395	**1889**	2421	*8623*
2579	1731	2401	**1912**	*8623*
8623	*8623*	*8623*	*8623*	*8623*

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

• Magic Square of Order 4

Date of Birth : 22.12.1887
Date of Death : 26.04.1920
Hardy-Ramanujan Number : 1729.

		8432	*8432*	*8432*	*8432*
	2212	**1887**	**1729**	**2604**	*8432*
8432	1696	2637	2179	**1920**	*8432*
8432	2487	1612	2004	2329	*8432*
8432	2037	2296	2520	1579	*8432*
	8432	*8432*	*8432*	*8432*	*8432*

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

- **Magic Square of Order 4**

Date of Birth : 22.12.1887
Date of Death : 26.04.1920
Age at the time of Death : 32
Got Job at Madrs Port Trust : 1912
Year of Entering England : 1914
Fellow Royal Society, London : 1918
Hardy-Ramanujan Number : 1729.

		8655	*8655*	*8655*	*8655*	*8655*
	2212	**1887**	**32**	**2604**	**1920**	*8655*
8655	1754	**1914**	3062	**1918**	7	*8655*
8655	2768	38	**1729**	1064	3056	*8655*
8655	1039	2206	2762	888	1760	*8655*
8655	882	2610	1070	2181	**1912**	*8655*
	8655	*8655*	*8655*	*8655*	*8655*	*8655*

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

1729 – 05

• Magic Square of Order 5

Date of Birth : 22.12.1887
Date of Death : 26.04.1920
Worked on Mathematics : 22 years
Age at the time of Death : 32 years
Most Struggling Year : 1908
Year of Entering England : 1914
Fellow Royal Society, London : 1918
Hardy-Ramanujan Number : 1729
Magic Sum : $8645 = 5 \times 1729$.

		5×1729	5×1729	5×1729	5×1729	5×1729
	2212	**1887**	**22**	**2604**	**1920**	5×1729
5×1729	1750	**1914**	3062	**1918**	1	5×1729
5×1729	2768	**32**	**1729**	1060	3056	5×1729
5×1729	1039	2202	2762	882	1760	5×1729
5×1729	876	2610	1070	2181	**1908**	5×1729
	5×1729	5×1729	5×1729	5×1729	5×1729	5×1729

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

• Single Digit Representations

$$\begin{aligned}
\mathbf{1729} &:= (11+1)^{1+1+1}+1 \\
&:= (2/2+2)\times(22+2)^2+2/2 \\
&:= (3\times 3+3)^3+3/3 \\
&:= 4\times(4\times 44+4^4)+4/4 \\
&:= 55\times(5\times 5-5)+(5^5-5)/5+5 \\
&:= 6\times 6\times(6\times 6+6+6)+6/6 \\
&:= 7\times 7\times(7\times 7-7-7)+7+7 \\
&:= 8\times(8\times(8+8)+88)+8/8 \\
&:= 9\times 9\times 9+999+9/9.
\end{aligned}$$

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

- **Patterns in Single Digit**

$$\mathbf{1729} := 55 \times (5 \times 5 - 5) + 5 + \frac{5^5 - 5}{5}$$
$$\mathbf{11729} := 555 \times (5 \times 5 - 5) + 5 + \frac{5^5 - 5}{5}$$
$$\mathbf{111729} := 5555 \times (5 \times 5 - 5) + 5 + \frac{5^5 - 5}{5}$$
$$\mathbf{1111729} := 55555 \times (5 \times 5 - 5) + 5 + \frac{5^5 - 5}{5}$$

$$\mathbf{1729} := 9 \times 9 \times 9 + 999 + \frac{9}{9}$$
$$\mathbf{10729} := 9 \times 9 \times 9 + 9999 + \frac{9}{9}$$
$$\mathbf{100729} := 9 \times 9 \times 9 + 99999 + \frac{9}{9}$$
$$\mathbf{1000729} := 9 \times 9 \times 9 + 999999 + \frac{9}{9}$$

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

- **Single Letter Representation**

$$\mathbf{1729} := \frac{(aaa + aa + aa) \times (aa + a + a)}{a \times a}.$$

where, $aaa = a10^2 + a10 + a$,
$aa = a10 + a$, $a \in \{1,2,3,4,5,6,7,8,9\}$.

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

• Patterns in Single Letter

$$\mathbf{1729} := \frac{(aaa+aa+aa)\times(aa+a+a)}{a\times a}$$
$$\mathbf{14729} := \frac{(aaaa+aa+aa)\times(aa+a+a)}{a\times a}$$
$$\mathbf{144729} := \frac{(aaaaa+aa+aa)\times(aa+a+a)}{a\times a}$$
$$\mathbf{1444729} := \frac{(aaaaaa+aa+aa)\times(aa+a+a)}{a\times a}$$

where, $aaaaa := a10^4+a10^3+a10^2+a10+a$, $\quad aaaa := a10^3+a10^2+a10+a$,
$aaa := a10^2+a10+a$, $\quad aa := a10+a$, etc.
$a \in \{1,2,3,4,5,6,7,8,9\}$.

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

• Crazy Representations: Pyramid-Type

$$\begin{aligned}
\mathbf{1729} &:= 12^3-4+5 && = 54\times 32+1\\
&:= 12^3+(-4+5)^6 && = 6\times(5+4)\times 32+1\\
&:= 123\times(4\times 5-6)+7 && = (7-6)\times(54\times 32+1)\\
&:= -1+(2+34+5)\times 6\times 7+8 && = 8-7+6\times(5+4)\times 32\times 1\\
&:= 12-3+4^5-6+78\times 9 && = (98-7)\times(6\times 5-4\times 3+2-1).
\end{aligned}$$

$$\begin{aligned}
\mathbf{1729} &:= T(9)+8\times 7\times 6\times 5+4 && = (F(F(4))+5)\times(F(6)+F(F(7)))+8+F(9)\\
& && = 4-T(56)+T(T(7)+8+T(9)\\
&:= 12^3-4+5 && = 5!\times T(4)+T(32)+1\\
&:= 12^3+(-4+5)^6 && = T(F(6)+5\times T(4))-3+21\\
& && = (F(6)+5)\times(T(4!-F(3!))-2-1\times 0!)\\
&:= 123\times(4\times 5-6)+7 && = F(7)\times(6+(5-F(4))\times 3\times 21+0!)\\
&:= T(12)+3-4+56+T(7\times 8) && = 876+F(T(5))+4\times 3+T(21)\\
& && = \sqrt{\sqrt{87-6}}+54\times 32-1-0!\\
&:= 12-3+4^5-6+78\times 9 && = (9\times F(8)+7+T(F(6))\times 5)\times 4-3!+T(21)\\
& && = (9-8)\times 7\times(6+(5\times 4\times F(3))\times(2+1)!+0!)
\end{aligned}$$

The function **F** and **T** are well known **Fibonacci** and **Triangular** numbers.

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

• Ending in Zero

$$\begin{aligned}\mathbf{1729} &:= (4\times 3)^{2+1}+0!\\ &:= 54\times 32+1\times 0!\\ &:= 6!-5-4-3!+2^{10}\\ &:= (7+6)\times(-5-4!\times 3+210)\\ &:= 8-7+(6+5)\times 4^3+2^{10}\\ &:= 9+8\times(7\times 6\times 5-4-3+2+10).\end{aligned}$$

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

• Numbers from 1 to 10 and Reverse

Instead using 1 to 9 or 9 to 1, here the numbers 1 to 10 are used in both ways, i.e., increasing and decreasing.

$$\begin{aligned}\mathbf{1729} &:= 10\times(98+7+65+\sqrt{4})+3^2\times 1\\ &:= 1+2^3+(-4+56+((7+8)/\sqrt{9})!)\times 10.\end{aligned}$$

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

• Powers and Bases: Same Digits

$$\begin{aligned}\mathbf{1729} &:= 1^3+2^6+3^2+4^5+5^4+6^1\\ &:= 1^5+2^8+3^9+4^4+5^1-6^7+7^2+8^6-9^3\\ &:= 0^3+1^0+2^6+3^2+4^5+5^4+6^1\\ &:= 0^4+1^7+2^9-3^8+4^6+5^5+6^2+7^1+8^3+9^0\\ \\ &:= 1^1+2^7+4^5+5^4-7^2\\ &:= 1^9-2^1+4^5+5^4+9^2.\end{aligned}$$

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

- **Power Patterns**

$$\mathbf{1729}\times 10+0 := -1^7+2^6+3^1+4^4+5^3+6^2+7^5$$
$$\mathbf{1729}\times 10+2 := 1^7+2^6+3^1+4^4+5^3+6^2+7^5$$
$$\mathbf{1729}\times 10+4 := 1^7+2^6+3^2+4^1+5^4-6^3+7^5$$
$$\mathbf{1729}\times 10+6 := -1^5+2^4+3^6+4^7+5^3+6^2+7^1$$
$$\mathbf{1729}\times 10+8 := 1^5+2^4+3^6+4^7+5^3+6^2+7^1.$$

$$\mathbf{1729}\times 10+0 := 1^7+2^8-3^3-4^5+5^6-6^1+7^4+8^2$$
$$\mathbf{1729}\times 10+2 := 1^8+2^6+3^2-4^7+5^4+6^3-7^1+8^5$$
$$\mathbf{1729}\times 10+4 := 1^3+2^4+3^2+4^8-5^7+6^6-7^5+8^1$$
$$\mathbf{1729}\times 10+6 := 1^6+2^8-3^5+4^7+5^4+6^3+7^2+8^1$$
$$\mathbf{1729}\times 10+8 := 1^8+2^4+3^6-4^7+5^3+6^2+7^1+8^5.$$

- **Same Digits Both Sides: Selfie-Type**

$$\mathbf{1729}665 := 17^2\times 9\times 665$$
$$4941729 := (494+\mathbf{1729})^2.$$

- **Same Digits Both Sides: Multiplication**

$$\mathbf{1729}\times 3584 = 1792\times 3458$$
$$\mathbf{1729}\times 3854 = 1927\times 3458$$
$$\mathbf{1729}\times 4358 = 2179\times 3458$$
$$\mathbf{1729}\times 4732 = 2197\times 3724$$
$$\mathbf{1729}\times 5438 = 2719\times 3458$$
$$\mathbf{1729}\times 5781 = 1927\times 5187.$$

- **Same Digits Both Sides: Power Plus**

$$\begin{aligned}
\mathbf{1729} &:= 2^7 + 40^2 + 130^0 \qquad = 27 + 402 + 1300 \\
&:= 2^6 + 40^2 + 64^1 + 66^0 = 26 + 402 + 641 + 660 \\
&:= 1^6 + 41^2 + 46^1 + 84^0 = 16 + 412 + 461 + 840.
\end{aligned}$$

$$\begin{aligned}
\mathbf{1729} &:= 3^5 + 3^5 + 3^6 + 4^0 + 8^3 + 150^0 = 35 + 35 + 36 + 40 + 83 + 1500 \\
&:= 2^4 + 2^4 + 3^5 + 6^4 + 8^1 + 150^1 = 24 + 24 + 35 + 64 + 81 + 1501 \\
&:= 2^4 + 2^8 + 3^1 + 6^4 + 8^1 + 150^1 = 24 + 28 + 31 + 64 + 81 + 1501 \\
&:= 2^4 + 2^8 + 4^1 + 6^4 + 7^1 + 150^1 = 24 + 28 + 41 + 64 + 71 + 1501 \\
&:= 2^4 + 2^8 + 5^1 + 6^1 + 6^4 + 150^1 = 24 + 28 + 51 + 61 + 64 + 1501 \\
&:= 3^4 + 3^5 + 5^1 + 5^4 + 5^4 + 150^1 = 34 + 35 + 51 + 54 + 54 + 1501.
\end{aligned}$$

