

ഗണിതം

CLASS 7 UNIT 4

Prepared by

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Ramanujan number

1729 IS Ramanujan number. It is the smallest number expressible as the sum of two cubes in two different ways.

$$\begin{aligned}10^3 + 9^3 &= (10 \times 10 \times 10) + (9 \times 9 \times 9) \\&= 1000 + 729 \\&= 1729\end{aligned}$$

$$\begin{aligned}12^3 + 1^3 &= (12 \times 12 \times 12) + (1 \times 1 \times 1) \\&= 1728 + 1 \\&= 1729\end{aligned}$$

Place value

$$1729=1000+700+20+9$$

$$=1000+(7 \times 100)+(2 \times 10)+9$$

$$=10^3+(7 \times 10^2)+(2 \times 10^1)+9$$

$$6174 = 6000 + 100 + 70 + 4$$

$$=(6 \times 1000) + 100 + 7 \times 10 + 4$$

$$=(6 \times 10^3) + 10^2 + 7 \times 10^1 + 4$$

Place value

Split 3675 according to place values

Thousands	hundreds	tens	ones
3	6	7	5

$$(3 \times 1000) + (6 \times 100) + (7 \times 10) + 5$$

Using powers of 10, we can write this as

$$(3 \times 10^3) + (6 \times 10^2) + (7 \times 10) + 5$$

Split 73502 according to place value

tenthousands	thousands	hundreds	tens	ones
7	3	5	0	2

$$(7 \times 10000) + (3 \times 1000) + (5 \times 100) + (0 \times 10) + 2$$

Using powers of 10, we can write this as

$$(7 \times 10^4) + (3 \times 10^3) + (5 \times 10^2) + 2$$

Place value

$$16347 = 10000 + 6000 + 300 + 40 + 7$$

$$= (1 \times 10000) + (6 \times 1000) + (3 \times 100) + (4 \times 10) + 7$$

$$= 10^4 + (6 \times 10^3) + (3 \times 10^2) + (4 \times 10^1) + 7$$

ACTIVITY 1

Split these numbers
like this

a) 1221

c) 4321

b) 6054

d) 732

Place value of decimals

$$8 \text{ mm} = \frac{8}{10} \text{ cm} = 0.8 \text{ cm} = 8 \times \frac{1}{10} = 8 \times \frac{1}{10^1}$$

$$\begin{aligned} \mathbf{0.005} &= \frac{\mathbf{5}}{\mathbf{1000}} \\ &= \mathbf{5} \times \frac{\mathbf{1}}{\mathbf{1000}} \\ &= \mathbf{5} \times \frac{\mathbf{1}}{\mathbf{10^3}} \end{aligned}$$

Place value of decimals

$$65.478 = 65\frac{478}{1000}$$

$$= 65 + \frac{478}{1000}$$

$$= 65 + (4 \times \frac{1}{10}) + (7 \times \frac{1}{100}) + (8 \times \frac{1}{1000})$$

$$= (6 \times 10^1) + 5 + (4 \times \frac{1}{10}) + (7 \times \frac{1}{10^2}) + (8 \times \frac{1}{10^3})$$

Place value of decimals

Split 362.574 according to place values

hundreds
3
tens
6
ones
2
tenths
5
hundredths
7
thousandths
4

$$(3 \times 100) + (6 \times 10) + 2 + (5 \times \frac{1}{10}) + (7 \times \frac{1}{100}) + (4 \times \frac{1}{1000})$$

$$(3 \times 10^2) + (6 \times 10) + 2 + (5 \times \frac{1}{10}) + (7 \times \frac{1}{10^2}) + (4 \times \frac{1}{10^3})$$

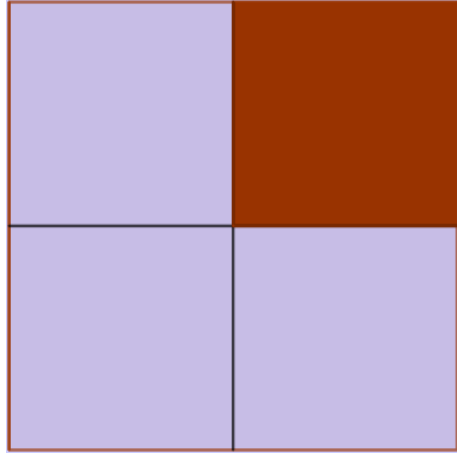
ACTIVITY 2

Try to split these numbers like this

- 437.54
- 23.005
- 4567
- 201

Powers of a fraction

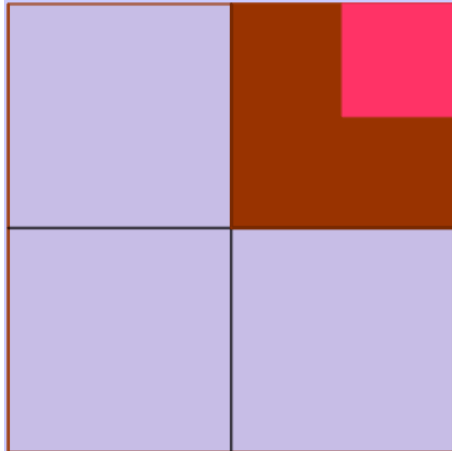
1



What part of the square is coloured?

