Generalized piegeonhole poinciples

Defin:

If n piegeonhole are occupied kn+1 moore piegeon, where k is a occupied positive integer then atlest one piegeonhole is occupied by k+1 (or) moore piegeon

Example:1

find the minmum number of student in a class to be sure that three (3) of them are boorn in the same month.

sol:

here: n = 12 months (or) piegeonhole

and k+1 = 3

k = 3-1 -) k=2

k = 2, n = 12

Hence among any kn+1 = 2x12 + 1

= 24+1

= 25

kn+1 = 25

Hence students (Peiegeon) three of

them of born in the same month.

Red

Problem,

1) 7 members of a family have total Rs 2886 in there packets show that atleast one of them much have atleast Rs 416 in his packets

Sol:

Let as assume that members → Pigeon holes

Rupees → pigeons → k=2886 n=7

Now, 2886 pigeons are to be assigned to 4 pigeonhole using the extent Pigeon hole principle

i.e) $\frac{k-1}{n}+1$

Here k=2886, n=7

$\frac{k-1}{n}+1 \Rightarrow \frac{2886-1}{7}+1 \Rightarrow \frac{2885}{7}+1$

$\Rightarrow 415+1 \Rightarrow 416$

Hence, there are Rs 416 in one members pockets.

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2) If 9 Books are to be kept in 4 shelves, there must be atleast one shelf which contain atleast 3 Books.

Sol:

Let as assume that Books → pigeon → k=9

Shelves → pigeon holes → n=4

Now, 9 pigeons are to be assig to 4 pigeon hole using the extant pigeon hole principle.

Then $\frac{k-1}{n}+1$, here $k=9, n=4$

$\Rightarrow \frac{9-1}{4}+1 \Rightarrow \frac{8}{4}+1 \Rightarrow 2+1 \Rightarrow 3$ Books

Hence, there are 3 books in atleast one half, Hence the result.

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2) How many people must you have to guarantie atleast 9 of the birthdays same day of the week.

Solu:

Let as assume that the days week → pigeonholes → $n=7$

people ⇒ pigeons ⇒ $k=?$

Now, 7 pigeonholes and we have to find pigeons using the extent pigeonhole poinciple

i.e) $\frac{k-1}{n}+1$ · $k=?$ $n=7$

$$\frac{k-1}{n}+1=9$$

$$\frac{k-1}{7}+1=9$$

$$\frac{k-1+7}{7}=9 \Rightarrow \frac{k+6}{7}=9 \Rightarrow k+6=9\times 7$$

$$k+6=63 \Rightarrow k=63-6 \Rightarrow \boxed{k=57}$$

Thus, There must be 57 people guarantie that atleast 9 of them will have birth days in same day of the week,

Hence the Result.

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4) Show that if 30 dictionary in a library in contain a total of 61327 pages. then one of the dictionary must have 2045 pages

Solut:

let as assume that

pages → pigeons → $k=61327$

dictionaries → pigeonholes → n = 30

assign to each page in the dictionary in which appear then by extent pigeon hole poinciple.

Thus, $\frac{k-1}{n} + 1$ Here, $n = 30$

$k = 61327$

$$\frac{61327-1}{30} + 1 \Rightarrow \frac{61326}{30} + 1 \Rightarrow 2044 + 1$$

2045 pages.

Hence, one dictionary Contains 2045 pages, ∴ Hence the Result.