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

$$
\begin{aligned}
\mathbf{1729} &:= 1^0+2^3+4^3+4^4+5^4+5^4+150^1 = 10+23+43+44+54+54+1501\\
&:= 1^0+2^9+4^2+4^5+5^0+5^2+150^1 = 10+29+42+45+50+52+1501\\
&:= 1^0+3^4+3^5+4^1+5^4+5^4+150^1 = 10+34+35+41+54+54+1501\\
&:= 1^1+2^9+3^0+4^5+5^1+6^2+150^1 = 11+29+30+45+51+62+1501\\
&:= 1^8+2^4+2^9+4^5+5^2+6^0+150^1 = 18+24+29+45+52+60+1501\\
&:= 1^8+2^9+2^9+2^9+6^1+6^2+150^1 = 18+29+29+29+61+62+1501\\
&:= 2^0+2^9+4^0+4^2+4^5+5^2+150^1 = 20+29+40+42+45+52+1501\\
&:= 2^1+2^9+3^0+4^1+4^5+6^2+150^1 = 21+29+30+41+45+62+1501\\
&:= 2^5+2^6+2^7+3^6+5^4+6^0+150^1 = 25+26+27+36+54+60+1501\\
&:= 2^9+3^0+3^0+4^2+4^5+5^2+150^1 = 29+30+30+42+45+52+1501\\
&:= 2^9+3^0+3^1+3^1+4^5+6^2+150^1 = 29+30+31+31+45+62+1501.
\end{aligned}
$$

$$
\begin{aligned}
\mathbf{1729} &:= 1^0+2^8+2^9+3^6+4^0+4^2+4^3+150^1 := 10+28+29+36+40+42+43+1501\\
&:= 1^1+2^6+2^9+3^6+4^0+4^2+4^4+150^1 := 11+26+29+36+40+42+44+1501\\
&:= 1^2+2^4+2^9+3^6+4^0+4^3+4^4+150^1 := 12+24+29+36+40+43+44+1501\\
&:= 1^4+2^0+2^9+3^6+4^2+4^3+4^4+150^1 := 14+20+29+36+42+43+44+1501\\
&:= 1^4+2^5+2^8+3^2+4^0+4^4+4^5+150^1 := 14+25+28+32+40+44+45+1501\\
&:= 1^4+2^8+3^3+3^3+3^5+4^0+4^5+150^1 := 14+28+33+33+35+40+45+1501\\
&:= 1^5+1^9+2^9+3^6+4^2+4^3+4^4+150^1 := 15+19+29+36+42+43+44+1501.
\end{aligned}
$$

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

- **Same Digits Both Sides: Factorial-Power**

$$
\begin{aligned}
\mathbf{1729} := 1! + (2! \times 4! + 5!) \times 3! + 6! &= 1^3 + 2^6 + 4^5 + 5^4 + 3^2 + 6^1 \\
&= (1^6 + 2^5) \times 4^1 + 5^4 + 3^3 \times 6^2 \\
:= 1! + (4! \times 3! + 6!) \times 2! &= 1^6 + 4^2 \times 3^4 + 6^3 \times 2^1 \\
:= 1! + (6! + 3! \times 4!) \times 2! &= 1^6 + 6^4 + 3^3 \times 4^1 \times 2^2 \\
:= 1! + 2! \times 3! \times (5! + 4!) &= 1^1 + 2^2 \times (3^5 + 5^3) + 4^4 \\
:= 1! + 3! \times 2! \times (4! + 5!) &= (1^1 + 3^2) \times 2^3 + 4^5 + 5^4 \\
\\
:= 1! + 2! \times 3! \times (5! + 4!) &= 1^1 + 2^5 \times (3^4 - 5^2) - 4^3 \\
&= 1^2 + 2^3 \times (3^5 + 5^1) - 4^4 \\
&= 1^3 + (2^5 + 3^4 - 5^1) \times 4^2 \\
:= 1! + 3! \times 2! \times (5! + 4!) &= 1^5 - 3^1 \times (2^4 - 5^2) \times 4^3 \\
&= 1^5 + 3^3 \times (2^4 \times 5^1 - 4^2) \\
:= 1! + (4! + 5! + 6!) \times 2! &= 1^5 - 4^4 - (5^1 - 6^2) \times 2^6 \\
&= 1^5 - 4^4 + (5^2 + 6^1) \times 2^6 \\
:= 1! + (6! + 4! + 5!) \times 2! &= 1^6 + 6^4 - 4^2 \times (5^1 - 2^5) \\
:= 1! + (6! + 3! \times 4!) \times 2! &= -1^6 + 6^4 + 3^3 \times 4^2 + 2^1 \\
&= 1^1 + (6^2 - 3^3) \times (4^4 - 2^6) \\
:= 1! + (6! + 4! \times 3!) \times 2! &= 1^1 - 6^3 \times 4^2 + 3^4 \times 2^6.
\end{aligned}
$$

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

- **Narcissistic-Type Representation**

$$
\mathbf{1729} := \frac{1^0 + 7^0 + 2^{15} + 9^2}{1 + 7 + 2 + 9}.
$$

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

- **Power Representations: Power 2**

$$\begin{aligned}\mathbf{1729} &:= 6^2+18^2+37^2\\ &:= 8^2+12^2+39^2\\ &:= 8^2+24^2+33^2\\ &:= 10^2+27^2+30^2\\ &:= 12^2+17^2+36^2\\ &:= 18^2+26^2+27^2.\end{aligned}$$

- **Power Representations: Power 3**

$$\begin{aligned}\mathbf{1729} &:= 1^3+12^3\\ &:= 9^3+10^3\\ &:= 1^3+6^3+8^3+10^3\\ &:= 1^3+3^3+4^3+5^3+8^3+10^3.\end{aligned}$$

- **Power Representations: Power 3 Multiplication**

$$\begin{aligned}\mathbf{1729} &:= (6^3-5^3)\times(3^3-2^3)\\ &:= (4^3+3^3)\times(3^3-2^3).\end{aligned}$$

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

- **Patterns with 1729: Power 3 - First Pattern**

$$
\begin{aligned}
\mathbf{1729} \times 10 + 0 &:= 13^3 + 18^3 + 21^3 \\
\mathbf{1729} \times 10 + 1 &:= 1^3 + 13^3 + 18^3 + 21^3 \\
\mathbf{1729} \times 10 + 2 &:= 2^3 + 7^3 + 13^3 + 16^3 + 22^3 \\
&:= 7^3 + 9^3 + 13^3 + 15^3 + 22^3 \\
\mathbf{1729} \times 10 + 3 &:= 1^3 + 2^3 + 7^3 + 13^3 + 16^3 + 22^3 \\
&:= 1^3 + 7^3 + 9^3 + 13^3 + 15^3 + 22^3 \\
\mathbf{1729} \times 10 + 4 &:= 5^3 + 8^3 + 10^3 + 14^3 + 17^3 + 20^3 \\
\mathbf{1729} \times 10 + 5 &:= 5^3 + 9^3 + 11^3 + 13^3 + 17^3 + 20^3 \\
\mathbf{1729} \times 10 + 6 &:= 6^3 + 17^3 + 23^3 \\
\mathbf{1729} \times 10 + 7 &:= 9^3 + 14^3 + 24^3 \\
\mathbf{1729} \times 10 + 8 &:= 1^3 + 9^3 + 14^3 + 24^3 \\
&:= 2^3 + 13^3 + 18^3 + 21^3 \\
\mathbf{1729} \times 10 + 9 &:= 7^3 + 11^3 + 25^3,
\end{aligned}
$$

The last two numbers can also be written as power 4:

$$
\begin{aligned}
\mathbf{1729} \times 10 + 8 &:= 4^4 + 7^4 + 11^4 \\
\mathbf{1729} \times 10 + 9 &:= 1^4 + 4^4 + 7^4 + 11^4.
\end{aligned}
$$

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

- **Patterns with 1729: Power 3 - Second Pattern**

$$
\begin{aligned}
10000 + \mathbf{1729} &:= 1^3 + 2^3 + 7^3 + 9^3 + 22^3 \\
&:= 6^3 + 9^3 + 12^3 + 13^3 + 19^3 \\
20000 + \mathbf{1729} &:= 1^3 + 5^3 + 16^3 + 19^3 + 22^3 \\
&:= 1^3 + 10^3 + 12^3 + 15^3 + 25^3 \\
&:= 4^3 + 6^3 + 12^3 + 16^3 + 25^3 \\
&:= 7^3 + 13^3 + 16^3 + 18^3 + 21^3 \\
30000 + \mathbf{1729} &:= 1^3 + 10^3 + 13^3 + 16^3 + 19^3 + 26^3 \\
&:= 3^3 + 4^3 + 10^3 + 16^3 + 19^3 + 27^3 \\
&:= 6^3 + 10^3 + 13^3 + 18^3 + 19^3 + 25^3 \\
40000 + \mathbf{1729} &:= 2^3 + 5^3 + 15^3 + 18^3 + 20^3 + 29^3 \\
&:= 2^3 + 8^3 + 11^3 + 13^3 + 17^3 + 32^3 \\
&:= 8^3 + 9^3 + 17^3 + 18^3 + 23^3 + 26^3 \\
50000 + \mathbf{1729} &:= 5^3 + 9^3 + 20^3 + 35^3 \\
&:= 14^3 + 17^3 + 27^3 + 29^3 \\
60000 + \mathbf{1729} &:= 6^3 + 12^3 + 17^3 + 38^3 \\
&:= 6^3 + 20^3 + 26^3 + 33^3 \\
70000 + \mathbf{1729} &:= 4^3 + 14^3 + 41^3 \\
80000 + \mathbf{1729} &:= 10^3 + 12^3 + 17^3 + 42^3 \\
90000 + \mathbf{1729} &:= 9^3 + 30^3 + 40^3.
\end{aligned}
$$

The last two numbers can also be written as power 4:

$$
\begin{aligned}
80000 + \mathbf{1729} &:= 4^4 + 6^4 + 11^4 + 16^4 \\
90000 + \mathbf{1729} &:= 4^4 + 6^4 + 10^4 + 11^4 + 16^4.
\end{aligned}
$$

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

- **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,

$$\mathbf{1729} := F(2) + F(6) + F(9) + F(11) + F(17)$$

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

©NumbersMagic
1729 – 24

• S-gonol Values

The general formula for **s-sides of a polygon** (**s-gonal**) is known as

$$P_s(n) := \frac{n(n-1)(s-2)}{2} + n, \;\; s > 2. \tag{1}$$

Below are particular cases:

$$\begin{aligned}
\textbf{Triangle (3-gonal):}\; & P_3(n) = n(n+1)/2 && \rightarrow \mathbf{1729} := P_3(26) + P_3(52)\\
\textbf{Square (4-gonal):}\; & P_4(n) = n^2 && \rightarrow \mathbf{1729} := P_4(6) + P_4(18) + P_4(37)\\
\textbf{Pentagonal (5-gonal):}\; & P_5(n) = n(3n-1)/2 && \rightarrow \mathbf{1729} := P_5(3) + P_5(34)\\
\textbf{Hexagonal (6-gonal):}\; & P_6(n) = n(2n-1) && \rightarrow \mathbf{1729} := P_6(9) + P_6(18) + P_6(22)\\
\textbf{Heptagonal (7-gonal):}\; & P_7(n) = n(5n-3)/2 && \rightarrow \mathbf{1729} := P_7(9) + P_7(14) + P_7(21)\\
\textbf{Octagonal (8-gonal):}\; & P_8(n) = n(3n-2) && \rightarrow \mathbf{1729} := P_8(4) + P_8(12) + P_8(21)\\
\textbf{Nonagonal (9-gonal):}\; & P_9(n) = n(7n-5)/2 && \rightarrow \mathbf{1729} := P_9(1) + P_9(2) + P_9(15) + P_9(17)\\
\textbf{Decagonal (10-gonal):}\; & P_{10}(n) = n(4n-3) && \rightarrow \mathbf{1729} := P_{10}(1) + P_{10}(3) + P_{10}(21)\\
\textbf{Hendecagonal (11-gonal):}\; & P_{11}(n) = n(9n-7)/2 && \rightarrow \mathbf{1729} := P_{11}(1) + P_{11}(9) + P_{11}(18)
\end{aligned}$$

Calculating further values, the exact values are for 12-gonal, 24-gonal and 84-gonal. See below:

$$\begin{aligned}
\textbf{12-gonal:}\; & P_{12}(n) = n(5n-4) && \rightarrow \mathbf{1729} := P_{12}(19)\\
\textbf{24-gonal:}\; & P_{24}(n) = n(11n-10) && \rightarrow \mathbf{1729} := P_{24}(13)\\
\textbf{84-gonal:}\; & P_{84}(n) = n(41n-40) && \rightarrow \mathbf{1729} := P_{84}(7).
\end{aligned}$$

Interestingly, 7, 13 and 19 are the **multiplicative factors** of **1729**.