$$\frac{1}{4}$$

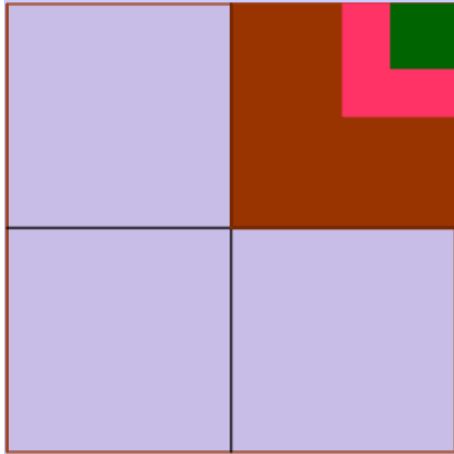
2



What part of the square is coloured rose

$$\frac{1}{4} \times \frac{1}{4} = \frac{1}{16}$$

3



What part of the square is coloured green

The coloured part is $\frac{1}{64}$ part of the rectangle

$$\frac{1}{4} \text{ part of } \frac{1}{16} \text{ is } \frac{1}{64}$$

$$\frac{1}{4} \times \frac{1}{16} = \frac{1}{64}$$

$$\frac{1}{4} \times \frac{1}{4} \times \frac{1}{4} = \left(\frac{1}{4}\right)^3 = \frac{1}{64}$$

$$\begin{aligned} \left(\frac{1}{4}\right)^5 &= \frac{1}{4} \times \frac{1}{4} \times \frac{1}{4} \times \frac{1}{4} \times \frac{1}{4} \\ &= \frac{1}{4 \times 4 \times 4 \times 4 \times 4} \\ &= \frac{1}{4^5} \\ &= \frac{1}{64 \times 16} \\ &= \frac{1}{1024} \end{aligned}$$

$\frac{1}{4} \times \frac{1}{4}$	$\frac{1}{4} \times \frac{1}{4}$	$\left(\frac{1}{4}\right)^2$	$\frac{1}{16} = \frac{1}{4^2}$
$\frac{1}{4} \times \frac{1}{16}$	$\frac{1}{4} \times \frac{1}{4} \times \frac{1}{4}$	$\left(\frac{1}{4}\right)^3$	$\frac{1}{64} = \frac{1}{4^3}$
$\frac{1}{4} \times \frac{1}{64}$	$\frac{1}{4} \times \frac{1}{4} \times \frac{1}{4} \times \frac{1}{4}$	$\left(\frac{1}{4}\right)^4$	$\frac{1}{256} = \frac{1}{4^4}$
$\frac{1}{4} \times \frac{1}{256}$	$\frac{1}{4} \times \frac{1}{4} \times \frac{1}{4} \times \frac{1}{4} \times \frac{1}{4}$	$\left(\frac{1}{4}\right)^5$	$\frac{1}{1024} = \frac{1}{4^5}$

ACTIVITY 3

Compute the powers given below:

$$\bullet \left(\frac{2}{3}\right)^5 \quad \bullet \left(\frac{3}{5}\right)^4 \quad \bullet \left(\frac{1}{2}\right)^{10} \quad \bullet \left(2\frac{1}{2}\right)^3$$

ACTIVITY 4

The powers of $\frac{1}{2}$ become smaller and smaller as $\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \dots$

Find the fractions that are getting bigger as the power increases. write the features of such fractions

E

$\frac{1}{100}$
 $\frac{1}{1000}$
 $\frac{1}{10}$
 10^5

$= 10 \times 10$
 10^3

$2 + 2^2 = 2^3 - 1$
 $\frac{1}{10^3}$

ആയിരം
 10^4
 10^2
 $\frac{1}{10^2}$

$2^3 \times 5^3$
 $\frac{1}{2}$
 $\frac{1}{4}$

10^6
 $2^4 \times 5^5$

20^5
 $10, 10^2, 10^3, 10^4, 10^5$

100^2
 $20, 20^2, 20^3, 20^4, 20^5$
 $1 - \frac{1}{4} = \frac{3}{4}$