In case of **decagonal (10-gonal)**, Ramanujan proved that

$$1^3 + 3^3 \times \frac{n-1}{n+1} + 5^3 \times \frac{(n-1)(n-2)}{(n+1)(n+2)} + 7^3 \times \frac{(n-1)(n-2)(n-3)}{(n+1)(n+2)(n+3)} + \ldots = n(4n-3).$$

https://oeis.org/A001107

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

• Centered Polygonal Numbers

Below are representations of 1729 based on **centered polyon numbers**:

$$
\begin{aligned}
\mathbf{1729} &:= \boldsymbol{C}_3(1) + \boldsymbol{C}_3(2) + \boldsymbol{C}_3(13) + \boldsymbol{C}_3(32).\\
&:= \boldsymbol{C}_4(1) + \boldsymbol{C}_4(2) + \boldsymbol{C}_4(3) + \boldsymbol{C}_4(7) + \boldsymbol{C}_4(29).\\
&:= \boldsymbol{C}_5(1) + \boldsymbol{C}_5(2) + \boldsymbol{C}_5(14) + \boldsymbol{C}_5(23).\\
&:= \boldsymbol{C}_6(1) + \boldsymbol{C}_6(2) + \boldsymbol{C}_6(3) + \boldsymbol{C}_6(4) + \boldsymbol{C}_6(5) + \boldsymbol{C}_6(9) + \boldsymbol{C}_6(22).\\
&:= \boldsymbol{C}_7(1) + \boldsymbol{C}_7(2) + \boldsymbol{C}_7(3) + \boldsymbol{C}_7(4) + \boldsymbol{C}_7(5) + \boldsymbol{C}_7(9) + \boldsymbol{C}_7(20).\\
&:= \boldsymbol{C}_8(1) + \boldsymbol{C}_8(2) + \boldsymbol{C}_8(3) + \boldsymbol{C}_8(4) + \boldsymbol{C}_8(5) + \boldsymbol{C}_8(6) + \boldsymbol{C}_8(9) +\\
&\qquad\qquad + \boldsymbol{C}_8(12) + \boldsymbol{C}_8(13).\\
&:= \boldsymbol{C}_{11}(7) + \boldsymbol{C}_{11}(17).\\
&:= \boldsymbol{C}_{14}(1) + \boldsymbol{C}_{14}(2) + \boldsymbol{C}_{14}(3) + \boldsymbol{C}_{14}(5) + \boldsymbol{C}_{14}(6) + \boldsymbol{C}_{14}(8) + \boldsymbol{C}_{14}(12).\\
&:= \boldsymbol{C}_{15}(1) + \boldsymbol{C}_{15}(2) + \boldsymbol{C}_{15}(9) + \boldsymbol{C}_{13}(13).
\end{aligned}
$$

The **centered polygonal numbers** are defined as

$$\boldsymbol{C_k}(n) := \frac{kn(n-1)}{2} + 1, \;\; k > 2$$

(*http://www.virtuescience.com/centered-polygonal.html*)

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

• Carmichael number

Considering Carmichael (Charmick, 1939) numbers of the form

$$(6n+1)(12n+1)(18n+1)$$

where $6n+1$, $12n+1$ and $18n+1$ are primes, then

$$\mathbf{1729} := 7 \times 13 \times 19$$

J. Chernick (1939), On Fermat's simple theorem,
Bull. Amer. Math. Soc. ***45:*** *269-274*
https://oeis.org/A033502

Also, Carmichael numbers of the form

$$(6n+1)(12n+1)(18n+1)$$

are known as *Zeisel numbers*.

https://oeis.org/A051015.

• Centered cube number

Centered cube numbers are defined as

$$C(n) := n^3 + (n+1)^3 = (2n+1) \times (n^2+n+1),\ n \geq 0$$

This gives

$$\mathbf{1729} = C(9) := 9^3 + 10^3$$

https://oeis.org/A005898

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

• Generalized Heptagonal (7-gonal)

Generalized heptagonal number is defined as

$$G_7(n) = n(5n-3)/2,\ n = 0, \pm 1, \pm 2, .$$

This gives

$$\mathbf{1729} := G_7(-6)$$

https://oeis.org/A085787

• Third Spoke of a Hexagonal Spiral

Third spoke of a hexagonal spiral is defined as

$$M(n) := 3n^2 + 1,\ n = 0, 1, 2, .$$

This gives

$$\mathbf{1729} := M(24)$$

https://oeis.org/A056107

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

• Stair-Type Formula

For all $n > 2, S(1) = 0, S(2) = 1$, we have

$$\begin{aligned} S(n) &:= S(n-2) + \frac{n(n-1)}{2} \\ &:= \frac{4n^3 + 6n^2 - 4n + 3(-1)^n - 3}{48} \end{aligned}$$

This gives

$$\mathbf{1729} := S(27)$$

The "*stair-type values*" are given by

1					1
3					3
6	1				7
10	3				13
15	6	1			22
21	10	3			34
28	15	6	1		50
36	21	10	3		70
45	28	15	6	1	95
...	...	...	...	...	...

https://oeis.org/A002623

• Selfie-Fractions

- $\frac{364}{\mathbf{1729}} = \frac{(3+6)\times 4}{(17+2)\times 9}$
- $\frac{546}{\mathbf{1729}} = \frac{(5+4)\times 6}{(17+2)\times 9}$
- $\frac{\mathbf{1729}}{4368} = \frac{1+7+2+9}{4+36+8}$
- $\frac{\mathbf{1729}}{8463} = \frac{1+7+2+9}{84+6+3}$
- $\frac{\mathbf{1729}}{6384} = \frac{1+7\times(2+9)}{(6+3)\times 8\times 4}$
- $\frac{\mathbf{1729}}{58604} = \frac{1+7+2+9}{5\times 8+604}$

• Equivalent Selfie Fractions

- $\frac{\mathbf{1729}}{3458} = \frac{17+29}{34+58} = \frac{17-29}{34-58} = \frac{17+2+9}{3+45+8} = \frac{1+7+2\times 9}{3\times 4+5\times 8}$
  $= \frac{17+2\times 9}{3\times 4+58} = \frac{1+7+29}{34+5\times 8} = \frac{1\times 7\times 29}{(3+4)\times 58} = \frac{1+7\times(2+9)}{3\times 4\times(5+8)}$

- $\frac{\mathbf{1729}}{3640} = \frac{(17+2)\times 9}{(3+6)\times 40} = \frac{1+7+2+9}{36+4+0}$

- $\frac{\mathbf{1729}}{5460} = \frac{(17+2)\times 9}{(5+4)\times 60} = \frac{1+7+2+9}{54+6+0}$

- $\frac{\mathbf{1729}}{8645} = \frac{1\times 7+2+9}{(8+6+4)\times 5} = \frac{1+7+2+9}{86+4+5} = \frac{1+7\times 2+9}{8\times(6+4+5)}$
  $= \frac{(1+7+2)\times 9}{(86+4)\times 5} = \frac{1\times 7\times 2\times 9}{(8+6)\times 45} = \frac{1^7\times 2^9}{8\times 64\times 5}$

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

• Equivalent Fractions: Triple Representations

- $\frac{\mathbf{1729}}{38456} = \frac{3458}{76912} = \frac{4368}{97152}$
- $\frac{\mathbf{1729}}{53846} = \frac{1267}{39458} = \frac{2534}{78916}$
- $\frac{\mathbf{1729}}{45836} = \frac{1976}{52384} = \frac{3458}{91672}$
- $\frac{\mathbf{1729}}{308465} = \frac{2639}{470815} = \frac{5278}{941630}$

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

- **Equivalent Fractions: Double Representations**

$$\blacktriangleright \frac{\mathbf{1729}}{34586} = \frac{3458}{69172}$$

$$\blacktriangleright \frac{\mathbf{1729}}{34856} = \frac{3458}{69712}$$

$$\blacktriangleright \frac{\mathbf{1729}}{35648} = \frac{3458}{71296}$$

$$\blacktriangleright \frac{\mathbf{1729}}{35846} = \frac{3458}{71692}$$

$$\blacktriangleright \frac{\mathbf{1729}}{36458} = \frac{3458}{72916}$$

$$\blacktriangleright \frac{\mathbf{1729}}{43586} = \frac{2457}{61938}$$

$$\blacktriangleright \frac{\mathbf{1729}}{45638} = \frac{3458}{91276}$$

$$\blacktriangleright \frac{\mathbf{1729}}{45863} = \frac{3458}{91726}$$

$$\blacktriangleright \frac{\mathbf{1729}}{46358} = \frac{3458}{92716}$$

$$\blacktriangleright \frac{\mathbf{1729}}{46835} = \frac{2639}{71485}$$

$$\blacktriangleright \frac{\mathbf{1729}}{48356} = \frac{3458}{96712}$$

$$\blacktriangleright \frac{\mathbf{1729}}{48563} = \frac{3458}{97126}$$

$$\blacktriangleright \frac{\mathbf{1729}}{304586} = \frac{3458}{609172}$$

$$\blacktriangleright \frac{\mathbf{1729}}{304856} = \frac{3458}{609712}$$

$$\blacktriangleright \frac{\mathbf{1729}}{305486} = \frac{3458}{610972}$$

$$\blacktriangleright \frac{\mathbf{1729}}{305864} = \frac{4921}{870536}$$

$$\blacktriangleright \frac{\mathbf{1729}}{306485} = \frac{3458}{612970}$$

$$\blacktriangleright \frac{\mathbf{1729}}{308546} = \frac{3458}{617092}$$

$$\blacktriangleright \frac{\mathbf{1729}}{308645} = \frac{3458}{6\mathbf{1729}0}$$

$$\blacktriangleright \frac{\mathbf{1729}}{345086} = \frac{3458}{690172}$$

$$\blacktriangleright \frac{\mathbf{1729}}{346085} = \frac{3458}{692170}$$

$$\blacktriangleright \frac{\mathbf{1729}}{348506} = \frac{3458}{697012}$$

$$\blacktriangleright \frac{\mathbf{1729}}{348605} = \frac{3458}{697210}$$

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

- **Equivalent Fractions: Double Representations**

$\blacktriangleright \frac{1729}{350648} = \frac{3458}{701296}$

$\blacktriangleright \frac{1729}{350846} = \frac{3458}{701692}$

$\blacktriangleright \frac{1729}{354608} = \frac{3458}{709216}$

$\blacktriangleright \frac{1729}{354806} = \frac{3458}{709612}$

$\blacktriangleright \frac{1729}{356048} = \frac{3458}{712096}$

$\blacktriangleright \frac{1729}{358046} = \frac{3458}{716092}$

$\blacktriangleright \frac{1729}{360458} = \frac{3458}{720916}$

$\blacktriangleright \frac{1729}{360548} = \frac{3458}{721096}$

$\blacktriangleright \frac{1729}{360845} = \frac{3458}{721690}$

$\blacktriangleright \frac{1729}{364508} = \frac{3458}{729016}$

$\blacktriangleright \frac{1729}{364805} = \frac{3458}{729610}$

$\blacktriangleright \frac{1729}{380456} = \frac{3458}{760912}$

$\blacktriangleright \frac{1729}{380546} = \frac{3458}{761092}$

$\blacktriangleright \frac{1729}{380645} = \frac{3458}{761290}$

$\blacktriangleright \frac{1729}{384506} = \frac{3458}{769012}$

$\blacktriangleright \frac{1729}{384605} = \frac{3458}{769210}$

$\blacktriangleright \frac{1729}{450638} = \frac{3458}{901276}$

$\blacktriangleright \frac{1729}{450836} = \frac{3458}{901672}$

$\blacktriangleright \frac{1729}{450863} = \frac{3458}{901726}$

$\blacktriangleright \frac{1729}{453086} = \frac{3458}{906172}$

$\blacktriangleright \frac{1729}{453608} = \frac{3458}{907216}$

$\blacktriangleright \frac{1729}{453806} = \frac{3458}{907612}$

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

• Equivalent Fractions: Double Representations

$\blacktriangleright \frac{1729}{456038} = \frac{3458}{912076}$ $\blacktriangleright \frac{1729}{463508} = \frac{3458}{927016}$ $\blacktriangleright \frac{1729}{485306} = \frac{3458}{970612}$

$\blacktriangleright \frac{1729}{458036} = \frac{3458}{916072}$ $\blacktriangleright \frac{1729}{463805} = \frac{3458}{927610}$ $\blacktriangleright \frac{1729}{485603} = \frac{3458}{971206}$

$\blacktriangleright \frac{1729}{458603} = \frac{3458}{917206}$ $\blacktriangleright \frac{1729}{480356} = \frac{3458}{960712}$ $\blacktriangleright \frac{1729}{486053} = \frac{3458}{972106}$

$\blacktriangleright \frac{1729}{460358} = \frac{3458}{920716}$ $\blacktriangleright \frac{1729}{480536} = \frac{3458}{961072}$ $\blacktriangleright \frac{1729}{486305} = \frac{3458}{972610}$

$\blacktriangleright \frac{1729}{460538} = \frac{3458}{921076}$ $\blacktriangleright \frac{1729}{480635} = \frac{3458}{961270}$ $\blacktriangleright \frac{1729}{540683} = \frac{1792}{560384}$

$\blacktriangleright \frac{1729}{460835} = \frac{3458}{921670}$ $\blacktriangleright \frac{1729}{483506} = \frac{3458}{967012}$ $\blacktriangleright \frac{1729}{568043} = \frac{1092}{358764}$

$\blacktriangleright \frac{1729}{460853} = \frac{3458}{921706}$ $\blacktriangleright \frac{1729}{483605} = \frac{3458}{967210}$ $\blacktriangleright \frac{1729}{605834} = \frac{1365}{478290}$

$\blacktriangleright \frac{1729}{463085} = \frac{3458}{926170}$ $\blacktriangleright \frac{1729}{485063} = \frac{3458}{970126}$ $\blacktriangleright \frac{1729}{643058} = \frac{1064}{395728}$

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

• Pythagorean Triples With 1729

$665^2+1596^2 := \mathbf{1729^2}$
$\mathbf{1729^2}+672^2 := 1855^2$
$\mathbf{1729^2}+1140^2 := 2071^2$
$\mathbf{1729^2}+2028^2 := 2665^2$
$\mathbf{1729^2}+3960^2 := 4321^2$
$\mathbf{1729^2}+5928^2 := 6175^2$
$\mathbf{1729^2}+8760^2 := 8929^2$

$\mathbf{1729^2}+11172^2 := 11305^2$
$\mathbf{1729^2}+16380^2 := 16471^2$
$\mathbf{1729^2}+78660^2 := 78679^2$
$\mathbf{1729^2}+30480^2 := 30529^2$
$\mathbf{1729^2}+114972^2 := 114985^2$
$\mathbf{1729^2}+213528^2 := 213535^2$
$\mathbf{1729^2}+1494720^2 := 1494721^2$

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

- **Blocks of 10 and 100**

$$\mathbf{1729}\,0^2+74736024^2 := 74736026^2$$
$$\mathbf{1729}\,1^2+149489340^2 := 149489341^2$$
$$\mathbf{1729}\,2^2+74753315^2 := 74753317^2$$
$$\mathbf{1729}\,3^2+149523924^2 := 149523925^2$$
$$\mathbf{1729}\,4^2+74770608^2 := 74770610^2$$
$$\mathbf{1729}\,5^2+149558512^2 := 149558513^2$$
$$\mathbf{1729}\,6^2+74787903^2 := 74787905^2$$
$$\mathbf{1729}\,7^2+149593104^2 := 149593105^2$$
$$\mathbf{1729}\,8^2+74805200^2 := 74805202^2$$
$$\mathbf{1729}\,9^2+149627700^2 := 149627701^2$$

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

$$1729\,00^2+7473602499^2 := 7473602501^2$$
$$1729\,01^2+14947377900^2 := 14947377901^2$$
$$1729\,02^2+7473775400^2 := 7473775402^2$$
$$1729\,03^2+14947723704^2 := 14947723705^2$$
$$1729\,04^2+7473948303^2 := 7473948305^2$$
$$1729\,05^2+14948069512^2 := 14948069513^2$$
$$1729\,06^2+7474121208^2 := 7474121210^2$$
$$1729\,07^2+14948415324^2 := 14948415325^2$$
$$1729\,08^2+7474294115^2 := 7474294117^2$$
$$1729\,09^2+14948761140^2 := 14948761141^2$$
$$1729\,10^2+7474467024^2 := 7474467026^2$$
$$1729\,11^2+14949106960^2 := 14949106961^2$$
$$1729\,12^2+7474639935^2 := 7474639937^2$$
$$1729\,13^2+14949452784^2 := 14949452785^2$$
$$1729\,14^2+7474812848^2 := 7474812850^2$$
$$1729\,15^2+14949798612^2 := 14949798613^2$$
$$1729\,16^2+7474985763^2 := 7474985765^2$$
$$1729\,17^2+14950144444^2 := 14950144445^2$$
$$1729\,18^2+7475158680^2 := 7475158682^2$$
$$1729\,19^2+14950490280^2 := 14950490281^2$$
$$1729\,20^2+7475331599^2 := 7475331601^2$$
$$1729\,21^2+14950836120^2 := 14950836121^2$$
$$1729\,22^2+7475504520^2 := 7475504522^2$$
$$1729\,23^2+14951181964^2 := 14951181965^2$$
$$1729\,24^2+7475677443^2 := 7475677445^2$$
$$1729\,25^2+14951527812^2 := 14951527813^2$$
$$1729\,26^2+7475850368^2 := 7475850370^2$$
$$1729\,27^2+14951873664^2 := 14951873665^2$$
$$1729\,28^2+7476023295^2 := 7476023297^2$$
$$1729\,29^2+14952219520^2 := 14952219521^2$$
$$1729\,30^2+7476196224^2 := 7476196226^2$$
$$1729\,31^2+14952565380^2 := 14952565381^2$$
$$1729\,32^2+7476369155^2 := 7476369157^2$$
$$1729\,33^2+14952911244^2 := 14952911245^2$$
$$1729\,34^2+7476542088^2 := 7476542090^2$$
$$1729\,35^2+14953257112^2 := 14953257113^2$$
$$1729\,36^2+7476715023^2 := 7476715025^2$$
$$1729\,37^2+14953602984^2 := 14953602985^2$$
$$1729\,38^2+7476887960^2 := 7476887962^2$$
$$1729\,39^2+14953948860^2 := 14953948861^2$$
$$1729\,40^2+7477060899^2 := 7477060901^2$$
$$1729\,41^2+14954294740^2 := 14954294741^2$$
$$1729\,42^2+7477233840^2 := 7477233842^2$$
$$1729\,43^2+14954640624^2 := 14954640625^2$$
$$1729\,44^2+7477406783^2 := 7477406785^2$$
$$1729\,45^2+14954986512^2 := 14954986513^2$$
$$1729\,46^2+7477579728^2 := 7477579730^2$$
$$1729\,47^2+14955332404^2 := 14955332405^2$$
$$1729\,48^2+7477752675^2 := 7477752677^2$$
$$1729\,49^2+14955678300^2 := 14955678301^2$$

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

$1729\,50^2+7477925624^2 := 7477925626^2$
$1729\,51^2+14956024200^2 := 14956024201^2$
$1729\,52^2+7478098575^2 := 7478098577^2$
$1729\,53^2+14956370104^2 := 14956370105^2$
$1729\,54^2+7478271528^2 := 7478271530^2$
$1729\,55^2+14956716012^2 := 14956716013^2$
$1729\,56^2+7478444483^2 := 7478444485^2$
$1729\,57^2+14957061924^2 := 14957061925^2$
$1729\,58^2+7478617440^2 := 7478617442^2$
$1729\,59^2+14957407840^2 := 14957407841^2$
$1729\,60^2+7478790399^2 := 7478790401^2$
$1729\,61^2+14957753760^2 := 14957753761^2$
$1729\,62^2+7478963360^2 := 7478963362^2$
$1729\,63^2+14958099684^2 := 14958099685^2$
$1729\,64^2+7479136323^2 := 7479136325^2$
$1729\,65^2+14958445612^2 := 14958445613^2$
$1729\,66^2+7479309288^2 := 7479309290^2$
$1729\,67^2+14958791544^2 := 14958791545^2$
$1729\,68^2+7479482255^2 := 7479482257^2$
$1729\,69^2+14959137480^2 := 14959137481^2$
$1729\,70^2+7479655224^2 := 7479655226^2$
$1729\,71^2+14959483420^2 := 14959483421^2$
$1729\,72^2+7479828195^2 := 7479828197^2$
$1729\,73^2+14959829364^2 := 14959829365^2$
$1729\,74^2+7480001168^2 := 7480001170^2$
$1729\,75^2+14960175312^2 := 14960175313^2$
$1729\,76^2+7480174143^2 := 7480174145^2$
$1729\,77^2+14960521264^2 := 14960521265^2$
$1729\,78^2+7480347120^2 := 7480347122^2$
$1729\,79^2+14960867220^2 := 14960867221^2$
$1729\,80^2+7480520099^2 := 7480520101^2$
$1729\,81^2+14961213180^2 := 14961213181^2$
$1729\,82^2+7480693080^2 := 7480693082^2$
$1729\,83^2+14961559144^2 := 14961559145^2$
$1729\,84^2+7480866063^2 := 7480866065^2$
$1729\,85^2+14961905112^2 := 14961905113^2$
$1729\,86^2+7481039048^2 := 7481039050^2$
$1729\,87^2+14962251084^2 := 14962251085^2$
$1729\,88^2+7481212035^2 := 7481212037^2$
$1729\,89^2+14962597060^2 := 14962597061^2$
$1729\,90^2+7481385024^2 := 7481385026^2$
$1729\,91^2+14962943040^2 := 14962943041^2$
$1729\,92^2+7481558015^2 := 7481558017^2$
$1729\,93^2+14963289024^2 := 14963289025^2$
$1729\,94^2+7481731008^2 := 7481731010^2$
$1729\,95^2+14963635012^2 := 14963635013^2$
$1729\,96^2+7481904003^2 := 7481904005^2$
$1729\,97^2+14963981004^2 := 14963981005^2$
$1729\,98^2+7482077000^2 := 7482077002^2$
$1729\,99^2+14964327000^2 := 14964327001^2$

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

- **Patterns With 1729**

$$13271^2 + 166200^2 := 166729^2$$
$$1288271^2 + 16662000^2 := 1671\,\mathbf{1729}^2$$
$$128438271^2 + 1666620000^2 := 167156\,\mathbf{1729}^2$$

$$\mathbf{1729}\,0^2 + 74736024^2 := 74736026^2$$
$$\mathbf{1729}\,00^2 + 7473602499^2 := 7473602501^2$$
$$\mathbf{1729}\,000^2 + 747360249999^2 := 747360250001^2$$
$$\mathbf{1729}\,0000^2 + 74736024999999^2 := 74736025000001^2$$

$$8318^2 + \mathbf{1729}\,7280^2 := \mathbf{1729}\,7282$$
$$83180^2 + \mathbf{1729}\,728099^2 := \mathbf{1729}\,728101$$

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

- **Pandigital Type Patterns**

$$\begin{aligned}
0270684^2 + 1708000^2 &:= \mathbf{1729}316^2\\
\mathbf{12}0270684^2 + 18788000^2 &:= \mathbf{12\,1729}316^2\\
\mathbf{1232}0270684^2 + 189588000^2 &:= \mathbf{1232\,1729}316^2\\
\mathbf{123432}0270684^2 + 1897588000^2 &:= \mathbf{123432\,1729}316^2\\
\mathbf{12345432}0270684^2 + 18977588000^2 &:= \mathbf{12345432\,1729}316^2\\
\mathbf{1234565432}0270684^2 + 189777588000^2 &:= \mathbf{1234565432\,1729}316^2\\
\mathbf{123456765432}0270684^2 + 1897777588000^2 &:= \mathbf{123456765432\,1729}316^2\\
\mathbf{12345678765432}0270684^2 + 18977777588000^2 &:= \mathbf{12345678765432\,1729}316^2\\
\mathbf{1234567898765432}0270684^2 + 189777777588000^2 &:= \mathbf{1234567898765432\,1729}316^2
\end{aligned}$$

$$\begin{aligned}
0270684^2 + 1708000^2 &:= \mathbf{1729}316^2\\
\mathbf{1020}0270684^2 + 172508000^2 &:= \mathbf{1020\,1729}316^2\\
\mathbf{10203020}0270684^2 + 17252508000^2 &:= \mathbf{10203020\,1729}316^2\\
\mathbf{102030403020}0270684^2 + 1725252508000^2 &:= \mathbf{102030403020\,1729}316^2\\
\mathbf{1020304050403020}0270684^2 + 172525252508000^2 &:= \mathbf{1020304050403020\,1729}316^2\\
\mathbf{1020304050605040302}0270684^2 + 17252525252508000^2 &:= \mathbf{1020304050605040302\,1729}316^2\\
\mathbf{10203040506070605040302}0270684^2 + 1725252525252508000^2 &:= \mathbf{10203040506070605040302\,1729}316^2\\
\mathbf{102030405060708070605040302}0270684^2 + 172525252525252508000^2 &:= \mathbf{102030405060708070605040302\,1729}316^2\\
\mathbf{1020304050607080908070605040302}0270684^2 + 1725252525252525252508000^2 &:= \mathbf{1020304050607080908070605040302\,1729}316^2
\end{aligned}$$

$$\begin{aligned}
0267264^2 + 1712000^2 &:= 1732736^2\\
\mathbf{1020}0267264^2 + \mathbf{1729}12000^2 &:= \mathbf{1020}1732736^2\\
\mathbf{10203020}0267264^2 + \mathbf{1729}2912000^2 &:= \mathbf{10203020}1732736^2\\
\mathbf{102030403020}0267264^2 + \mathbf{1729}292912000^2 &:= \mathbf{102030403020}1732736^2\\
\mathbf{1020304050403020}0267264^2 + \mathbf{1729}29292912000^2 &:= \mathbf{1020304050403020}1732736^2\\
\mathbf{1020304050605040302}0267264^2 + \mathbf{1729}2929292912000^2 &:= \mathbf{1020304050605040302}1732736^2\\
\mathbf{10203040506070605040302}0267264^2 + \mathbf{1729}292929292912000^2 &:= \mathbf{10203040506070605040302}1732736^2\\
\mathbf{102030405060708070605040302}0267264^2 + \mathbf{1729}29292929292912000^2 &:= \mathbf{102030405060708070605040302}1732736^2\\
\mathbf{1020304050607080908070605040302}0267264^2 + \mathbf{1729}2929292929292912000^2 &:= \mathbf{1020304050607080908070605040302}1732736^2
\end{aligned}$$

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

- **Magic Squares Generated by Pythagorean Triples**

1. **(252, 864, 900)** $\Rightarrow 900-864=6^2,\ \boldsymbol{S}_{6\times 6}:=10584,\ \boldsymbol{T}_{36}:=252^2,$
$E:=\{\mathbf{1729},1731,\ldots,1797,1799\}$

2. **(287, 816, 865)** $\Rightarrow 865-816=7^2,\ \boldsymbol{S}_{7\times 7}:=11767,\ \boldsymbol{T}_{49}:=287^2,$
$E:=\{1633,1635,\ldots,1727,\mathbf{1729}\}$ or $E:=\{1657,1658,\ldots,1704,1705\}$

3. **(473, 864, 985)** $\Rightarrow 985-864=11^2,\ \boldsymbol{S}_{11\times 11}:=20339,\ \boldsymbol{T}_{121}:=473^2,$
$E:=\{\mathbf{1729},1731,\ldots,1967,1969\}$ or $E:=\{1789,1790,\ldots,1908,1909\}$

4. **(703, 504, 865)** $\Rightarrow 865-504=19^2,\ \boldsymbol{S}_{19\times 19}:=26011,\ \boldsymbol{T}_{361}:=703^2,$
$E:=\{1009,1011,\ldots,1727,\mathbf{1729}\}$ or $E:=\{1189,1190,\ldots,1548,1549\}$

5. **(290, 816, 866)** $\Rightarrow 866-290=24^2,\ \boldsymbol{S}_{24\times 24}:=27744,\ \boldsymbol{T}_{576}:=816^2,$
$E:=\{581,583,\ldots,\mathbf{1729},1731\}$

6. **(864, 1152, 1440)** $\Rightarrow 1440-864=24^2,\ \boldsymbol{S}_{24\times 24}:=55296,\ \boldsymbol{T}_{576}:=1152^2,$
$E:=\{\mathbf{1729},1731,\ldots,2877,2879\}$

7. **(624, 1457, 1585)** $\Rightarrow 1585-624=31^2,\ \boldsymbol{S}_{31\times 31}:=68479,\ \boldsymbol{T}_{961}:=1457^2,$
$E:=\{1249,1251,\ldots,3167,3169\}$ or $E:=\{\mathbf{1729},1730,\ldots,2688,689\}$

8. **(864, 2223, 2385)** $\Rightarrow 2385-864=39^2,\ \boldsymbol{S}_{39\times 39}:=126711,\ \boldsymbol{T}_{1521}:=2223^2,$
$E:=\{\mathbf{1729},1731,\ldots,4767,4769\}$ or $E:=\{2489,2490,\ldots,4008,4009\}$

9. **(864, 2852, 2980)** $\Rightarrow 2980-864=46^2,;\boldsymbol{S}_{46\times 46}:=176824,\ \boldsymbol{T}_{2116}:=2852^2,$
$E:=\{\mathbf{1729},1731,\ldots,5957,5959\}$

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

1729 – (42)

- **Magic Square of Order 6 × 6**

						10584
1729	1773	1783	1795	1761	1743	*10584*
1785	1741	1797	1755	1769	1737	*10584*
1751	1739	1753	1781	1789	1771	*10584*
1791	1759	1735	1775	1747	1777	*10584*
1765	1793	1749	1733	1787	1757	*10584*
1763	1779	1767	1745	1731	1799	*10584*
10584	*10584*	*10584*	*10584*	*10584*	*10584*	*10584*

$$\mathbf{1729} + 1731 + \ldots + 1799 = 6 \times 10584 = 63504 = 252^2 = 900^2 - 864^2$$

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

- **Pandiagonal Magic Square of Order 7 × 7**

		11767	*11767*	*11767*	*11767*	*11767*	*11767*	*11767*
	1633	1649	1665	1681	1697	1713	**1729**	*11767*
11767	1711	1727	1645	1647	1663	1679	1695	*11767*
11767	1677	1693	1709	1725	1643	1659	1661	*11767*
11767	1657	1673	1675	1691	1707	1723	1641	*11767*
11767	1721	1639	1655	1671	1687	1689	1705	*11767*
11767	1701	1703	1719	1637	1653	1669	1685	*11767*
11767	1667	1683	1699	1715	1717	1635	1651	*11767*
	11767	*11767*	*11767*	*11767*	*11767*	*11767*	*11767*	*11767*

$$1633 + 1635 + \ldots + \mathbf{1729} = 7 \times 11767 = 82369 = 287^2 = 865^2 - 816^2$$

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

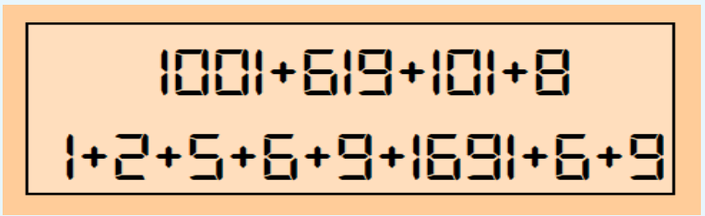
• Pandiagonal Magic Square of Order 11 × 11

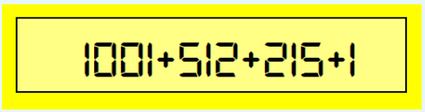
		20339	*20339*	*20339*	*20339*	*20339*	*20339*	*20339*	*20339*	*20339*	*20339*	*20339*
	1729	1769	1787	1805	1823	1841	1881	1899	1917	1935	1953	*20339*
20339	1929	1969	1745	1763	1781	1799	1817	1857	1875	1893	1911	*20339*
20339	1887	1905	1945	1963	1739	1757	1775	1815	1833	1851	1869	*20339*
20339	1845	1863	1903	1921	1939	1957	1733	1751	1791	1809	1827	*20339*
20339	1803	1821	1839	1879	1897	1915	1933	1951	1749	1767	1785	*20339*
20339	1761	1779	1797	1837	1855	1873	1891	1909	1927	1967	1743	*20339*
20339	1961	1737	1755	1773	1813	1831	1849	1867	1885	1925	1943	*20339*
20339	1919	1937	1955	1731	1771	1789	1807	1825	1843	1861	1901	*20339*
20339	1877	1895	1913	1931	1949	1747	1765	1783	1801	1819	20339	*20339*
20339	1835	1853	1871	1889	1907	1947	1965	1741	1759	1777	1795	*20339*
20339	1793	1811	1829	1847	1865	1883	1923	1941	1959	1735	1753	*20339*
	20339	*20339*	*20339*	*20339*	*20339*	*20339*	*20339*	*20339*	*20339*	*20339*	*20339*	*20339*

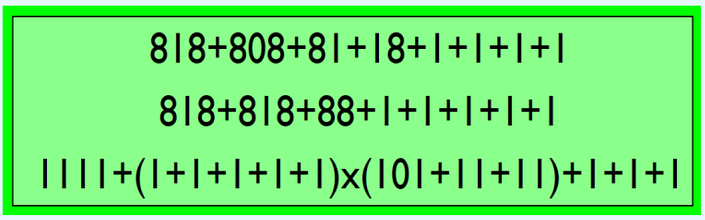
$$\mathbf{1729} + 1731 + \ldots + 1969 = 11 \times 20339 = 223729 = 473^2 = 985^2 - 864^2$$

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

- **Upside Down and/or Mirror Looking**







In case of 2 and 5, the numbers are written in digital form. Looking in mirror, 2 becomes 5 and 5 becomes 2.

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

- **Special Representations**

$$\begin{aligned}\mathbf{1729} &:= \left(1+7+2+\sqrt{9}\right)\times\left(\left(\sqrt{9}\right)!+2^7-1\right)\\ &:= ((1+7)\times 2-9)\times\left(1+7+2+\sqrt{9}\right)\times(1+7+2+9).\end{aligned}$$

- **Birth Day: 22.12.1887**

$$\mathbf{1729} := (-2+21)\times(-2-1+8+8)\times 7$$

- **Death Day: 26.04.1920**

$$\mathbf{1729} := (-(2+60)\times 4+1)\times(-9+2+0)$$

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

• Numbers From 1 to 10iin Terms of 17291729 and Reverse

$$
\begin{aligned}
\mathbf{1} &:= 17-29-1+7-2+9 && = 9271/9271\\
\mathbf{2} &:= 17-(29-17)\times 2+9 && = (92-71)+((9-27)-1)\\
\mathbf{3} &:= 1\times 72-91-7+29 && = (92-(71-9))-(27\times 1)\\
\mathbf{4} &:= 1+72-91-7+29 && = 9+((2-7)\times(1^{9271}))\\
\mathbf{5} &:= 17-2-91+72+9 && = (9+(2-7))+(1^{9271})\\
\mathbf{6} &:= 17\times 2-91+72-9 && = (9+27)-((19\times 2)-(7+1))\\
\mathbf{7} &:= 1+7+2+9+17-29 && = (92+7)-((19+2)+71)\\
\mathbf{8} &:= (1+7)\times(-2-9-17+29) && = ((9-27)\times(1^{9}))+(27-1)\\
\mathbf{9} &:= 17+2-91+72+9 && = ((9-27)-((1^{9})-27))+1\\
\mathbf{10} &:= -1+7\times 2+9+17-29 && = (9+2)-((7+19)/(27-1))
\end{aligned}
$$

For complete list from 1 to 1729 see the list given in the work.

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

• Running Equality Expressions

$$
\begin{aligned}
120 &:= 1\times(2+3)! && = 4+5!/6+7+89\\
&:= 98+7+6+5+4 && = (3+2)!\times 1\\
&:= \sqrt{9}+87+6\times 5 && = \sqrt{4}\times 3\times 2\times 10.
\end{aligned}
$$

$$
\begin{aligned}
\mathbf{1729} &:= -1+T(-2+T(T(3)))+T(T(T(4))) && = T(5)+6+7+T(T(8))+T(T(9))\\
&:= 12^3-4+5 && = T(6)+7+T(T(8))+T(T(9))\\
&:= F(12)\times 3\times 4-5+6 && = T(7)+T(T(8))+T(T(9))\\
&:= 12^3-T(4)+5+6 && = T(7)+T(T(8))+T(T(9))\\
&:= -9+T(T(8))+T(T(7))+T(T(6)+T(5)) && = T(T(T(4)))+T((T(T(3))-2))-1\\
&:= 98+7\times F(F(6)+5) && = T(T(T(4)))-T(T(3))+210\\
&:= T(T(9))+T(T(8))+7+T(6) && = 54\times 32+1\\
&:= T(T(9))+T(T(8))+T(7) && = -6\times 5+T(T(4))\times 32-1\\
& && = F(6)\times 54\times F(3)\times 2+1\\
& && = -65+43^2-F(10).
\end{aligned}
$$

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

• Selfie Representations: Fibonacci and Triangular

Below are selfie representation of **1729** in terms of Fibonacci sequence and Triangular values in order of digits and reverse.

$$
\begin{aligned}
\mathbf{1729} &:= 1 + (F(7) - F(2))^{\sqrt{9}} \\
&:= T(-1 + T(7)) \times T(2) + T(F(9)) \\
&\\
&:= 9!/T\left(\sqrt{-T(T(2)) + T(T(7))}\right) + 1 \\
&:= T(F(9)) + T(2) \times T(T(7) - 1)
\end{aligned}
$$

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

• Selfie Representations: Polygonal-Type

• Digit's Order

$$\begin{aligned}
\mathbf{1729} &:= 1\times 7\times (P_4(P_4(P_4(2)))-9)\\
&:= 1+(7+P_5(2))^{\sqrt{9}}\\
&:= 1\times P_7\left(\sqrt{P_7(7)\times P_7(2)}\right)-P_7(9)\\
&:= 1\times P_8(7)\times\left(-P_8(2)+P_8(\sqrt{9})\right)\\
&:= 1+72\times P_9(\sqrt{9})\\
&:= -1-P_{10}(7+P_{10}(2))+P_{10}(P_{10}(\sqrt{9}))\\
&:= -1^7+P_{11}(P_{11}(2)+9)\\
&:= P_{12}(1+7+2+9)\\
&:= P_{24}(-1+7-2+9)\\
&:= P_{84}((1+7)\times 2-9).
\end{aligned}$$

• Reverse Order of Digits

$$\begin{aligned}
\mathbf{1729} &:= (-9+P_4(P_4(P_4(2))))\times 7\times 1\\
&:= P_5(\sqrt{9})+P_5(P_5(2)\times 7-1)\\
&:= -P_7(9)+P_7(27+1)\\
&:= P_8(9)\times P_8(2)-71\\
&:= P_9(\sqrt{9})\times (P_9(2))!/7!+1\\
&:= P_{10}(P_{10}(\sqrt{9}))-P_{10}(P_{10}(2)+7)-1\\
&:= P_{11}(9)+P_{11}(P_{11}(2)+7))+1\\
&:= P_{12}(9+2+7+1)\\
&:= P_{24}(9-2+7-1)\\
&:= P_{84}(-9+2\times (7+1)).
\end{aligned}$$

Combining the results given above, we have following unified values:

$$\begin{aligned}
\mathbf{1729} &:= P_{12}(19)=P_{12}(1+7+2+9) \quad =P_{12}(9+2+7+1)\\
&:= P_{24}(13)=P_{24}(-1+7-2+9)=P_{24}(9-2+7-1)\\
&:= P_{84}(7) \quad =P_{84}((1+7)\times 2-9)=P_{84}(-9+2\times (7+1)).
\end{aligned}$$

- **Fixed Digits Repetitions Prime Patterns: 6-Patterns**

► 2611729
261 0 1729
261 0 0 1729
261 0 0 0 1729
261 0 0 0 0 1729
261 0 0 0 0 0 1729

► 172987
939 172987
939 939 172987
939 939 939 172987
939 939 939 939 172987
939 939 939 939 939 172987

► 1017293
87 1017293
87 87 1017293
87 87 87 1017293
87 87 87 87 1017293
87 87 87 87 87 1017293

► 1017299
1 435 017299
1 435 435 017299
1 435 435 435 017299
1 435 435 435 435 017299
1 435 435 435 435 435 017299

► 2371729
237 99 1729
237 99 99 1729
237 99 99 99 1729
237 99 99 99 99 1729
237 99 99 99 99 99 1729

► 1217299
861 1217299
861 861 1217299
861 861 861 1217299
861 861 861 861 1217299
861 861 861 861 861 1217299

► 172973
17297 444 3
17297 444 444 3
17297 444 444 444 3
17297 444 444 444 444 3
17297 444 444 444 444 444 3

► 1531729
15 348 31729
15 348 348 31729
15 348 348 348 31729
15 348 348 348 348 31729
15 348 348 348 348 348 31729

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

- **Fixed Digits Repetitions Prime Patterns: 6-Patterns**

▶ 1531729
153 483 1729
153 483 483 1729
153 483 483 483 1729
153 483 483 483 483 1729
153 483 483 483 483 483 1729

▶ 1729543
1729 783 543
1729 783 783 543
1729 783 783 783 543
1729 783 783 783 783 543
1729 783 783 783 783 783 543

▶ 1729237
954 1729237
954 954 1729237
954 954 954 1729237
954 954 954 954 1729237
954 954 954 954 954 1729237

▶ 1729723
1729 327 723
1729 327 327 723
1729 327 327 327 723
1729 327 327 327 327 723
1729 327 327 327 327 327 723

▶ 1729477
172947 966 7
172947 966 966 7
172947 966 966 966 7
172947 966 966 966 966 7
172947 966 966 966 966 966 7

▶ 1729901
330 1729901
330 330 1729901
330 330 330 1729901
330 330 330 330 1729901
330 330 330 330 330 1729901

▶ 1729493
519 1729493
519 519 1729493
519 519 519 1729493
519 519 519 519 1729493
519 519 519 519 519 1729493

▶ 1729909
172990 663 9
172990 663 663 9
172990 663 663 663 9
172990 663 663 663 663 9
172990 663 663 663 663 663 9

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

- **Fixed Digits Repetitions Prime Patterns: 6-Patterns**

▶ 2**1729**01
2 576 **1729**01
2 576 576 **1729**01
2 576 576 576 **1729**01
2 576 576 576 576 **1729**01
2 576 576 576 576 576 **1729**01

▶ 2**1729**79
789 2**1729**79
789 789 2**1729**79
789 789 789 2**1729**79
789 789 789 789 2**1729**79
789 789 789 789 789 2**1729**79

▶ 32**1729**7
32 450 **1729**7
32 450 450 **1729**7
32 450 450 450 **1729**7
32 450 450 450 450 **1729**7
32 450 450 450 450 450 **1729**7

▶ 36**1729**3
36**1729** 183 3
36**1729** 183 183 3
36**1729** 183 183 183 3
36**1729** 183 183 183 183 3
36**1729** 183 183 183 183 183 3

▶ 39**1729**7
534 39**1729**7
534 534 39**1729**7
534 534 534 39**1729**7
534 534 534 534 39**1729**7
534 534 534 534 534 39**1729**7

▶ 56**1729**1
56**1729**1 363
56**1729**1 363 363
56**1729**1 363 363 363
56**1729**1 363 363 363 363
56**1729**1 363 363 363 363 363

▶ 58**1729**3
840 58**1729**3
840 840 58**1729**3
840 840 840 58**1729**3
840 840 840 840 58**1729**3
840 840 840 840 840 58**1729**3

▶ 6041**1729**
6041**1729** 579
6041**1729** 579 579
6041**1729** 579 579 579
6041**1729** 579 579 579 579
6041**1729** 579 579 579 579 579

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

• Fixed Digits Repetitions Prime Patterns: 7-Patterns

►2251729
2250 1729
2250 0 1729
2250 0 0 1729
2250 0 0 0 1729
2250 0 0 0 0 1729
2250 0 0 0 0 0 1729

►5011729
501 222 1729
501 222 222 1729
501 222 222 222 1729
501 222 222 222 222 1729
501 222 222 222 222 222 1729
501 222 222 222 222 222 222 1729

►611729
611729 81
611729 81 81
611729 81 81 81
611729 81 81 81 81
611729 81 81 81 81 81
611729 81 81 81 81 81 81

►5491729
5 423 491729
5 423 423 491729
5 423 423 423 491729
5 423 423 423 423 491729
5 423 423 423 423 423 491729
5 423 423 423 423 423 423 491729

►7321729 7
7 15 321729 7
7 15 15 321729 7
7 15 15 15 321729 7
7 15 15 15 15 321729 7
7 15 15 15 15 15 321729 7
7 15 15 15 15 15 15 321729 7

►5491729
54 234 91729
54 234 234 91729
54 234 234 234 91729
54 234 234 234 234 91729
54 234 234 234 234 234 91729
54 234 234 234 234 234 234 91729

►2671729
267 714 1729
267 714 714 1729
267 714 714 714 1729
267 714 714 714 714 1729
267 714 714 714 714 714 1729
267 714 714 714 714 714 714 1729

►5651729
5 126 651729
5 126 126 651729
5 126 126 126 651729
5 126 126 126 126 651729
5 126 126 126 126 126 651729
5 126 126 126 126 126 126 651729

►3172907
3 615 172907
3 615 615 172907
3 615 615 615 172907
3 615 615 615 615 172907
3 615 615 615 615 615 172907
3 615 615 615 615 615 615 172907

►6317293
631729 897 3
631729 897 897 3
631729 897 897 897 3
631729 897 897 897 897 3
631729 897 897 897 897 897 3
631729 897 897 897 897 897 897 3

- **Fixed Digits Repetitions Prime Patterns: 8-Patterns**

► 13**1729**83
1 6 3**1729**83
1 6 6 3**1729**83
1 6 6 6 3**1729**83
1 6 6 6 6 3**1729**83
1 6 6 6 6 6 3**1729**83
1 6 6 6 6 6 6 3**1729**83
1 6 6 6 6 6 6 6 3**1729**83

► 78**1729**93
78 768 **1729**93
78 768 768 **1729**93
78 768 768 768 **1729**93
78 768 768 768 768 **1729**93
78 768 768 768 768 768 **1729**93
78 768 768 768 768 768 768 **1729**93
78 768 768 768 768 768 768 768 **1729**93

► 78**1729**93
7 876 8**1729**93
7 876 876 8**1729**93
7 876 876 876 8**1729**93
7 876 876 876 876 8**1729**93
7 876 876 876 876 876 8**1729**93
7 876 876 876 876 876 876 8**1729**93
7 876 876 876 876 876 876 876 8**1729**93

► 9039**1729**
141 9039**1729**
141 141 9039**1729**
141 141 141 9039**1729**
141 141 141 141 9039**1729**
141 141 141 141 141 9039**1729**
141 141 141 141 141 141 9039**1729**
141 141 141 141 141 141 141 9039**1729**

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

- **Embedded Palindromic Prime Numbers: All Digits**

131
11311
92711311**1729**
339271131**1729**33
93392711311**1729**339

131
71317
1592713**1729**51
315927131**1729**513
3315927131**1729**5133

191
71917
3092719**1729**03
73092719**1729**037
973092719**1729**0379

191
71917
792719**1729**7
19779271**1729**7791
1197792719**1729**77911

191
71917
792719**1729**7
927927**1729**729
7927927**1729**7297

191
71917
792719**1729**7
927927**1729**729
9927927**1729**7299

191
9919199
72991919927
17**1729**91919927171
117**1729**919199271711

313
93139
7299931399927
1**1729**9931399927111
111**1729**9931399927111

313
93139
9931399
1**1729**9931399927111
111**1729**9931399927111

313
93139
9931399
7299931399927
1**1729**9931399927111
111**1729**9931399927111

313
9931399
7299931399927
1**1729**9931399927111
111**1729**9931399927111

787
194787491
71947874917
927194787491**1729**
99271947874917299

797
17971
711797117
19927117971**1729**91
119927117971**1729**911

- **Embedded Palindromic Prime Numbers: Digits 1, 7, 2, 9**

927**1729**
9129271**729**219
9291292**71729**21929
192912927**1729**219291
11192912927**1729**21929111.

927**1729**
1929271**729**291
119192927**1729**291911
979711792717**29**7117979.

927**1729**
7792717**29**77
917792717**29**7719
77917792717**29**771977.

927**1729**
9729271**729**279
997292717**29**2799
11997292717**29**279911.

927**1729**
92927**1729**29
1929271**729**291
11919292717**29**291911.

927**1729**
1919927**1729**9191
121919927**1729**919121
71219199271**729**9191217.

927**1729**
1179271**729**711
7971179271**729**711797
979711792717**29**7117979.

729272927
17292729271
12**1729**272927121
11271217**29**2729271217211.

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

1729 – 58

- **Embedded Palindromic Prime Numbers: More Examples**

1.

172909271

1729000909271

172900000000009271

17290000000000000000009271

1729000000000000000000000000000009271

2.

172959271

17295555555559271

172955555555559271

1729555555555555555555555555555559271

3.

1729 5 9271

32 **1729 5 9271** 23

3132 **1729 5 9271** 2313

323132 **1729 5 9271** 231323

16323132 **1729 5 9271** 23132361

1216323132 **1729 5 9271** 2313236121

741216323132 **1729 5 9271** 231323612147

72741216323132 **1729 5 9271** 23132361214727

3617274121632313 **1729 5 9271** 231323612147271 63

12361727412163231 **1729 5 9271** 2313236121472716321

91236172741216323132 **1729 5 9271** 231323612147271 63219

7791236172741216323132 **1729 5 9271** 2313236121472716321977

903779123617274121632313 **1729 5 9271** 23132361214727163219773 09

75903779123617274121632313 **1729 5 9271** 231323612147271632197730957

1375903779123617274121632313 **1729 5 9271** 2313236121472716321977309573 1

… … … …

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

• Magic Square Type Palprimes

1.

9	9	1	9	1	9	9
9	7	3	2	3	7	9
1	3	1	7	1	3	1
9	2	7	**1**	**7**	**2**	**9**
1	3	1	7	1	3	1
9	7	3	2	3	7	9
9	9	1	9	1	9	9

2.

9	7	1	1	1	7	9
1	7	1	2	1	7	1
9	2	1	2	1	2	9
9	2	7	**1**	**7**	**2**	**9**
9	2	1	2	1	2	9
1	7	1	2	1	7	1
9	7	1	1	1	7	9

3.

1	9	9	3	9	9	1
9	2	7	**1**	**7**	**2**	**9**
9	7	7	0	7	7	9
3	1	0	6	0	1	3
9	7	7	0	7	7	9
9	2	7	**1**	**7**	**2**	**9**
1	9	9	3	9	9	1

Below are **extended palprimes** of above three sets of **magic square type palprimes**:

1. 9919199 9732379 1317131 927**1729** 1317131 9732379 9919199;
2. 9711179 1712171 9212129 927**1729** 9212129 17121719 711179;
3. 1993991 927**1729** 9770779 3106013 9770779 927**1729** 1993991.

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

• Palindromic Prime Numbers: Double 1729

927**1729**271**1729**

129927**1729**271**1729**921
772927**1729**271**1729**277
972927**1729**271**1729**279
922927**1729**271**1729**229

1177927**17292**717**17292**7711
1122927**17292**717**17292**2211
1717927**17292**717**17292**7171
1719927**17292**717**17292**9171
1771927**17292**717**17292**1771

199292**1729**27**1729**2991
719292**1729**27**1729**2917
777792**1729**27**1729**7777
777992**1729**27**1729**9777
772292**1729**27**1729**2277
727292**1729**27**1729**2727

7221927**1729**27**1729**1227
7921927**1729**27**1729**1297
9111927**1729**27**1729**1119
9721927**1729**27**1729**1279
9277927**1729**27**1729**7729
9991927**1729**27**1729**1999

1117992**1729**27**1729**97111
1119792**1729**27**1729**79111
1121292**1729**27**1729**21211
1122992**1729**27**1729**92211
1719792**1729**27**1729**79171

1772292**1729**27**1729**22771
1217792**1729**27**1729**77121
1212192**1729**27**1729**12121
1272792**1729**27**1729**72721
1227992**1729**27**1729**97221

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

- **Palindromic Prime Numbers: Triple 1729**

172927**1729**9799271**1729**271
1729271**1729**792711**1729**271
17299927**1729**27**1729**99271

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

- **Palindromic-Type: Multiplications**

1729821 × 128**9271** = 1183881 × 1883811.

2**1729**12 × 21**9271**2 = 1163904 × 4093611
2**1729**06 × 60**9271**2 = 3091824 × 4281903.

17299221 × 1229**9271** = 11293881 × 18839211
17299921 × 1299**9271** = 11839981 × 18993811
1**1729**622 × 226**9271**1 = 12773802 × 20837721
2**1729**162 × 261**9271**2 = 13291824 × 42819231
2**1729**232 × 232**9271**2 = 12363904 × 40936321
2**1729**264 × 462**9271**2 = 23491824 × 42819432
2**1729**344 × 443**9271**2 = 23563904 × 40936532
2**1729**366 × 663**9271**2 = 33691824 × 42819633
2**1729**456 × 654**9271**2 = 34763904 × 40936743
6**1729**332 × 233**9271**6 = 35273904 × 40937253
6**1729**353 × 353**9271**6 = 35273916 × 61937253
2**1729**568 × 865**9271**2 = 40936954 × 45963904
2**1729**468 × 864**9271**2 = 42819834 × 43891824
6**1729**164 × 461**9271**6 = 35273808 × 80837253
6**1729**374 × 473**9271**6 = 35273928 × 82937253

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

- **Palindromic-Type: Addition and Multiplication**

$$\mathbf{1729}1 \times 10001 + 10001 \times 1\mathbf{9271} = \mathbf{1729}27291 + 1927\mathbf{29271}$$
$$\mathbf{1729}2 \times 10001 + 10001 \times 2\mathbf{9271} = \mathbf{1729}37292 + 2927\mathbf{39271}$$
$$\mathbf{1729}3 \times 10001 + 10001 \times 3\mathbf{9271} = \mathbf{1729}47293 + 3927\mathbf{49271}$$
$$\mathbf{1729}4 \times 10001 + 10001 \times 4\mathbf{9271} = \mathbf{1729}57294 + 4927\mathbf{59271}$$
$$\mathbf{1729}5 \times 10001 + 10001 \times 5\mathbf{9271} = \mathbf{1729}67295 + 5927\mathbf{69271}$$
$$\mathbf{1729}6 \times 10001 + 10001 \times 6\mathbf{9271} = \mathbf{1729}77296 + 6927\mathbf{79271}$$
$$\mathbf{1729}7 \times 10001 + 10001 \times 7\mathbf{9271} = \mathbf{1729}87297 + 7927\mathbf{89271}$$
$$\mathbf{1729}8 \times 10001 + 10001 \times 8\mathbf{9271} = \mathbf{1729}97298 + 8927\mathbf{99271}$$

$$\mathbf{1729}01 \times 100001 + 100001 \times 10\mathbf{9271} = \mathbf{1729}0272901 + 1092720\mathbf{9271}$$
$$\mathbf{1729}02 \times 100001 + 100001 \times 20\mathbf{9271} = \mathbf{1729}0372902 + 2092730\mathbf{9271}$$
$$\mathbf{1729}03 \times 100001 + 100001 \times 30\mathbf{9271} = \mathbf{1729}0472903 + 3092740\mathbf{9271}$$
$$\mathbf{1729}04 \times 100001 + 100001 \times 40\mathbf{9271} = \mathbf{1729}0572904 + 4092750\mathbf{9271}$$
$$\mathbf{1729}05 \times 100001 + 100001 \times 50\mathbf{9271} = \mathbf{1729}0672905 + 5092760\mathbf{9271}$$
$$\mathbf{1729}06 \times 100001 + 100001 \times 60\mathbf{9271} = \mathbf{1729}0772906 + 6092770\mathbf{9271}$$
$$\mathbf{1729}07 \times 100001 + 100001 \times 70\mathbf{9271} = \mathbf{1729}0872907 + 7092780\mathbf{9271}$$
$$\mathbf{1729}08 \times 100001 + 100001 \times 80\mathbf{9271} = \mathbf{1729}0972908 + 8092790\mathbf{9271}$$

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

- **Palindromic-Type Patterns**

$$\begin{aligned}
\mathbf{1729}\times 10001+10001\times\mathbf{9271} &= \mathbf{17291729}+\mathbf{92719271}\\
\mathbf{1729}\times 100001+100001\times\mathbf{9271} &= \mathbf{172901729}+\mathbf{9271}\,09271\\
\mathbf{1729}\times 1000001+1000001\times\mathbf{9271} &= \mathbf{1729001729}+\mathbf{9271}\,009271\\
\mathbf{1729}\times 10000001+10000001\times\mathbf{9271} &= \mathbf{17290001729}+\mathbf{9271}\,0009271
\end{aligned}$$

$$\begin{aligned}
1\mathbf{1729}\times 100001+100001\times\mathbf{9271}1 &= 1\mathbf{17291}1729+\mathbf{9271}\,192711\\
1\mathbf{1729}\times 1000001+1000001\times\mathbf{9271}1 &= 1\mathbf{17290}11729+\mathbf{9271}\,1092711\\
1\mathbf{1729}\times 10000001+10000001\times\mathbf{9271}1 &= 1\mathbf{172900}11729+\mathbf{9271}\,10092711.
\end{aligned}$$

Still there is one more non sequential pattern giving same digits on both sides except number 0:

$$\begin{aligned}
10001\times\mathbf{1729}+9271\times 10001 &= \mathbf{1729}\,1729+7291\,7291\\
10001\times 1927+7291\times 10001 &= 1927\,1927+7291\,7291\\
10001\times 2719+9172\times 10001 &= 2719\,2719+9172\,9172\\
10001\times 2917+7192\times 10001 &= 2917\,2917+7192\,7192.
\end{aligned}$$

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

• Magic Squares of Order 13

													1729
204	195	197	199	201	203	205	57	55	53	51	49	60	1729
50	84	92	90	88	86	185	186	188	190	192	82	216	1729
52	193	100	172	170	168	167	104	106	108	102	73	214	1729
54	191	93	116	120	118	153	154	156	114	173	75	212	1729
56	189	95	157	124	121	141	139	140	109	171	77	210	1729
58	187	97	155	144	134	129	136	122	111	169	79	208	1729
59	83	165	115	143	135	133	131	123	151	101	183	207	1729
202	85	163	117	128	130	137	132	138	149	103	181	64	1729
200	87	161	119	126	145	125	127	142	147	105	179	66	1729
198	89	159	152	146	148	113	112	110	150	107	177	68	1729
196	91	164	94	96	98	99	162	160	158	166	175	70	1729
194	184	174	176	178	180	81	80	78	76	74	182	72	1729
206	71	69	67	65	63	61	209	211	213	215	217	62	1729
1729	1729	1729	1729	1729	1729	1729	1729	1729	1729	1729	1729	1729	1729

The magic sums are given by

$$S_{3\times3} := 1729 \times \frac{3}{13} = 399 \qquad S_{9\times9} := 1729 \times \frac{9}{13} = 1197$$

$$S_{5\times5} := 1729 \times \frac{5}{13} = 665 \qquad S_{11\times11} := 1729 \times \frac{11}{13} = 1463$$

$$S_{7\times7} := 1729 \times \frac{7}{13} = 931 \qquad S_{13\times13} := 1729 \times \frac{13}{13} = \mathbf{1729}$$

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

													1729
204	195	197	199	201	203	205	57	55	53	51	49	60	1729
50	84	92	90	88	86	185	186	188	190	192	82	216	1729
52	193	114	163	122	119	156	124	112	161	126	73	214	1729
54	191	127	113	159	120	115	164	125	117	157	75	212	1729
56	189	158	123	118	160	128	111	162	121	116	77	210	1729
58	187	132	100	167	137	93	169	130	98	171	79	208	1729
59	83	172	131	96	165	133	101	170	135	94	183	207	1729
202	85	95	168	136	97	173	129	99	166	134	181	64	1729
200	87	150	145	104	155	138	106	148	143	108	179	66	1729
198	89	109	149	141	102	151	146	107	153	139	177	68	1729
196	91	140	105	154	142	110	147	144	103	152	175	70	1729
194	184	174	176	178	180	81	80	78	76	74	182	72	1729
206	71	69	67	65	63	61	209	211	213	215	217	62	1729
1729	1729	1729	1729	1729	1729	1729	1729	1729	1729	1729	1729	1729	1729

In this case the magic sums of orders 9, 11 and 13 are as given above. The magic squares of order 3 are **semi-magic** squares with equal **semi-magic** sums. The magic square of order 9 is **pandiagonal**.

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

• Magic Squares of Order 19

Below are three magic squares of order 19 with magic sum as 1729. One is bordered magic square and another 2 are with inner magic squares of orders 15 with blocks of order 3 and 5.

																		1729
-70	-54	-56	-58	-60	-62	-64	-66	-68	255	256	258	260	262	264	266	268	270	-72	1729
271	-38	234	232	230	228	226	224	222	221	-34	-32	-30	-28	-26	-24	-22	-36	-89	1729
269	-53	188	177	179	181	183	185	187	189	-11	-13	-15	-17	-19	-21	-8	235	-87	1729
267	-51	-20	162	153	155	157	159	161	163	15	13	11	9	7	18	202	233	-85	1729
265	-49	-18	8	42	50	48	46	44	143	144	146	148	150	40	174	200	231	-83	1729
263	-47	-16	10	151	58	130	128	126	125	62	64	66	60	31	172	198	229	-81	1729
261	-45	-14	12	149	51	74	78	76	111	112	114	72	131	33	170	196	227	-79	1729
259	-43	-12	14	147	53	115	82	79	99	97	98	67	129	35	168	194	225	-77	1729
257	-41	-10	16	145	55	113	102	92	87	94	80	69	127	37	166	192	223	-75	1729
-71	219	-9	17	41	123	73	101	93	91	89	81	109	59	141	165	191	-37	253	1729
-69	217	186	160	43	121	75	86	88	95	90	96	107	61	139	22	-4	-35	251	1729
-67	215	184	158	45	119	77	84	103	83	85	100	105	63	137	24	-2	-33	249	1729
-65	213	182	156	47	117	110	104	106	71	70	68	108	65	135	26	0	-31	247	1729
-63	211	180	154	49	122	52	54	56	57	120	118	116	124	133	28	2	-29	245	1729
-61	209	178	152	142	132	134	136	138	39	38	36	34	32	140	30	4	-27	243	1729
-59	207	176	164	29	27	25	23	21	19	167	169	171	173	175	20	6	-25	241	1729
-57	205	190	5	3	1	-1	-3	-5	-7	193	195	197	199	201	203	-6	-23	239	1729
-55	218	-52	-50	-48	-46	-44	-42	-40	-39	216	214	212	210	208	206	204	220	237	1729
254	236	238	240	242	244	246	248	250	-73	-74	-76	-78	-80	-82	-84	-86	-88	252	1729
1729	1729	1729	1729	1729	1729	1729	1729	1729	1729	1729	1729	1729	1729	1729	1729	1729	1729	1729	1729

The magic sums are given by

$$S_{3\times3} := 1729 \times \frac{3}{19} = 273$$

$$S_{5\times5} := 1729 \times \frac{5}{19} = 455$$

$$S_{7\times7} := 1729 \times \frac{7}{19} = 637$$

$$S_{9\times9} := 1729 \times \frac{9}{19} = 819$$

$$S_{11\times11} := 1729 \times \frac{11}{19} = 1001$$

$$S_{13\times13} := 1729 \times \frac{13}{19} = 1183$$

$$S_{15\times15} := 1729 \times \frac{15}{19} = 1365$$

$$S_{17\times17} := 1729 \times \frac{17}{19} = 1547$$

$$S_{19\times19} := 1729 \times \frac{19}{19} = \mathbf{1729}$$

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

																			1729
-70	-54	-56	-58	-60	-62	-64	-66	-68	255	256	258	260	262	264	266	268	270	-72	1729
271	-38	234	232	230	228	226	224	222	221	-34	-32	-30	-28	-26	-24	-22	-36	-89	1729
269	-53	-21	196	8	97	175	9	166	53	82	145	24	136	68	112	115	235	-87	1729
267	-51	98	187	-20	189	1	83	157	10	159	46	113	127	25	129	61	233	-85	1729
265	-49	190	-6	91	188	-8	160	39	76	158	22	130	54	106	128	37	231	-83	1729
263	-47	181	-7	202	-5	84	151	23	172	40	69	121	38	142	55	99	229	-81	1729
261	-45	7	85	174	-14	203	52	70	144	16	173	67	100	114	31	143	227	-79	1729
259	-43	-19	195	6	95	178	11	165	51	80	148	26	135	66	110	118	225	-77	1729
257	-41	96	185	-17	191	0	81	155	13	161	45	111	125	28	131	60	223	-75	1729
-71	219	193	-4	90	186	-10	163	41	75	156	20	133	56	105	126	35	-37	253	1729
-69	217	180	-9	200	-2	86	150	21	170	43	71	120	36	140	58	101	-35	251	1729
-67	215	5	88	176	-15	201	50	73	146	15	171	65	103	116	30	141	-33	249	1729
-65	213	-18	197	4	93	179	12	167	49	78	149	27	137	64	108	119	-31	247	1729
-63	211	94	183	-16	192	2	79	153	14	162	47	109	123	29	132	62	-29	245	1729
-61	209	194	-3	92	184	-12	164	42	77	154	18	134	57	107	124	33	-27	243	1729
-59	207	182	-11	198	-1	87	152	19	168	44	72	122	34	138	59	102	-25	241	1729
-57	205	3	89	177	-13	199	48	74	147	17	169	63	104	117	32	139	-23	239	1729
-55	218	-52	-50	-48	-46	-44	-42	-40	-39	216	214	212	210	208	206	204	220	237	1729
254	236	238	240	242	244	246	248	250	-73	-74	-76	-78	-80	-82	-84	-86	-88	252	1729
1729	1729	1729	1729	1729	1729	1729	1729	1729	1729	1729	1729	1729	1729	1729	1729	1729	1729	1729	1729

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

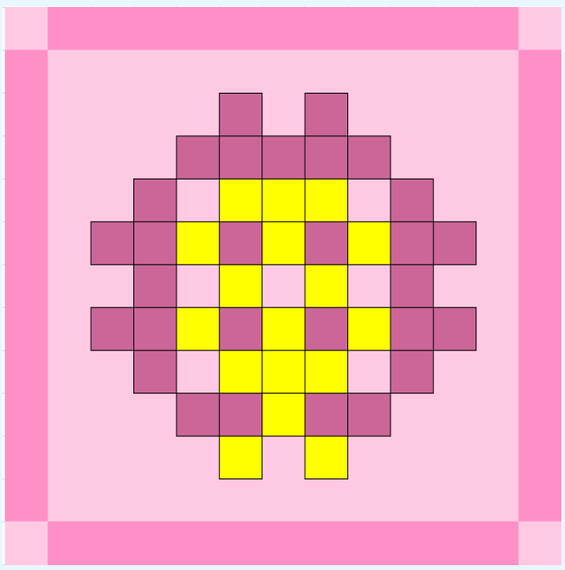
©NumbersMagic
1729 – (69)

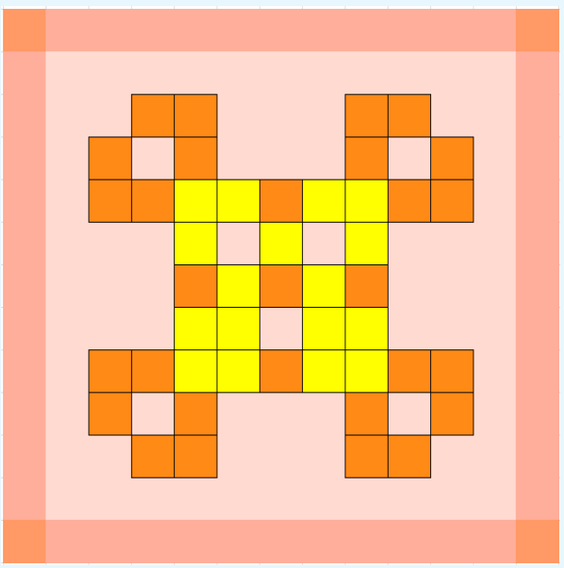
																		1729
-70	-54	-56	-58	-60	-62	-64	-66	-68	255	256	258	260	262	264	266	268	270	-72	1729
271	-38	234	232	230	228	226	224	222	221	-34	-32	-30	-28	-26	-24	-22	-36	-89	1729
269	-53	164	43	66	165	52	56	166	53	54	167	42	64	168	40	65	235	-87	1729
267	-51	58	171	44	67	161	45	68	159	46	57	169	47	55	170	48	233	-85	1729
265	-49	51	59	163	41	60	172	39	61	173	49	62	162	50	63	160	231	-83	1729
263	-47	14	178	81	15	187	71	16	188	69	17	177	79	18	175	80	229	-81	1729
261	-45	73	21	179	82	11	180	83	9	181	72	19	182	70	20	183	227	-79	1729
259	-43	186	74	13	176	75	22	174	76	23	184	77	12	185	78	10	225	-77	1729
257	-41	-16	193	96	-15	202	86	-14	203	84	-13	192	94	-12	190	95	223	-75	1729
-71	219	88	-9	194	97	-19	195	98	-21	196	87	-11	197	85	-10	198	-37	253	1729
-69	217	201	89	-17	191	90	-8	189	91	-7	199	92	-18	200	93	-20	-35	251	1729
-67	215	134	28	111	135	37	101	136	38	99	137	27	109	138	25	110	-33	249	1729
-65	213	103	141	29	112	131	30	113	129	31	102	139	32	100	140	33	-31	247	1729
-63	211	36	104	133	26	105	142	24	106	143	34	107	132	35	108	130	-29	245	1729
-61	209	149	-2	126	150	7	116	151	8	114	152	-3	124	153	-5	125	-27	243	1729
-59	207	118	156	-1	127	146	0	128	144	1	117	154	2	115	155	3	-25	241	1729
-57	205	6	119	148	-4	120	157	-6	121	158	4	122	147	5	123	145	-23	239	1729
-55	218	-52	-50	-48	-46	-44	-42	-40	-39	216	214	212	210	208	206	204	220	237	1729
254	236	238	240	242	244	246	248	250	-73	-74	-76	-78	-80	-82	-84	-86	-88	252	1729
1729	1729	1729	1729	1729	1729	1729	1729	1729	1729	1729	1729	1729	1729	1729	1729	1729	1729	1729	1729

♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

©NumbersMagic
1729 – 70

• Colored Pattern Designs With 17-29

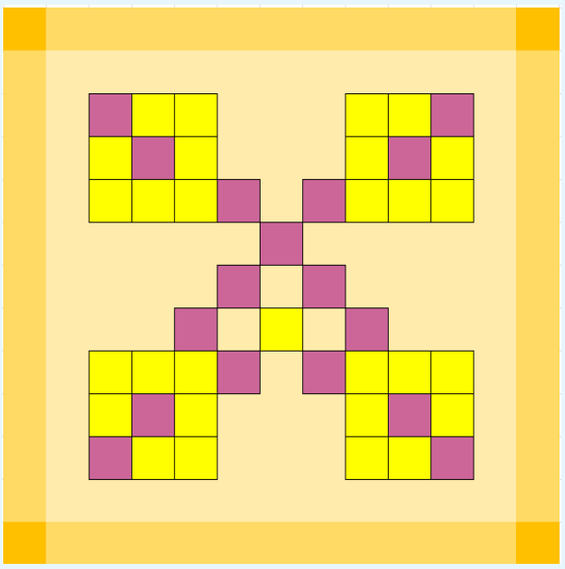


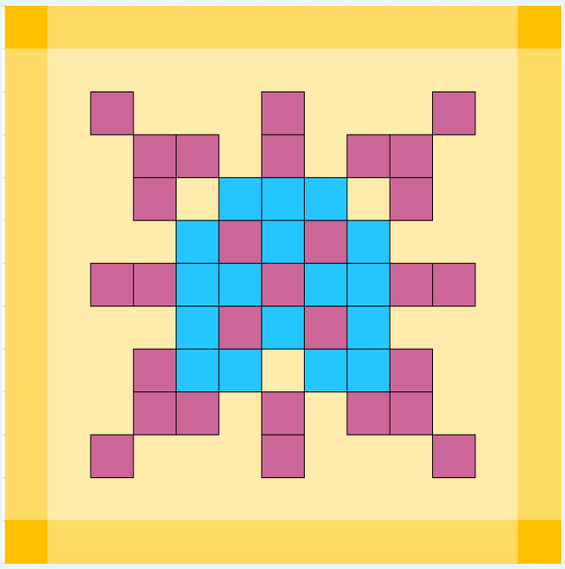


♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

©NumbersMagic
1729 – 71

• Colored Pattern Designs With 17-29

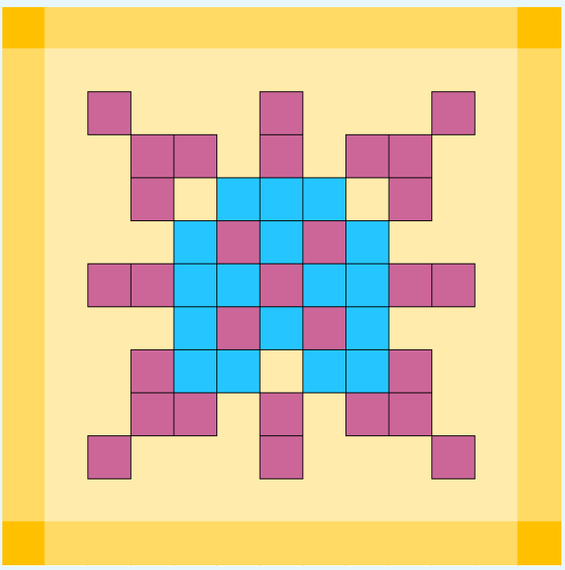


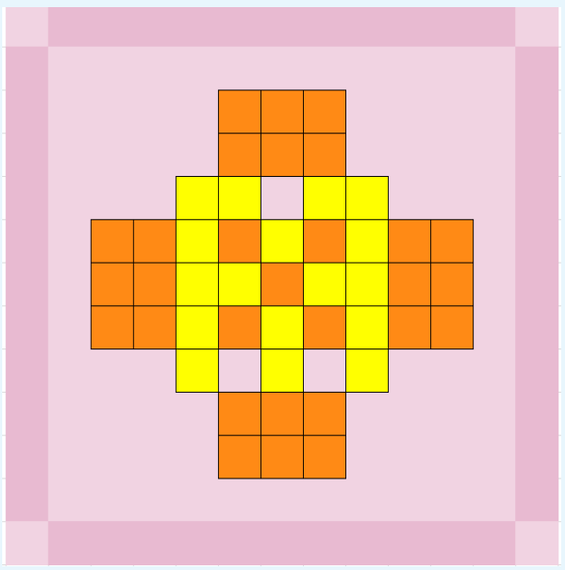


♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

©NumbersMagic
1729 – 72

• Colored Pattern Designs With 17-29





♦ Inder J. Taneja
https://inderjtaneja.wordpress.com
https://numbers-magic.com

©NumbersMagic
1729 – 73